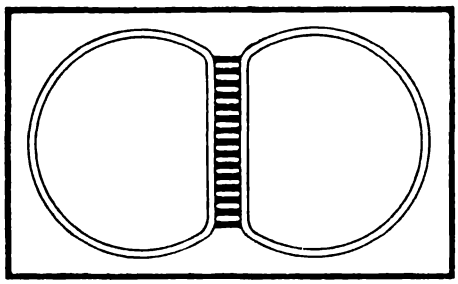

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DISTRIBUTION OF NERVE FIBERS IN THE OPTIC NERVE OF THE QUAIL: A LASER-DEGENERATION STUDY.

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Normal visual function requires specific connections between the retina and the visual centers. Connections arise after migration of the optic axons to the brain; however, the biological basis of their specificity are mostly unknown. Some of the postulated mechanisms require a recongnition between axons and brain neurons, whereas others depend on the maintenance of a retinotopic order along the optic pathways.

We are studying the course of retinal fibers in the quail using the distribution of degenerating fibers in the optic nerve. Lesions are made with a continuous argon laser (514 nm) focused on the retina. Size of the lesions depends on light energies (0.5-2.0 watts) and exposure times (1-30 sec) employed. Birds are killed a week after irradiation. Retinas are examined in fresh and as cresyl violet-stained flat-mounts. Optic nerves are fixed in glutaraldehyde and osmium tetroxide. Epon thick sections, stained with p-phenylendiamine, are scanned with a light microscope to obtain the density of dark-degenerating axons.

The main conclusions are; i. Retinal quadrants are not represented as such in the optic nerve. ii. Axons from different quadrants of the retina can traverse through the same quadrant of the nerve. iii. Though axons from certain retinal sites occupy a restricted region, some others are spread through most of the nerve area.