

(CONSULTANT COMMENT - NEUROPATHOLOGY)

19 APRIL 1955

AFIP No. 259900

1. FIVE BLOCKS OF BRAIN IN THE CASE REFERRED TO ABOVE WERE SUBMITTED FOR EXAMINATION. ORIENTATION OF THESE BLOCKS IS INDICATED IN THE SKETCH WHICH ACCOMPANIED THE BLOCKS.

2. THE STAINING METHODS EMPLOYED WERE H & E, CRESYL VIOLET, VAN GIESON, LILLIE (MYELIN), GODIAN (NERVE FIBERS).

3. BLOCK CONTAINING HYPOTHALAMUS AND BASAL NUCLEI, RIGHT

HISTOLOGICAL EXAMINATION OF THE MENINGES REVEALS MILD ARTERIOLOSCLEROSIS. IN H & E STAINED SECTIONS OCCASIONAL CELLS LYING FREE IN THE MENINGES CONTAINED DARK BROWN PIGMENT. IN THE CEREBRAL CORTEX AND BASAL NUCLEI, SOME OF THE NERVE CELLS SHOW SLIGHT LIPOFUSCIN PIGMENTATION CHARACTERISED IN H & E STAINED SECTIONS BY THE PRESENCE OF PALE BROWN GRANULES. WHEN STAINED BY CRESYL VIOLET, THE GRANULES TAKE A BLUE-GREEN TINGE. BLUE-GREEN DROPLETS ARE FOUND ALSO IN THE CYTOPLASM OF GLIA. OLIGODENDROGLIA IN THE WHITE MATTER SHOW MARKED HYDROPIIC SWELLING. THE MYELIN SHEATHS AND AXIS CYLINDERS ARE WELL PRESERVED. IN THE PUTAMEN, CAUDATE NUCLEUS AND GLOBUS PALLIDUS, AND IN LESS MEASURE IN THE CEREBRAL CORTEX, THERE ARE SCATTERED ALZHEIMER GLIAL CELLS (TYPE 2); THESE CELLS, REGARDED AS DEGENERATING ASTROCYTES, ARE CHARACTERIZED BY A LARGE BIZARRELY-SHAPED (KIDNEY-BEAN, ETC.) PALE NUCLEUS WITH VERY SPARSE PERINUCLEAR CYTOPLASM. NO CHANGES ARE SEEN IN THE HYPOTHALAMUS OR EPENDYMA, AND NO CYTOPLASMIC PROCESSES.

4. PRECENTRAL GYRUS AND SUPERIOR FRONTAL GYRUS, LEFT (2 SECTIONS)

NOTED IN THESE SECTIONS ARE MILD MENINGEAL ARTERIOLOSCLEROSIS, SLIGHT LIPOFUSCIN PIGMENTATION OF NERVE CELLS, OCCASIONAL CHROMATOLYSIS, AND SMALL GROUPS OF PYKNOTIC SHRUNKEN NERVE CELLS. LAMINATION OF CORTICAL NERVE CELLS IS DISTINCT AND A FEW SCATTERED ALZHEIMER GLIAL CELLS (TYPE 2) ARE SEEN. CRESYL VIOLET STAIN REVEALS SMALL BLUE-GREEN DROPLETS IN GLIA, ESPECIALLY IN THE ASTROCYTES OF THE CORTEX. IN THE WHITE MATTER THERE IS MARKED HYDROPIIC SWELLING OF OLIGODENDROGLIA. THE MYELIN SHEATHS AND AXIS CYLINDERS ARE WELL PRESERVED.

NON-CCRP

STATUS VERIFIED UNCL

BY: Jan. Day DATE 4/17/81

US DOE ARCHIVES 326 US ATOMIC ENERGY COMMISSION
Location <u>DBM</u>
<u>376-78-3 Box -3</u>
US DOE ARCHIVES <u>M&amp;A Radiation Exposures</u> <u>Jp Fishing Trade 1955</u>

BEST COPY AVAILABLE

### 5. Cerebellum, Left:

The meninges are delicate. They contain occasional small round cells. A moderate number of Purkinje cells have disappeared. A few Purkinje cells take on a diffuse blue in cresyl-violet-stained sections. A few glia in the molecular zone contain sparse blue-green lipid granules. The nerve cells of the dentate nucleus show marked lipofuscin pigmentation, and in the glia there are fairly prominent blue-green lipid droplets. Hydropic swelling of oligodendroglia is present, but it is less conspicuous than in the white matter of the cerebrum. Nerve cells of the dentate nucleus have probably suffered a reduction, but there is no glial proliferation.

### 6. Spinal Cord, Thoracic:

The meninges are slightly thickened. Nerve cell population appears normal. In the anterior horn cells, lipochrome deposits are prominent. No alterations are seen in the spinal roots. There is no evidence of degenerative change.

### 7. Summary and Comment:

The meningeal arteriosclerosis is moderate and not unexpected in a man of this age (40 years). No explanation for the yellow meningeal tint described at autopsy, was found. The chromatolysis and pyknosis of occasional nerve cells may be ascribed to conditions related to the agonal state or they may represent a post-mortem change. The lipofuscin pigment in nerve cells, most pronounced in the dentate nucleus of the cerebellum, is regarded as in the usual range at this age level. The pigmentary changes in the glia, especially astrocytes (most marked in the cerebral cortex), probably represent physiological involutionary changes. In this connection, Penfield (1932) has stated that "pigment granules appear in astrocytes especially in older subjects. They are evidently the result of cell degeneration rather than ingestion," and Mic-Hortega has stated of microglia that "in some cells there are lipoid granulations." It is possible that the involutionary change is more pronounced than usual.

The hydropic swelling of the oligodendroglia, most prominent in the cerebral white matter, is a nonspecific alteration found in a variety of conditions, e.g., coma and early edema. It has been found in experimental animals (monkeys) under normal conditions, in which the brain has been fixed 3 hours post mortem.

- 3 -

THE PRESENCE OF THE ALZHEIMER GLIAL CELLS IN BASAL NUCLEI AND THE CORTEX IS OF INTEREST AND IS SIGNIFICANT. THESE CELLS ARE CONSISTENTLY FOUND IN THE PRESENCE OF LIVER DAMAGE OF MORE THAN 3 OR 4 WEEKS DURATION, AND THEY HAVE BEEN FOUND IN SEVERE HYPOXIDOSIS.

NO CHANGES WERE NOTED IN VESSELS, NOR WAS THERE ANY EVIDENCE OF DAMAGE OF COLLAGEN. NO REDUCTION IN THE NUMBER OF GRANULE CELLS OF THE CEREBELLUM WAS FOUND. IRON STAINS ON ALL BLOCKS PROVED NEGATIVE. THUS, THERE WERE NO CHANGES SUGGESTIVE OF THOSE OF IRRADIATION.