First Annual Report of Pathological Department

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I.

CASES OF DEMENTIA.

I PRIMARY ORGANIC DEMENTIA, INCLUDING PAR-ETIC DEMENTIA, AND DEMENTIA FROM COARSE DISEASE OF THE BRAIN.

Case No. II.—Male; Age, 36 years.

Autopsy, eighteen hours after death: Body well-nourished. Skull-cap of ordinary thickness. Quantity of cerebro-spinal fluid, about three and a half ounces. Dura mater showed nothing unusual. Pia mater adherent along both sides of the median fissure. Purulent fluid diffused through meshes of pia and arachnoid. Pia opaque here and there; vessels full.

Weight of brain, 49 ounces.
Organs of thorax and abdomen showed nothing unusual, except the heart, which yielded evidence of a former pericarditis.

Microscopical examination: Walls of blood-vessels much sclerosed and the perivascular lymph-spaces dilated. The nerve-cells, as a whole, are well preserved, but occasionally one is found which seems to have shrunken, and to have lost its processes. In the sub-cortical tissue are found numerous vacuoles and fissures. Crystals of leucin are also present.

Case No. V.—Male; Age, 47 years.

Autopsy, six hours after death: Membranes not adherent, general appearance normal. Amount of cerebro-spinal fluid not excessive. Ventricles not dilated. On section, the brain appears soft; the gray matter in some places thinner than normal; the white matter shows here and there, streaks of pinkish yellow discoloration, more decided in the right hemisphere, and toward the anterior than the posterior part of the brain. Floor of the fourth ventricle is villous. Some pigmentation of the right auditory-nerve, near its origin, is observed.

Weight of brain, 47 ounces.

Microscopical examination of the cortex reveals no change in the cells or their contents. The vessels are numerous, and the nuclei in their walls are undergoing proliferation. The perivascular lymph-spaces appear larger than normal. A general increase in the neuroglia appears to have taken place.

Case No. XV.—Male; Age, 30 years.

Calvarium normal. Amount of cerebro-spinal fluid about six ounces. Pachymeningitis, especially along longitudinal sinus. Lep-tomeninges translucent, verging here and there to opacity; also adherent to both hemispheres, especially along middle fissure. Frontal lobes coherent at base. Arachnoid of base of brain decidedly opaque. Vessels of base present no unusual appearance.

Lateral ventricles enormously dilated; foramina of Monro over half an inch in diameter. Velum-interpositisum thickened with granulations along the veins of Galen. Choroid-plexuses anemic. Ventricles extremely pale. On section, the gray matter of the surface is pale, while in the depths of the fissure it has retained its normal color. Lymph-spaces about vessels much dilated; this appearance is most marked in area of distribution of anterior nutritive arteries.

Examination of organs of thorax and abdomen reveals a fatty heart and slight cirrhosis of kidneys.

Case No. XVI.—Female; Age, 55—60 years.


Weight of brain, 36 ounces.

Examination of organs of thorax and abdomen reveals tuberculous deposit in apex of left lung, small cyst of right kidney, and thickening of walls of bladder.

Microscopic examination of cortex: The nerve-cells here and there present a yellowish pigmentation. In a few instances they appear shrunken, and are surrounded by an enlarged lymph-space. A few of the vessels show a decided increase in the adventitia, and many present a dilated perivascular space. A general increase in the neuroglia appears to have taken place.

Case No. XXII.—Male; Age, 52 years.

On opening the skull a large amount of cerebro-spinal fluid escaped, about eight ounces. Brain much shrunken and sulci gaping. Membranes loosely attached. Nothing abnormal about dura.

Examination of other organs revealed pleuritic adhesions of both lungs, with tuberculous deposit in apex of left.

Microscopic examination of brain shows a general increase of neuroglia. The blood-vessels are excessively numerous and tortuous, and are for the most part filled with blood. Their walls are not decidedly thickened, if at all; nor are their lymph-spaces dilated. The nerve-cells of the upper layer are in some instances decidedly granular, and appear less numerous in some places than elsewhere. Those of the third layer are large and exhibit no perceptible change. The pia mater is evidently thickened.
Case No. XXVI.—Male; Age, 43 years.

Autopsy, eight and a half hours after death: On raising calvarium, which exhibited nothing unusual, two large haematomata were found, completely covering the superior aspect of the hemispheres; that is to say, they completely filled the vault of the calvarium.

The walls of the sacks were quite firm, and they contained a dark bloody liquid. They separated easily from the dura, and were in no way attached to the pia. The pia was slightly opaque and thickened. The diameter of the sacks at their thickest portions was upwards of an inch.

The convolutions of the brain were small and shrunken. On section, the gray matter appeared thin on the upper surface of the convolutions, but normal in the depths of the sulci. The substance of the brain was firm. The lateral ventricles showed slight reddening of the ependyma.

Microscopic examination of the cortex reveals no change beyond an apparent decrease in the number of cells in some places, and a slight general increase in the neuroglia.

Case No. XXVII.—Male; Age, 66 years.

Autopsy, sixteen hours after death: Calvarium normal; escape of six ounces of cerebro-spinal fluid; dura firmly adherent to skull. Pia and arachnoid show slight opacity over entire surface of brain, but separate readily from the latter. Convolutions appear somewhat shrunken. Vessels atheromatous throughout. Lateral ventricles dilated. Choroid plexuses pale and empty. Velum interpositum seems thickened. On section, the gray matter is pale, especially on surface of brain.

Weight of brain, 35 ounces.

Microscopic examination: The nerve-cells appear normal, except in a few instances in which they are granular and have their processes poorly differentiated.

Here and there are capillaries with their walls closely studded with nuclei. In some of the larger vessels the walls are much thickened, with here and there a dilated lymph-space. A marked general increase of the neuroglia has taken place.

Case No. XXXVI.—Female; Age, 40 years.

Autopsy, ten hours after death: Calvarium thick; escape of almost eight ounces of cerebro-spinal fluid. Opacity and thickening of pia and arachnoid over entire surface of brain. Vessels prominent, but not distended. On section, brain is soft. Both ventricles dilated; vessels of walls unusually prominent. Choroid plexuses, pale and cystic. Velum interpositum thickened. In posterior portion of the external capsule of each hemisphere is found a small sac-like cyst, a dilated perivascular lymph-space,—with a vessel passing through it. Atheroma of vessels of base.

Weight of brain, 35 ounces.

Microscopic examination reveals a diminution or absence of the larger pyramidal cells, a general increase of the neuroglia, and some thickening of the walls of the larger vessels. The capillaries are for the most part distended with blood.

Case No. XXXVII.—Female; Age, 45—50 years.

Autopsy, seventeen hours after death: Calvarium thick, but dura not abnormal. Opacity and thickening of pia and arachnoid over entire surface of brain. Lateral ventricles somewhat dilated. Walls of third ventricle somewhat reddened. Velum interpositum thickened. Choroid plexuses pale and cystic. On making sections of the brain, the knife came in contact with hard calcareous particles scattered through the substance of the hemispheres. They varied in size from a quarter of an inch or more in diameter to scarcely appreciable sand-like particles. An examination showed that they were largest and most numerous in those regions supplied by the anterior nutritive arteries,—i.e., the internal capsule and head of caudate-nucleus and lenticular body. They were, however, scattered in varying amounts throughout the hemisphere, being, in general terms, more numerous and larger in the basal ganglia and their capsules than in the other portion of the brain.

They disappeared altogether toward the cortex, in which none whatever were found.

An examination of the cerebellum revealed similar particles scattered in and about the dentate bodies of both lobes. The tissues in which they were found were slightly softened.

Examination of the lungs revealed extensive tuberculosis; phthisis
being the immediate cause of death. No calcification of tubercles had taken place. Examination of the heart did not reveal any calcareous deposits either in valves or great vessels. The kidneys were not sclerosed.

Microscopic examination: A number of the calcareous particles found in the brain were removed from the tissue in which they were imbedded, and were then decalcified. Sections were cut and mounted as usual. The microscope revealed a mass of irregular bodies, more or less cylindroid in shape. They were gnarled and twisted, and so densely packed that only at the periphery could the structure of the mass be determined. Each cylindroid body proved to be a vessel, the walls of which were enormously thickened, and in which a deposit of lime-salts had evidently taken place. In many instances the lumen of the vessels could readily be distinguished; in others, again, the lumen was entirely obliterated. In most cases, it was exceedingly small. A few of the vessels at the periphery of the hardened masses were surrounded by dilated lymph-spaces.

The tissue surrounding the calcareous masses showed no change, other than a possible increase in the neuroglia.

An examination of the cortex revealed an enormous increase in the number of the vessels. The walls of the latter were not excessively thickened, but the perivascular lymph-spaces were almost uniformly dilated. So marked was this appearance that in many places the sections were typical of the *etat criblé*.

The nerve-cells exhibited, as a rule, their processes and contents very distinctly, but here and there they were extremely granular, and in some areas very sparse.

Remarks: The dense cluster of vessels constituting each calcareous particle found in the hemispheres and cerebellum evidently constituted an angioma, so that we had here a condition (to us thus far unknown) of *multiple angioma of the brain* with subsequent calcification. The enormous multiplication of the vessels of the cortex and sub-cortical tissues also proved that there was here a general telangiectatic condition.

It is of interest to note the absence of calcareous deposits or sclerosed vessels in other portions of the body.

The woman, a patient of Dr. Alice Bennett, suffered from dementia, interspersed with periods of excitement, though the latter did not differ from such as are frequently present in patients in whom no lesions, similar to the ones described, are found.

The brain weighed 39½ ounces.

CASE No. XLIV.—Female; Age, 68 years.


Weight of brain, 47 ounces.

N. B.—On opening skull, upwards of six ounces of blood and cerebro-spinal fluid escaped. The sinuses had been distended with blood.

Examination of organs of thorax and abdomen revealed thickening and stenosis of aortic valves; thickening of mitral valve; also antemortem clot in left ventricle. Lungs edematous. Kidneys large, of deep red color, and capsule easily detached.

Microscopic examination of cortex: The blood-vessels are numerous, but their walls are not notably thickened. Here and there they are very tortuous, and in a few instances form abrupt coils and loops. The perivascular lymph-spaces are much dilated. Here and there small vacuoles are scattered through the tissue. The nerve-cells show no decided change, other than a diminution of the larger pyramidal cells, very few of which are to be seen.

CASE No. XLV.—Male; Age, 40 years.


Microscopic examination of the cortex reveals general increase of the neuroglia with dense nuclear infiltration of the adventitia of the
blood-vessels. No diminution in the number of nerve-cells is made out, but they are for the most part very granular, with contents and processes poorly differentiated.

Case No. XLVII.—Male; Age, 53 years.


Case No. VIII.—Male (Colored); Age, 35 years.

Calvarium enormously thickened, measuring one-half inch in frontal region and one inch in occipital region, just above occipital protuberance; in parietal region, however, it measured only one-fourth of an inch. Dura mater dense and much thickened, and of a dark red color. Amount of cerebro-spinal fluid, about six ounces. Pia and arachnoid much thickened and opaque, especially in frontal region of both hemispheres, and bordering the longitudinal fissure. Collection of purulent fluid beneath pia in these areas. Pacchionian bodies along longitudinal fissure, especially on the left hemisphere. Ventricles not dilated. Floor of fourth ventricle pigmented. Spots of pigmented tissue in optic thalami; also in corpora striata. On section, gray matter very thin, inner layer decidedly pink. Weight of brain, 38 ounces. Microscopic examination: Blood-vessels are exceedingly few in number, in fact, almost absent in the cortex and sub-cortical tissues. The nerve-cells show remarkably little change. In most places, the cells and layers preserve their normal appearances. The neuroglia seems to be increased.

Case No. XXXII.—Male; Age, 39 years.

Autopsy, seven hours after death: Calvarium normal. Dura mater dense, but not adherent. Escape of about six ounces of cerebro-spinal fluid. Pia thickened and adherent. Lateral ventricles much dilated, especially the left. On section, brain very soft; gray matter very pale. Weight of brain, 35 ounces. Microscopic examination: Here and there are seen vessels with their walls much sclerosed. Frequently the lymph-spaces surrounding them are not only dilated, but also crowded with leucocytes. The smaller vessels and capillaries show less change than the larger. The nerve-cells appear for the most part granular, with poor differentiation of their contents and processes. The neuroglia appears increased.

Case No. XLI.—Female; Age, 60 (?) years.

Autopsy: Great leakage of cerebro-spinal fluid, upwards of eight ounces. Calvarium normal. Dura dense. Pia and arachnoid more or less opaque. Convolutions shrunken, sulci gaping. Lateral ventricles dilated. Choroidplexuses pale and cystic. Velum interpositum thickened. Vessels at base slightly atheromatous. On section, brain soft; gray matter pale; perivascular spaces much dilated, especially in the region of the capsules and striated body. Weight of brain, 37 ounces. Microscopic examination: A general and decided increase of the neuroglia is observed throughout. The capillaries are very numerous, and in some places show increase of nuclei in their walls. Here and there the surrounding lymph-spaces are dilated, giving in some areas the etat cribl appearance. The cells are in some places numerous and comparatively well presented; in others, they appear granular and shrunken, and are few in number.

Case No. XLII.—Male; Age, 47 years.

Calvarium normal; escape of four ounces of cerebro-spinal fluid. Pia mater thick and opaque, and infiltrated here and there by purulent fluid. Sulci gaping. Lateral ventricles dilated and their walls darkened. Choroidplexuses pale and somewhat cystic. Velum
interpositum thickened. On section, puncta vasculosa very prominent, oozing drops of blood. Gray matter seemed thin.

Microscopic examination: The cells of the cortex are in most places well preserved, cell-contents, processes, and layers being readily distinguished; in areas, where the inflammation of the pia seems to have been pronounced, the uppermost layer of cells appears to have suffered. In these situations, the pia is densely infiltrated with leucocytes, which also infiltrate to some extent the subjacent cortex. Even in these points, the layer of large pyramidal cells is well preserved.

The vessels are very numerous, and their walls are for the most part thickened by a dense proliferation of nuclei. The perivascular spaces are frequently dilated and often crowded with leucocytes. A decided increase of the general neuroglia has taken place.

SUMMARY.

In sixteen cases, enumerated above, the various lesions occurred with the following frequency:

In eleven the cerebro-spinal fluid was largely in excess, being compensatory, no doubt, to a general shrinkage or loss of bulk of the brain.

In one case, that of a negro, the skull was enormously sclerosed, and, in two others, it was decidedly thickened. In another case, on the other hand, it was unusually thin.

The dura mater was firmly adherent in three cases, and decided pachymeningitis existed in three others.

Opacities of the pia and arachnoid were found in ten cases, while the pia was adherent in three. Decided thickening of the pia was present in seven, while purulent lepto-meningitis was present in four cases.

The brain, as a whole, and the convolutions had a shrunken appearance in five cases.

Hydrops of the lateral ventricles existed in eleven cases, being in several instances enormous; the ependyma was at times injected and inflamed.

The choroid plexuses were cystic in six cases, in others, again, they were excessively pale.

In seven cases, the velum interpositum was thickened.

In five brains, on section, cystic or marked dilatation of the lymph-spaces of the nutrient vessels of the basal ganglia and capsules was observed.

Under the microscope, sclerosis, or recent nuclear infiltration of the walls of the vessels, was noted in ten cases, whilst in seven of these dilatation of the perivascular spaces co-existed. In two, the vessels were exceedingly numerous and tortuous.

An absolute or relative increase in the neuroglia had occurred in eight cases. In two others, on the contrary, a more or less decided vacuolation of the brain-tissue was observed.

Regarding the nerve-cells, our observations were, of course, less positive. In one case, a decided numerical diminution, if not absence, of the larger pyramidal cells was noted; in eight others, shrinking, granular degeneration, or pigmentation of the cells was seen.

Of the sixteen cases, eleven brains were weighed, six male brains, one being a negro, and five female brains. The average weight of the five male brains proved to be 42.8 ounces, which is 7.2 ounces below the normal. The average weight of the five female brains is 38.9 ounces, being 6.1 ounces below the normal. The weight of the negro brain (male) was 38 ounces.

Before concluding this brief summary, attention should once more be directed to Cases No. VIII and No. XXVI as instances of very gross lesions; the one being a case of excessive sclerosis of the encephalon, the other a case of large hematomata. Case No. XXXVII is also of special interest, and appears to be unique. Calcareous deposits have, however, been known to take place in the falx, the tentorium, the dura, in the pia, and even in the plexuses of the ventricles. There is, therefore, no a priori reason why the lesion in brain No. XXXVII should be deemed anomalous, although its occurrence must be excessively rare.

Addendum.—In two of the sixteen cases disease of the heart was noted, and in three others phthisis existed.
B.—TERMINAL DEMENTIA.

Case No. III.—Male; Age, 66 years.

Autopsy, eight hours after death: Calvarium and dura normal. Pia opaque and adherent. Fibrino-purulent exudation over vertex and base, especially in sub-arachnoid space. Ventricles normal, as also velum interpositum and choroid plexuses. Brain, on section, pale. Weight, 47 ounces.

Examination of organs of thorax and abdomen: Lungs emphysematous; heart fatty, liver granular; kidneys, cortical portion, fatty; small intestine somewhat constricted in region of ileum for about five inches.

Microscopic examination of cortex reveals remarkably little change. Nerve-cells show nothing abnormal, either as regards structure or layers. The walls of the vessels show no perceptible alteration. Perivascular spaces not dilated. The pia mater is the only seat of change, being in some places very thick and dense, and in others infiltrated with leucocytes.

Case No. XXV.—Male; Age, 60 years.

Calvarium appears to be somewhat thickened over frontal region; dura dense and adherent. Leakage of about four ounces of cerebrospinal fluid. Pia and arachnoid slightly opaque over vertex. Brain does not fill cavity of skull. Lateral ventricles not dilated. Right choroid plexus cystic, left plexus unchanged. On section, brain is soft, gray matter appears normal.

Weight of brain, 41 1/2 ounces.

Examination of organs of thorax and abdomen: Both lungs tuberculous throughout, especially the left, with formation of cavities, and numerous pleuritic adhesions. Heart and kidneys fatty.

Microscopical examination: In the sub-cortical tissue small islets of sclerosis are observed. The nerve-cells exhibit a decided yellowish pigmentation. The vessels and perivascular lymph-spaces show no change.

Case No. XXXIII.—Male; Age, 31 years.

Autopsy, about seven hours after death: Calvarium much thickened, dense and heavy, measuring on an average three-eighths of an inch. Dura thick and firm. Pia opalescent in focuses. Ventricles not dilated. Choroid plexuses cystic. Vessels of base unchanged. On section, gray matter seems thin and sulci appear less deep than normal.

Examination of thorax revealed tubercular deposit in both lungs, with large cavity near apex of the right. Nothing special to note of other organs.

Weight of brain, 34 ounces.

Microscopic examination: A general increase of the neuroglia has taken place. The general appearance of the cells, with regard to numbers and layers, is normal, but taken individually, they appear for the most part shrunken with an abnormally prominent pericellular lymph-space. In some a yellowish pigmentation is noticeable. These appearances are more marked in some areas than others. The vessels exhibit no change.

Case No. XLVIII.—Male; Age, 48 years.

Autopsy, eighteen hours after death: Calvarium dense and thick, dura firmly adherent. Pia and arachnoid opalescent over vertex. Occipital lobe of left hemisphere presents an old hemorrhagic cyst of the cortex; it measures some two inches in length, one and a half inches in width, and about three-fourths of an inch in depth, and is filled with yellowish semi-fluid matter.


Perivascular lymph-spaces, especially in region of capsules, and striated bodies, much dilated. In internal capsule of left hemisphere are found three small hemorrhagic foci (old).

Weight of brain, 42 1/2 ounces.

Examination of thorax: Lungs edematous and congested; heart much dilated, walls thin, old pericardial adhesions, thickening mitral and aortic valves with calcareous deposits.
Examination of abdomen: Stomach, chronic gastritis; liver, cirrhotic; irregular contraction of colon.

Microscopic examination of cortex and sub-cortical tissue revealed nothing beyond an unusual paucity of vessels. When observed, the latter did not yield any evidence of change.

Case No. L.—Female; Age, 79 years.

Autopsy, six hours after death: Calvarium thick and dense, dura adherent. Pia more or less opaque over entire vertex. Vessels of base and Sylvian fissure atheromatous. Convolutions appear shrunken, sulci gaping. About six ounces of fluid escaped when skull was opened. Lateral ventricles dilated. Choroid plexuses cystic. On section, gray matter is pale; perivascular spaces prominent and gaping.

Microscopic examination: The nerve-cells show little change beyond occasional pigmentation. The vessels, here and there have their lymph-spaces dilated, and some of the larger vessels give evidence of nuclear proliferation in their walls.

Case No. XIX.—Female; Age, 33 years.


Weight of brain, 47 1/2 ounces.

Organs of thorax and abdomen: Tuberculous deposit in apices of both lungs, also pleuritic adhesions. Heart, about one and a half ounces of fluid in pericardial sac; calcareous deposits on aortic valves. Stomach and transverse colon enormously distended with gas. Kidneys fatty. Nothing else of special note.

Microscopical examination of brain reveals no decided change in the cortex or sub-cortical tissue.

Case No. XIII.—Female; Age, 41 years.

Autopsy, ten hours after death: Calvarium and membranes show nothing worthy of note. Lateral ventricles not dilated; choroid plexuses pale. On section, gray matter seems paler than normal.

Floor of fourth ventricle slightly pigmented. Vessels of base somewhat thickened.

Weight of brain, 43 ounces.

Examination of organs of thorax and abdomen: Heart fatty; left lung, extensive pleural adhesions; liver fatty; kidneys, chronic pyelitis, with large abscess of the left; bladder, chronic cystitis with hypertrophy; uterus, extensive ulceration of cervix (carcinomatous?).

Microscopic examination of the cortex: Capillaries numerous and surrounded, as shown in transverse section, by dilated lymph-spaces. A few of the larger vessels have thickened walls, but this is rather the exception than the rule. The nerve-cells are many of them well preserved; others, again, are very granular, and appear shrunken, while the pericellular spaces are unusually prominent.

Case No. VII.—Male; Age, 21 years.

Autopsy, seventeen hours after death: Body much emaciated. Calvarium unusually thin anteriorly and to the left of vertex. Opalescent hue of pia over entire surface of brain; pia not adherent, vessels prominent, but not enlarged. Cerebro-spinal fluid rather more than normal.

Lungs: Tuberculosis of both lungs, most extensive in the left, which is much broken down.

Microscopic examination of cortex fails to reveal anything abnormal.

Case No. LII.—Male; Age, 33 years.


Weight of brain, 42 ounces.

Microscopic examination shows dense infiltration of the walls of the vessels with nuclei. This appearance is most marked in the cortex. No other change is noted.
SUMMARY.

In the preceding cases, nine in number, the various lesions were present as follows:

The amount of cerebro-spinal fluid was excessive in four cases.

In three instances the calvarium was decidedly increased in thickness and density, and in a fourth the thickening was excessive.

In another case the cranium was unusually thin.

In six cases the dura was thickened and adherent. Opacities of the pia-arachnoid were found in seven brains, in three of which the pia was decidedly thickened, and in one of them purulent leptomenigitis existed.

In two specimens atheroma or sclerosis of the larger vessels was noted.

In two the lateral ventricles were dilated; in one, injected if not inflamed.

In five the choroid plexuses were cystic, and in two the velum interpositum was thickened. Dilatation of the perivascular lymph-spaces of the nutrient vessels occurred in four cases.

In one brain a large and old hemorrhagic cyst of the occipital lobe was found.

Under the microscope, alteration in the walls of the vessels was marked in one instance, and less pronounced in two others. In another the vessels were excessively numerous.

Dilatation of the perivascular space was noted but once.

Regarding the neuroglia, it had undergone general increase in one case, and in another marked multiple sclerosis existed. The nerve-cells showed shrinking, granular or pigmented change, to greater or less extent, in four cases.

In three brains no change whatever was observed under the microscope.

Seven of the nine brains were weighed, averaging 42.5 ounces. The average loss of weight, it will be noticed, was nearly the same as in the brains of the preceding group of cases.

Phthisis was present in four cases, heart-disease in one, and abscess of the kidney in another.

G.—SENIILE DEMENTIA.

Case No. IV.—Male; Age, 63 years.

Autopsy, twelve hours after death: Some opacity of membranes over vertex and parietal regions. Plastic effusion in sub-arachnoid space. Ventricles not dilated. Here and there reddened areas seen in the cortex, copora striata, and optic thalami.

Weight of brain, 48 ounces.

Examination of thorax and abdomen reveals tubercular deposit in both lungs; more extensive in the right, in which there are also pleuritic adhesions. Remaining organs show no point of special interest, except the ileum, which is alternately sacculated and contracted for almost its entire length.

Microscopic examination of cortex and sub-cortical tissue reveals numerous dense sclerotic patches scattered throughout both. They are of variable size, though for the most part small. At such situations the normal nerve-tissues are absent. The neuroglia, too, appears to have undergone general increase. The vessels show no thickening of their walls, and the nerve-cells in areas not attacked by sclerosis, are normal in appearance.

No dilatation of any of the lymph-spaces is observed.

Case No. XXIX.—Female; Age, 78 years.


Weight of brain, 35 ounces.

Microscopic examination: The layers of the cortex cannot be distinguished very well. Large pyramidal cells appear to be absent. Cell-contents and processes are for the most part poorly differentiated. In transverse section the lymph-spaces of the smaller vessels frequently appear dilated. The neuroglia exhibits no decided change.
CASE No. XII.—Female; Age, 74 years.

Autopsy, nineteen hours after death: Dura mater adherent. Pia opaque over vertex of right hemisphere. Sero-purulent exudation in sub-arachnoid space. Choroid plexuses cystic. Vessels of base atheromatous throughout.

Weight of brain, 38 ounces.

Examination of thorax and abdomen: Deposit of tubercles in both lungs, most marked in right; heart fatty; colon sacculated and contracted by turns. Nothing else of special note.

Microscopic examination of the cortex reveals little change. A few of the vessels have thickened walls, others, again, are observed which seem perfectly normal. No change is noted in the cells, nor in the neuroglia.

SUMMARY.

In two of the three cases the dura was thickened; in all, the pia was more or less opaque, and in two purulent lepto-meningitis existed. In two cases the vessels of the base were atheromatous. In one instance, dilatation of the lateral ventricles was observed, the walls being at the same time villous. In one brain the choroid plexuses were cystic, and in another the velum interpositum was thickened.

With the exception of brain No. IV, the microscope reveals little else than a more or less doubtful change in the nerve-cells.

The case of multiple sclerosis showed comparatively little loss of weight, while of the other two one showed a loss of about ten ounces, the other of seven.

In two cases phthisis was present.

D.—EPILEPTIC DEMENTIA.

CASE No. XXIV.—Male; Age, 18 years.

Autopsy: Amount of cerebro-spinal fluid about normal; nothing unusual about membranes. Lateral ventricles not dilated. On section, gray matter is normal.

Nothing else of special note.

Organs of thorax and abdomen reveal nothing special.

Microscopic examination of the cortex reveals an enormous number of very tortuous and branching capillaries. The larger vessels are, for the most part, filled with blood, and appear dilated. The capillaries and vessels are throughout strikingly prominent; their walls appear normal. No other change is noted.

CASE No. XLVI.—Male; Age, 13 years.

Autopsy, five hours after death: Calvarium normal; amount of cerebro-spinal fluid between five and six ounces. Pia mater infiltrated with serum, opaque, and thickened. Brain soft. Lateral ventricles dilated; choroid plexuses cystic. Velum interpositum thickened. On section, gray and white matter very pale.

Weight of brain, 33 ounces.

Examination of lungs revealed extensive tubercular deposit in both, with softening and destruction far advanced.

Microscopic examination: The vessels are exceedingly numerous and, for the most part, empty. Many of the capillaries show a marked increase of nuclei, while some of the larger vessels have their walls thickly infiltrated. The general neuroglia appears, also, to be much increased. Regarding the nerve-cells, large and typical pyramidal cells are very infrequent, though small cells are quite numerous. In many areas they are well differentiated as regards contents and processes, in others, again, they appear very granular and indistinct.

Remarks.—In Case No. XXIV the leading feature seems to be the number and tortuous character of the blood-vessels, while Case No. XLIV resembles more closely that of a terminal dement. We have the general shrinking of the brain, with loss of weight so common in dements, as also undoubted evidence of inflammatory changes in the blood-vessels.

Regarding the cases of dementia in general, it is noticed that the various forms are frequently more closely allied pathologically than clinically; and, other things being equal, it is also noticed that there is a decrease in the coarseness and frequency of the lesions as we pass from the so-called organic dementia to the other forms. The great similarity of the lesions in some instances is, of course, in keeping with the supposition that, even in organic dementia, they are frequently to be regarded in the light of effect and not of cause.
II.

CASES OF PHTHISICAL INSANITY, WHICH IN THEIR LAST STAGES SIMULATED DEMENTIA.

Case No. IX.—Female; age, 54 years.

Autopsy, nineteen hours after death: Skull normal; vessels of pia not engorged; no opalescence of membranes. About two ounces of fluid escaped when skull was opened. Ventricles normal. No special abnormal appearance visible to naked eye.

Weight of brain, 43 ounces.

Organs of thorax: Left pleural sac completely filled with greenish yellow pus; left lung collapsed, and looking like a mere remnant, a few inches in size. Right lung tuberculous and but slightly crepitant; right pleural sac contained about a pint of serous fluid. Heart soft and fatty; about two drachms of fluid in pericardial sac.

Microscopical examination of cortex yields no decided evidence of change.

Case No. XXXIX.—Female; Age, 23 years.


Weight of brain, 46 ounces.

A general post-mortem examination was not permitted, but phthisis had undoubtedly been the cause of death.

Microscopic examination of cortex gave negative results.

Case No. XLIX.—Female; Age, 28 years.


Perivascular spaces much dilated throughout the region of the

capsules and striated bodies. Corpora striata and thalami mottled in appearance.

Weight of brain, 52 ounces.

Both lungs are extensively tuberculosed and undergoing rapid softening. The right lung has undergone almost complete destruction, while the left happens to be a little less affected. Nothing else appears worthy of note beyond a contraction of the transverse and descending colon, which extends almost to the sigmoid flexure.

Microscopical examination: The vessels appear very numerous and prominent, but beyond this nothing unusual is seen.

SUMMARY.

It is of interest to note the almost entire absence of important lesions in the brain.

In case No. XLIX dilatation of the lymph-spaces of the anterior nutrient arteries was observed; beyond this, nothing.

The microscope, too, in all three cases, gave negative results.

The weights of the brains also gave little or no indication of loss of substance.

III.

CASES OF MANIA.

A.—ACUTE MANIA.

Case No. VI.—Male; Age, 45 years.

Autopsy, nine hours after death: Pia and arachnoid slightly opalescent. Lateral ventricles normal. On section, brain soft; vessels comparatively empty; gray and white matter of normal appearance.

Weight of brain, 52 ounces.

Examination of thorax revealed chronic induration of lower lobe of right lung, with small amount of pleural effusion. Rupture of aneurism of aorta. The opening was found about an inch above the origin of the vessel, the hemorrhage taking place into the pericardium. The aneurism had existed on the side adjoining the right auricle.

Microscopic examination of cortex of brain yielded negative results.
Case No. XI.—Male; Age, 43 years.

Autopsy: General appearance of brain normal; amount of cerebro-spinal fluid somewhat more than usual. Lateral ventricles slightly dilated; choroid plexuses pale. On section, pia vascularosa prominent. Coats of vessels appear thickened.

Examination of thorax and abdomen revealed tubercular deposit in both lungs; also, marked contraction of both kidneys, especially the left. Nothing further of special note.

Microscopic examination yields no positive results. Occasionally a vessel is seen the walls of which appear to be slightly thickened, but if so, it is the exception and not the rule.

Case No. XXIII.—Male; Age, 38 years.

Autopsy, by Coroner's Physician: Brain presented no abnormal appearance.

Cause of death, mitral disease of heart.

Microscopical examination of cortex yielded negative results.

Case No. XXVIII.—Male (Colored); Age, 35 years.


Weight of brain, 46 ounces.

Microscopical examination yields negative results.

B.—CHRONIC MANIA.

Case No. I.—Male; Age, 45 years.

Autopsy, twelve hours after death: Calvarium and dura normal. Pia slightly adherent along longitudinal fissure on left hemisphere. Lateral ventricles and choroid plexuses normal. On section, cortex appears redder than normal.

Microscopical examination yields nothing abnormal.

Case No. XVII.—Male; Age, 60 years.

Calvarium thick and dense; dura not abnormal. Pia opalescent and adherent to both hemispheres along the median line. Lateral ventricles are somewhat dilated, as is also the foramen of Monro. Choroid plexuses cystic. General amount of cerebro-spinal fluid rather more than normal.

Weight of brain, 59 ounces.

Microscopic examination shows here and there infiltration of the pia with leucocytes; beyond this, nothing abnormal.

Case No. XVIII.—Female; Age, 84 years.

Autopsy: Pia and arachnoid opaque, and infiltrated with blood and serum. Membranes readily detached. Convolutions somewhat shrunken on left side at junction of superior frontal with anterior central. Lateral ventricles not dilated. General appearance, on section, normal. Vessels of base atheromatous with perforation of left posterior communicating artery, and hemorrhage at base of brain.

Weight of brain, 41½ ounces.

Microscopical examination: The cells are, many of them, shrunken and extremely granular, with their processes poorly differentiated, and are surrounded by a relatively large lymph-space. The capillaries are exceedingly numerous, and, though they show no alteration of their walls, their perivascular spaces are almost uniformly dilated.

Case No. XXXV.—Female (Colored); Age, 27 years.

Autopsy, eighteen hours after death: Dura matter thickened. Pia and arachnoid normal. Walls of lateral ventricles villous, otherwise normal. Choroid plexuses normal. On section, brain is firm; gray matter pale, as is also the white.

Weight of brain, 36½ ounces, though it appeared to fill the skull-cavity.

Lungs, both tuberculous, with large cavity in apex of left.

Microscopic examination: Nerve-cells numerous and without noticeable changes. Capillaries exceedingly numerous, with here and there proliferation of nuclei in their walls, and occasional dilatation of the lymph-spaces.
Case No. XLIII.—Female; Age, 37 years.


On section, gray matter pale. Nothing else of special note.

Lungs, both extensively tubercuosed; the left much broken down with formation of cavities.

Microscopical examination fails to reveal anything abnormal.

G.—RECURRENT MANIA.

Case No. XIV.—Female; Age, 30—35 years.

Autopsy: Brain in general appearance and in detail was perfectly normal. Amount of cerebro-spinal fluid, about two ounces. Unfortunately, a general post-mortem could not be made.

Microscopical examination yields negative results. Capillaries are filled with blood, but no signs of inflammatory or other change are to be seen.

SUMMARY.

The cases of acute mania, four in number, yielded almost purely negative results. The pia was slightly opalescent in one case, and the lateral ventricles appeared to be slightly dilated in another. These changes, if met with elsewhere than in insane subjects, would hardly be considered worthy of note.

The microscope yielded positively no evidence in three cases, and very doubtful signs of change in the vessels in the fourth.

In the five cases of chronic mania, but few positive lesions were noted. Two cases presented unusually thick calvaria, and another a thickened dura. In one instance the cerebro-spinal fluid appeared to be a little in excess. The pia was slightly adherent in two cases, opalescent or opaque in two others, whilst purulent leptomenigitis existed in a fifth case.

The lateral ventricles were somewhat dilated in one instance, in which the choroid plexuses were also cystic. The vessels were markedly atheromatous in one case.

IV.

CASES OF MELANCHOLIA.

A.—ACUTE MELANCHOLIA.

Case No. XX.—Male; Age, 29 years.

Autopsy, twelve hours after death: Cerebro-spinal fluid normal in amount. No unusual appearance about the skull or membranes. On section, nothing abnormal. Nothing worthy of special note.

Microscopic examination: Blood-vessels excessively numerous and distended with blood, but no change in the lymph-spaces.

The nerve cells gave a negative result.

Case No. XXX.—Male; Age, 51 years.

Autopsy, six hours after death: Calvarium rather thick. Dura normal. Pia slightly opaque. Brain soft; sulci tend to gape. Vessels at base of brain slightly atheromatous. Lateral ventricles normal; vessels of ependyma prominent; choroid plexuses distended and cystic. On section, gray matter normal; puncta vasculosa prominent.

Organs of thorax and abdomen: Right lung hepatized and adherent throughout; deposit of tubercles in apex of left. Mitral and aortic valves much thickened, the former calcified.

Colon contracted at junction with caecum, then enormously distended and finally contracted throughout the entire extent of the transverse and descending colons.

Microscopic examination of cortex of brain yields negative results.
Case No. XXXI.—Male; Age, 75 years.

Autopsy, twenty-four hours after death: Calvarium dense and thick; dura firmly adherent. Slight opacity of pia; peels off readily. Vessels of base atheromatous. Perforation of basilar artery, with hemorrhage into base of skull. Lateral ventricles not dilated; vessels of walls prominent. Right choroid plexuses cystic. On section, gray matter decidedly pink, especially in depths of convolutions.

Weight of brain, 53 ounces.

Microscopic examination demonstrates no change beyond an occasional yellowish pigmentation of the cells.

Case No. XXXIV.—Male; Age, 45 years.

Autopsy, six hours after death: Calvarium normal. Quantity of cerebral-spinal fluid excessive. Brain firm. Pia not adherent, opaque in patches, and infiltrated with serum. Lateral ventricles normal; choroid plexuses cystic. On section, gray matter excessively pale, as is also the white. Here and there near striated bodies is found a dilated perivascular space.

Lungs, both phthisical, softening, and formation of cavities.

Microscopical examination reveals no change beyond a proliferation of nuclei in the walls of some of the vessels; in a few instances it is quite marked.

B.—CHRONIC MELANCHOLIA.

Case No. XXI.—Male; Age, 44 years.

Autopsy, two hours after death: Calvarium exceedingly thin at temporal regions; also thin to the left of vertex, corresponding to a bulging of the vessels of the pia. Vessels of pia very prominent. Effusion of sero-purulent fluid in meshes of pia and arachnoid. Lateral ventricles not dilated; vessels of ependyma distended. Choroid plexuses cystic. On section, brain soft, gray matter decidedly pinkish, puncta vasculosa very prominent. Lungs, both tuberculous, extensive cheesy degeneration.

Microscopical examination of cortex of brain yields negative results.

Case No. XL.—Male; Age, 40 years.


Weight of brain, 49 ounces.

Examination of the lungs revealed phthisis as the cause of death. Microscopic examination reveals here and there dilatation of the perivascular spaces, as shown in transverse section. Beyond this, nothing definite is noted.

SUMMARY.

Of the four cases of acute melancholia one presented a rather thick calvarium with adherent dura, another an increase in the amount of cerebral-spinal fluid. Slight opacities of the pia were present in three cases. In these three also the choroid plexuses were cystic, and in two of them the vessels were more or less atheromatous.

Under the microscope, two specimens present no change whatever; the third, occasional pigmentation of the cells, and the fourth, occasional proliferation of the nuclei of the vessel-walls.

In the chronic cases, the calvarium was unusually thin in one case, which also presented chronic lepto-meningitis and cystic degeneration of choroid plexuses. The other case presented merely slight opacities of the pia, with dilatation of some of the perivascular spaces.

In one the microscopic examination was purely negative, and the other presented nothing beyond dilatation of the lymph-spaces about the smaller vessels.

Taking the chronic and acute cases together, phthisis occurred in four, in one of which there was also thickening and calcification of the heart-valves.
V.

CASE OF ARRESTED DEVELOPMENT.

IMBECILITY WITH EPILEPSY.

Case No. XXXVIII.—Male; Age, 30 years.

Nothing abnormal about calvarium; dura dense but not adherent.
Leakage of four to five ounces of cerebro-spinal fluid.

Brain was firm.
The convolutions were remarkable in some respects, and presented the following peculiarities:—

They are exceedingly small, while the sulci were extremely shallow.
The convolutions and fissures were best developed in the parietal region, but even here they presented the peculiarities noted above.
Anteriorly the frontal convolutions were outlined, but the fissures constituted little more than shallow grooves. In the right hemisphere, the third frontal convolution was poorly developed, there was no operculum, and the temporal lobe was exceedingly small, thus leaving the island of Reil freely exposed. In the left hemisphere the island was covered. The fissura interparietales pursued an average course in the parietal region, but when it reached the occipital lobe, it became shallowed and was lost upon the general surface. It extended back a little farther and was a little deeper upon the right than upon the left hemisphere. The two temporal fissures were indicated upon either side by shallow grooves.
The occipital lobes especially were remarkable for the smoothness of their surfaces. On the lateral aspect in either hemisphere were noted only the short and shallow impressions of the interparietal fissure and a small transverse groove, corresponding possibly with the normal inferior longitudinal occipital fissure.

Upon the mesial surfaces the shallowness of the fissures was in keeping with that already described. In both occipital lobes the calcareous fissure was exceedingly short and extended directly into the hippocampal fissure.

The gyrus hippocampi was present on either side, but so small as not to rise to the surface. The posterior end of the calcarine was bifurcated in the right brain and simple in the left. On both sides the cuneus was much distorted by the aberrant course of the parieto-occipital. In the right hemisphere the parieto-occipital fissure curved forward and ran for a short distance parallel with the fissure of the corpus callosum and then abruptly turned upward and terminated upon the lateral surface. A comparatively well-marked pli de passage was present. Instead of making an angle of about 50° or 60° with the calcarine fissure, it made an obtuse angle of about 120°.

In the left hemisphere the parieto-occipital made a right angle with the calcarine and ran perpendicularly upwards to end in a bifurcation upon the lateral surface. On this side a comparatively large superior pli de passage was also found.
The pia mater was adherent; lateral ventricles dilated, with ependyma injected. Choroid plexuses distended. Velum interpositum thickened.

Examination of other organs revealed old pericardial adhesions and inflammation with ulceration of intestine. Nothing else noted.

Microscopical examination: A small fragment was removed from the paracentral lobule of left hemisphere. It was extremely difficult to separate the cells into layers. In the upper portion of the cortex the cells, though numerous, were rounded or irregular in shape; in the layer below, the cells were comparatively few, and pyramidal cells were the exception; only one or two large cells like those usually found in the normal cortex in this position were seen.
The pia appeared to be thickened, but the walls of the vessels showed no change. The amount of neuroglia was relatively large.

Remarks.—This imbecile brain can only suggest atavism in a remote sense. It was essentially a case of arrest of development, the arrest being most marked in the frontal and occipital regions. Furthermore, the excessive quantity of cerebro-spinal fluid, the condition of the pia, and lateral ventricles all go to show that the brain was essentially a diseased brain.

In presenting this Report, we thank the Trustees for the various measures that alone have made this undertaking possible. The State
Hospital at Norristown yields a wealth of material and opportunities for investigation, such as are afforded by few institutions, and the unsatisfactory condition of the subject of insanity makes pathological research an imperative need. It is with the earnest hope of future favor and encouragement, such as your wisdom may dictate, that we submit our results.

FRANCIS X. DER CUM,
IDA V. REEL.