SECTION 4.

PHOTOGRAPHS, PHOTOMICROGRAPHS and MICRO-SKETCHES.
Case AA.
Fourth ventricle.

Case AB.
Fourth ventricle.

Case AC.
Fourth ventricle.

Case AD.
Fourth ventricle.
Case AE. Fourth ventricle.

Case AF. Fourth ventricle.

Case AG. Fourth ventricle.

Case AH. Fourth ventricle.
Case AI.
Fourth ventricle.

Case BA.
Fourth ventricle.

Case BB.
Fourth ventricle.

Case BC.
Fourth ventricle.
Case BD.
Fourth ventricle.

Case BE.
Fourth ventricle.

Case BG.
Fourth ventricle.

Case GB.
Fourth ventricle.
Case CC.
Fourth ventricle.

Case CD.
Fourth ventricle.

Case CE.
Fourth ventricle.

Case DB.
Fourth ventricle.
Case DG.  Fourth ventricle.

Case DH.  Fourth ventricle.

Case DI.  Fourth ventricle.

Case DJ.  Fourth ventricle.
Case DK.
Fourth ventricle.

Case DK.
Lateral ventricle.

Case DL.
Fourth ventricle.

Case DM.
Fourth ventricle.
Case DP.
Fourth ventricle.

Case DO.
Fourth ventricle.

Case DN.
Fourth ventricle.

Case DQ.
Fourth ventricle.
Case DR.
Fourth ventricle.

Case DR.
Septum lucidum.

Case EA.
Fourth ventricle.

Case EB.
Fourth ventricle.
Case EB.  
Septum lucidum.

Case EC.  
Fourth ventricle.

Case ED.  
Fourth ventricle.

Case EE.  
Fourth ventricle.
Fourth ventricle.

Case GB.

Case HA.

Case HB.

Case HC.
Case HD.

Fourth ventricle.

Photograph of lateral ventricle from a case of epilepsy.
1. Brain of frog. Photomicrograph of ITER. 
Obj. 16mm. Proj. ocular 2. Camera extension 18 inches. Stain, Weigert-Pal haematoxylin. 
Note, the single layer of epithelial cells bounding the cavity, and their long tailed processes.

2. The same. Proj. ocular 4, camera extension 17 inches.
Obj. 16mm. Proj. ocular 4. Camera extension 17 inches.
Stain, Weigert-Pal haematoxylin.
Note, the epithelial cells with tailed processes passing into the tissues below.

Obj. 16mm. Proj. ocular 2. Camera extension 18 inches.
Stain, haematoxylin and aniline-blue.
Note, the ependymal convolutions bounded by a single layer of epithelial cells.

7. Case CA.
Same as 6, but taken with projection ocular 4, and camera extension of 17 inches.

Stain, alum-carmine.
Note, the large pedunculated "granulation", the dense fibrous tissue, and the damaged epithelium.
   Transverse section.
   Objective 8mm. Ocular 4.
   Stain, alun-carmine.

   Note, the central canal of the cord, irregular in shape, and bounded by several layers of epithelial cells.

See scale, for comparison of drawings, in Section 5.
2. Fourth ventricle of young kitten.
Lateral aspect.
Objective 8mm. Ocular 4.
Stain, haematoxylin with aniline-blue.
Note, the distinctly columnar epithelium,
sometimes in a single layer, sometimes
two or more cells deep, and apparently
ciliated. An ill-defined subepithelial
layer. Ependymal folds.
3. Iter of young kitten.

Vertical section.

Objective 16mm Ocular 4.

Stain, alum-carmine.

Note, the well defined epithelium of columnar type, with cells several deep in places. A subepithelial layer forming. Well marked ependymal convolutions, with sulci bounded by a single layer of epithelial cells.
4. A small portion of 3, more highly magnified.
Objective 8mm. Ocular 4.
Note, the epithelial cells, two deep in places, and their tailed processes into the subjacent tissue.
5. Third ventricle of frog.
vertical section, central portion.
Objective 8mm. Ocular 4.
Stain, haematoxylin with aniline-blue.
Note, the single layer of epithelial cells
sending long tailed processes into
the surrounding tissues. In places,
there is a double layer of cells.

Transverse section.

Objective 8mm. Ocular 8.

Stain, haematoxylin with eosin.

Note, the rounded central canal bounded by epithelial cells, several layers deep in places. The nuclei are granular.
7. Spinal cord of rabbit.
Transverse section.
Objective 16mm. Ocular 4.
Stain, haematoxylin with eosin.
Note, the oval central canal, bounded by a single layer of epithelial cells, on a reticular basis with few nuclei.
8. Case AB. Fourth ventricle.
Lateral aspect.
Objective 16 mm. Ocular 4.
Stain, alum - carmine.

Note, the ependymal convolutions, bounded by a single layer of epithelium. The subepithelial reticular tissue with few nuclei. The slight demarcation of the ependyma.
Upper part, lateral aspect.
Objective 16mm. Ocular 4.
Stain, alum-carmine.
Note, the ependymal convolutions, bounded by a single epithelial layer. The proliferation of the epithelial cells at the bottom of some of the sulci. The subepithelial reticular layer with few nuclei.
10. Case AC. Fourth ventricle.

Lateral aspect of ventricle.

Objective 16mm. Ocular 4.

Stain, haematoxylin with aniline-blue.

Note, the somewhat irregular ependymal convolutions, with their bounding layer of epithelium.

Slight proliferation of the epithelial cells at the bottom of the Sulci.
11. Case AC. Fourth ventricle

Lower part of central furrow.

Objective 8mm. Ocular 4.

Stain, alum-carmine.

Note, the single layer of epithelium giving rise to two tongues of proliferated epithelial cells.

This is probably a developmental condition.

Small portion of surface.

Objective 18 mm. Ocular 4.

Stain, haematoxylin with eosin.

Note, the single layer of epithelium, with apparent proliferation in places. The tumour mass with two foci of growth; near this mass was one with four foci.
13. Case BA. Fourth ventricle.

Small area near central furrow.

Objective 16mm. Ocular 4.

Stain, alum-carmine.

Note, the flattened granulations composed of fibrous tissue with numerous nuclei. Inclusion and proliferation of the epithelium. A small trace of the normal epithelial layer. Blood vessels in the subependyma.
Near central furrow.
Objective 8mm. Ocular 4.
Stain, alum-carmine.
Note, the single layer of cubical cells. Two elongated cell clusters in the subepithelial layer. Increase in the subependymal nuclei, and distinctness of the fibres in the same region.
15. Case CA. Lateral ventricle.

Small recess in ventricle wall.

Objective 3mm. Ocular 4.

Stain, alum-carmine.

Note, the somewhat irregular ependymal foldings in a recess of the lateral ventricle. The single layer of cubical epithelium bounding them. Associated with some of the foldings were small strands of wavy fibrous tissue.
Small area in lower part of ventricle.
Objective 8mm. Couler 4.
Stain, alum-carmine.
Note, a fairly normal ependyma.
The single layer of cubical epithelial cells. The reticular subependymal layer with few nuclei. The subependyma with fairly numerous nuclei.
17. Case CD. Fourth ventricle.

Near central furrow.

Objective 8mm. ocular 4.

Stain, haematoxylin with eosin.

Note, the cell collections in the subepithelial layer, with increased definition and straightening of the surrounding fibrils. Increase of cells in the subependyma, and the apparent connection between the two groups. The loss of contour in the epithelium, and its involvement in the process.

Calamus scriptorius.

Objective 8mm. Ocular 4.

Stain, haematoxylin with aniline-blue.

Note, the single layer of epithelium. The cell collections in the subepithelial layer, with rupture of the epithelium at one point. The increase of the subependymal cells opposite the clusters.

Over central furrow.

Objective 16 mm. Ocular 4.

Stain, alum-carmine.

Note, the mass of fibrous tissue covering the ventricular surface.
The circles of included epithelium.
The reticular layer of the ependyma with few nuclei.
The subependyma well defined.
20. Case DC. Fourth ventricle.
Upper part, near iter.
Objective 16mm. Ocular 4.
Stain, haematoxylin with aniline-blue.

Note, the bridging over of the central furrow by a fibrous tissue growth. The included epithelium with proliferation at certain points.

In lower part, near central furrow.

Objective 16 mm. Ocular 4.

Stain, haematoxylin with eosin.

Note, an elongated cell cluster, almost connecting the subependymal cells with the epithelium. The straightening of the fibrils in the ependyma and below it. The increase in the subependymal cells near the cluster. The single layer of epithelium, which has become involved over the cluster.
22. Case DJ. Fourth ventricle.

Close to central furrow.

Objective 16 mm. Ocular 4.

Stain, haematoxylin with aniline-blue.

Note, two conical "granulations", the smaller of which appears to be the younger. The fibro-cellular tissue of which the tumours are composed. The cell clusters and increase of subependymal cells. The single layer of epithelium, which is burst through and proliferated at the tips of the tumours.
23. Case DK. Fourth ventricle.

Lateral aspect of wide part of ventricle.

Objective 16 mm. Ocular 1. (Searcher).

Stain, haematoxylin with aniline-blue.

Note. A low power view of a portion of the ventricular surface, shewing several granulation tumours of varying shape.

Bottom of a recess in ventricle.

Objective 16 mm. Ocular 4.

Stain, haematoxylin.

Note, the tumour mass which has fallen over, become adherent, and included some of the epithelium.
25. Case DL. Fourth ventricle.

Lower part of ventricle.

Objective 8mm. Ocular 4.

Stain, haematoxylin with aniline-blue.

Note, the fibrous tumour mass, reticular above, cellular below. Flattened and degenerated epithelium over the surface of the tumour. Inclusion of epithelium with some proliferation.

A small cluster of cells near the base of the tumour.

Widest part of ventricle, lateral aspect.

Objective 8mm. Ocular 4.

Stain, haematoxylin with aniline-blue.

Note, a rounded fibrous tumour, which appears to have fallen over, become fused at the point of contact, and has included a circle of epithelium. Flattened epithelium over surface of tumour. Well marked epithelial cells in included portion.
27. Case DL. Fourth ventricle.

Lower part of ventricle.

Objective 16mm. Ocular 4.

Stain, haematoxylin with aniline-blue.

Note, an elongated tumour, which has fallen over, become fused at the point of contact, and has sent out fibrils to the adjacent ventricular surface; the epithelium being included in two places. Parts of the tumour are decidedly cellular.
Over central furrow.
Objective 16 mm. Ocular 4.
Stain, haematoxylin with aniline-blue.
Note, a somewhat conical fibrous tumour, which at one place has burst through the epithelial layer. The numerous circles of included epithelium. Several cell clusters. The intact layer of epithelial cells.
29. Case DO. Fourth ventricle.

Upper part of ventricle.

Objective 16 mm. Ocular 4.

Stain, haematoxylin with aniline-blue.

Note, the ependymal convolutions grown over and united by a flattened mass of fibrous tissue with elongated nuclei.

The epithelial proliferation in the sulci between the folds. The apparently passive condition of the subepithelial layer of the ependyma in the folds.
30. Case DP. Lateral ventricle.

Portion of ventricular surface.

Objective 8 mm. Ocular 4.

Stain, haematoxylin.

Note, the single layer of cubical epithelial cells, regular in arrangement. The subepithelial reticular layer, somewhat coarser than normal, with an average number of nuclei. The cells of the subependyma.
31. Case DP. Lateral ventricle.

Portion of ventricular surface.

Objective 8 mm. Ocular 4.

Stain, haematoxylin.

Note, the alteration in contour of the epithelial layer with disarrangement of the cells. Two cell collections in the subepithelial layer; the one on the right has not caused any bulging of the epithelium, though the epithelium shews a slight change. The increase in the cells of the subependyma. Compare this with 30, the previous drawing.
32. Case DQ. Fourth ventricle.

Near central furrow.

Objective 16 mm. Ocular 4.

Stain, haematoxylin with aniline-blue.

Note, the flattened fibrous tumour covered by a single layer of intact epithelium. The cell cluster near the base of the tumour on the left. The increase in the cells of the subependyma, with straightening of the fibrils in the same region.
33. Case DQ. Fourth ventricle.

Near central furrow.

Objective 16 mm. Ocular 4.

Stain, haematoxylin with aniline-blue.

Note, the fibro-cellular tumour which has burst through the epithelium. The cluster of cells on its left, evidently the starting point of another tumour. The increase in the subependymal cells, with the accompanying alteration in the fibrils.
34. Case DR. Lateral ventricle.
Portion of general ventricular surface.

Objective 16 mm. Ocular 4.
Stain, haematoxylin with aniline-blue.

Note, the ependymal convolutions or folds, bounded by a single layer of epithelial cells. The fibro-cellular granulation which has burst through one of the folds & projects above the surface.
35. Case DS. Fourth ventricle.

Lower part of ventricle.

Objective 8 mm. Ocular 4.

Stain, haematoxylin.

Note, the centre tumour of 36 more highly magnified. The fibro-cellular structure of the tumour. The proliferated epithelium at the sides of the mass. The cap of epithelial elements. The subepithelial reticular layer surrounding the nucleus of the tumour. A cell cluster below the tumour.
36. Case DS. Fourth ventricle.
   Lower part of ventricle.
   Objective 16 mm. Ocular 4.
   Stain, haematoxylin.

Note, three squarish granulation tumours growing from the ependymal surface.
Proliferation, in places, of the epithelium between the tumours. The subepithelial tissue surrounding the tumour tissue proper.
The epithelial caps over the tumours.
Compare 35.
37. Case DS. Fourth ventricle.

Widest part of ventricle, central furrow.

Objective 16 mm. Ocular 4.

Stain, haematoxylin.

Note, the tumour masses, one of which has stretched across the central furrow, and included some of the epithelium. On the extreme right, the tumour is evidently a very young one. One or two collections of cells. Some epithelial proliferation.
38. Case EA. Medulla.

Transverse section of lower part.

Objective 8 mm. Ocular 4.

Stain, alum-carmine.

Note, the irregular, elongated mass of epithelial cells representing the central canal in the medulla.
The surrounding neuroglia with few nuclei.

Upper part near iter.

Objective 16 mm. Ocular 4.

Stain, haematoxylin.

Note, two conical tumour masses growing from the ependyma. Their fibro-cellular structure: well nucleated. The layer of epithelium some distance up their sides, with some epithelial proliferation at the top of the tumour. The apparently passive subepithelial layer.
40. Case EB. Fourth ventricle.

Wide part of ventricle, laterally.

Objective 8 mm. Ocular 4.

Stain haematoxylin with aniline-blue.

Note, the fibro-cellular tumour, largely subepithelial. The single layer of flattened epithelium, becoming ruptured at one spot. The large collection of cell elements at the base of the tumour.
41. Case ED. Fourth ventricle.

Near the central furrow.

Objective 8 mm. Ocular 4.

Stain, haematoxylin with aniline-blue.

Note, the large cluster of cells in the subepithelial layer, with involvement of the surface epithelium over it. The increase in the subependymal cells, and their connection with the cluster. The straightening of the fibrils. The small portions of fairly normal ependyma.
42. Case FB. Fourth ventricle.

Close to central furrow.

Objective 16 mm. Ocular 4.

Stain, haematoxylin with aniline blue.

Note, the large mass of fibrous tissue of irregular shape, which has grown and included the epithelium. This mass appears to be the result of the fusion of several tumours. The included epithelium, proliferated in places.
48. Case FB. Iter.

Small portion of wall of iter.

Objective 16 mm. Ocular 4.

Stain, haematoxylin.

Note, the masses of fibrous tissue with elongated nuclei. The single layer of epithelium, broken through in places, by the growth of the tumours. The cap of proliferated epithelial cells.
44. Case GA. Fourth ventricle.

Near the calamus.

Objective 16 mm. Ocular 4.

Stain, haematoxylin with aniline-blue.

Note, the flattened fibrous tumour with the epithelium intact over its surface.

The cell elements at the base of the tumour. The increase in the cells of the subependymal region just below the tumour, and their apparent migration.
45. Case GA. Fourth ventricle.

Wide part of ventricle,
central furrow.

Objective 16 mm. Ocular 4.
Stain, alum-carmine.

Note, the bifurcation of the central furrow. The single, regular layer of epithelial cells. The reticular subepithelial layer.
46. Case GC. Fourth ventricle.

Upper part, lateral aspect.

Objective 8 mm. Ocular 4.

Stain, haematoxylin.

Note, the somewhat shallow fibrous tissue
tumour, bounded partially by a
flattened, degenerated, epithelium.
The wavy fibrous tissue with elongated
nuclei. Apparent inclusions of
epithelium. Increase of the
subependymal cells.
47. Case HA. Fourth ventricle.

Widest part of ventricular surface.

Objective 8 mm. Ocular 4.

Stain, alum-carmine.

Note, the single layer of epithelium, the cells of which are swollen and apparently oedematous. The fine stratum, crossed by a few fibrils, between the cells and the subepithelial layer.
43. Case HB. Fourth ventricle.

Portion of a small tumour.

Objective 8 mm. Ocular 8.

Stain, haematoxylin with aniline-blue.

Note, the elongated cells with rounded nuclei, for the most part arranged horizontally.
49. Case BB. Fourth ventricle.

Small area below a tumour.

Objective 8 mm. Ocular 8.

Stain, alum-carmine.

Note, the elongated cells, some with one, others with two nuclei.

Their granular protoplasm. Their narrow ends pointing upwards towards the tumour. The scattered, deeply-stained, nuclei in the subepithelial layer; their protoplasmic surroundings could not be made out.
Central canal of the spinal cord, shewing the ependyma. From a young kitten's spinal cord, prepared by Golgi's method.
See article by Andriezen, "Newer aspects of the Pathology of Insanity."

(38. Winter 1894.558)