

that of blue and yellow to be much more extensive than that of red and green. The observations relative to this part of the subject were published in the *Annales de Ophthalmologie* in the year 1872.

ALTERATIONS OF THE BRAIN AND CORD IN TETANUS. The following post mortem observations are taken from a recent article by Dr. Julius Elischer, *Virchow's Archiv*. LXVI., Jan. 21, 1876, p. 61, on the alterations of the brain and spinal cord in tetanus. He reports a case in which the most careful microscopic examination was made of all parts of the central nervous system.

I. *Macroscopic appearances.* Gray degeneration of the cervical and upper dorsal cord in the posterior columns, also in the lateral columns in the cervical region, loosened cavities in the thickened (at this point) dura-mater, with slight extravasations. Hyperæmia of the vessels of the cord and the basal part of the cerebrum.

II. *Microscopic appearances.*

1. Thickening of the ependyma of the lateral ventricles and the "rauten-grube," distortion, together with roughened proliferation of tissue and granular cell formation, in the sub-epithelial connective tissue.

2. General hyperplasia of the connective tissue in the medullary bundles of the cerebral ganglia, in the middle cerebellar peduncle, the funiculus cuneatus, and the nerve twigs passing out from the regions of the fifth and seventh nerves, in the olivary body, and finally, in the central gray tube. Swelling of the spongy intermediate connective tissue of the lateral and anterior columns of the cervical and upper dorsal regions, with partial wasting of the medullary substance and axis cylinder.

3. Softening of the peripheral white nerve substance from the lumbar enlargement downward to the filum terminale, with nuclear proliferation in the pia mater surrounding these parts.

4. Amyloid degeneration of the nerve cells in the regions of the fifth and seventh nerves, of the olivary bodies and cervical cord, progressive degenerative processes, swelling of the cells and crumpling of their nuclei, the processes being apparently intact,—nuclear proliferation in the latter.

5. Differentiation of the ganglion cell protoplasm into two layers, one reacting strongly with carmine, red and striated, and the other a finely granular yellow mass, not taking up carmine; coagulation of the protoplasm into concentrically arranged masses: finally granular decomposition of certain ganglion cells of the posterior cornua, cloudy appearance of the latter with proliferation of epitheliaform cells between the coarser filaments of the neuroglia.

6. Increase of epithelial (lymphperithel) cells around the central canal, and also in the sub-epithelial stratum and in the ependymal tissue itself. Presence of similar cellular forms under the lining of the lateral ventricles, and division of cells in the corpus striatum.

These appearances indicate plainly an irritative process affecting the nerve centres, such as might well be produced by nervous irritation either peripheral or even central, but, as the author says, they afford no ground for the theory of an infectious or zymotic cause of the disease.