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Corpus callosum and intermodal visuo-tactile integration in the monkey.

Our first report in 1957 on memory transfer in split-brain monkeys stated that disconnection of the hemispheres prevented contralateral transfer of visual learning but not of manual somesthetic discrimination. Subsequent studies here and elsewhere confirmed the former but yielded inconsistent results regarding the somesthetic transfer. Further observations based partly on human patients with commissurotomy suggests now a resolution of these inconsistent findings at least in part along the following lines: If the sensory learning cues be strictly confined to the hand, transfer depends on the corpus callosum. If the performance involves proprioceptive or other cues that extend proximally into the upper arm segments, transfer may be mediated through bilateral cortical representation and the peripheral spread of differential postural changes across the midline. By carefully restricting the somesthetic input we have been able to train intermodal visuo-tactile discriminations that are consistently disrupted by commissurotomy when the visual and tactile stimulus components are projected to separate hemispheres, but not when both visual and tactile components enter the same hemisphere (three monkeys). We are currently trying to localize the intrahemispheric association paths involved in such visuo-tactile integration. Deep transverse sections have been made through the superior parietal and angular gyri extending from the midplane laterally about 13 mm and downward into the lateral ventricle. The intermodal performance has survived such surgery in two cases and was disrupted in a third.

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