Abstract for Atlantic City Meetings, 1936

a) Read by Title.

b) Contralateral mnemonic effects with ipsilateral sensory inflow.

c) R. E. Myers* and R. W. Sperry.

d) Division of Biology, California Institute of Technology.

Simple visual discriminations learned with one eye are retained with the other eye by cats having all crossed optic fibers destroyed at the chiasma. To find out whether ~~or not~~ the mnemonic traces involved are confined entirely to the trained (ipsilateral) hemisphere, fourteen chiasma-sectioned cats were taught one or two visual pattern discriminations with a mask covering one eye. On completion of training, varying portions of cortex were removed from the hemisphere on the trained side. These removals varied from restricted ablation of the visual areas I plus II, to complete cortical ablation extending forward to the edge of the posterior sigmoid and coronal gyri. Following a post-operative rest period of 11 to 24 days, the cats were tested for retention with the untrained eye. The results obtained appeared not to be affected by the extent of cortical removal beyond the minimal lesion, but did differ for the two discriminations used. In the case of the less difficult discrimination (horizontal vs vertical striations) there was nearly perfect retention in five instances, partial loss in seven, and apparent complete loss in only one. In both of two cases where the more difficult discrimination (solid circle vs open ring) was used, transfer to the untrained eye was completely absent, although this same discrimination has been shown to transfer at a high level in the absence of cortical lesions. The findings demonstrate a mnemonic carryover via the corpus callosum into the hemisphere not directly receiving the sensory information. The carryover was sufficient to effect partial to complete retention of simple discriminations but was not sufficient to support the performance of more difficult discriminations.

"paper from platform"

_____. Localization of function within the corpus callosum--visual gnostic transfer. Ronald E. MYERS,* Division of Biology, California Institute of Technology. (Introduced by A. W. Sperry)

Destruction of the crossed retinal fibers at the optic chiasma restricts the afferent impulses from the two eyes to their respective ipsilateral brain-halves. Such cats still remember with one eye simple pattern discriminations learned with the other eye. However, this recognition by the second eye fails when the corpus callosum has been sectioned prior to training. In the present study an attempt was made to determine if this visual gnostic function of the corpus callosum could be localized to any particular portion of the tract. A series of chiasma--sectioned cats were prepared with varying portions of the anterior or posterior corpus callosum divided. These cats were then taught pattern discriminations with one eye masked. Tests for interocular transfer of the discriminations were then carried out and it was found that destruction of the posterior 40-50% of the corpus callosum (in terms of total length) was associated with complete contralateral agnosia for the response while high level contralateral gnostic transfer was seen with destruction anteriorly of as much as 70-75% of the total structure. Though there was this gross posterior localization of the gnostic transfer process, it was evident from the data that within this involved sector there was considerable functional equivalence between its different portions with transfer of the same discrimination being supported by relatively small segments of callosum irregardless

of their position.

---

[1]Supported by a grant from the National Science Foundation

Physiology, brain