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ABSTRACT OF PAPER

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BIOLOGICAL ABSTRACTS

SPERRY, ROGER W. (U. of Chicago) / Patterning of central synapses in regeneration of the optic nerve in Teleosts. / Physiol. Zool.,

Optic nerve regeneration following its section in a series of 27 marine teleosts of 5 different species led consistently to rapid and good recovery of vision. It was apparent from histological study of the regenerated optic nerves that individual fibers and small fiber bundles had become extremely intermixed in the nerve scars. Nevertheless there was no indication of abnormality in the recovered vision. In another series of 14 cases in which the eyeball was rotated 180 degrees on its optic axis at the time of optic nerve section, the recovered visuomotor responses showed a systematic directional reversal correlated with the rotated position of the eye. Since the recovered function in the latter cases was distinctly maladaptive, the orderly patterning of the central reflex relations of the regenerated optic fibers could not be attributed to functional adaptation. The results, which are essentially similar to those previously obtained by the author in amphibians, indicate that the optic fibers are qualitatively specified, probably through a polarized differentiation of the retinal field in development. The findings extend to another class of vertebrates evidence in support of a "biochemical affinity" theory of the developmental organization of synaptic connections. -- R. W. Sperry