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Garey L J, Jones E G & Powell T P S. Interrelationships of striate and extrastriate cortex with the primary relay sites of the visual pathway.
J. Neurol. Neurosurg. Psychiat. **31**:135-57, 1968.
[Department of Human Anatomy, Oxford University, England]

Areas 17 and 18 of the cat visual cortex send independent retinotopic subcortical projections. Callosal fibres connect parts of the cortex related to the vertical visual meridian. Area 17 sends fibres to areas 18 and 19 ipsilaterally, and area 18 to areas 17 and 19. [The SCI® indicates that this paper has been cited in over 340 publications since 1968.]

Laurence J. Garey
Institute of Anatomy
University of Lausanne
CH-1011 Lausanne
Switzerland

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"In 1963, after the preclinical part of a medical degree at Oxford, I undertook a research project in the department of human anatomy before continuing clinical studies. I was attracted to the visual system by undergraduate contacts with two leaders in the field, Sir Wilfrid Le Gros Clark, then professor of anatomy, and Tom Powell, my anatomy 'tutor.' Nineteen sixty-three was an exciting time for visual research: Hubel and Wiesel[1] had just published their paper on the cat visual cortex; James McGill had recently demonstrated the precise retinotectal projection in the pigeon;[2] and neuroanatomy was enjoying a resurgence thanks to the 'Nauta' technique for degenerating axons.[3] With Tom, I studied the connexions of the cat visual system from retina to cortex, and from cortex to subcortical centres, with particular attention to relationships with the superior colliculus. Max Cowan was also there, and I see from my records that Tom and Max introduced me to making discrete cortical lesions in October 1963.

"Using lesions in different parts of the visual cortex, we described the retinotopicity of descending cortical projections. However, virtually the whole of the geniculate and colliculus contained degeneration after lesions involving less than the total mediolateral extent of what was recognized as 'visual' cortex: its medial and lateral parts had independent subcortical projections. We therefore made small lesions restricted to the medial or lateral visual cortex, and even in the auditory, somatosensory, and motor cortex. The 1965 paper of Hubel and Wiesel[4] describing the organization of areas 17, 18, and 19 helped us define the separate subcortical projections from each area. The superficial laminae of the superior colliculus received information from the visual cortex, while other cortex projected to deeper layers. We also investigated ipsilateral and callosal cortico-cortical connexions, confirming that the cortex related to the vertical visual meridian projected callosally.

"It was not easy to cut frozen sections of the whole cat brain and then stain and mount the delicate sections. I well remember the 'dry ice,' used to freeze the brain, that would evaporate during the coffee break, and the dozens of little glass dishes into which the fragile sections were plunged one by one using tiny glass rods. Fortunately, we had the solid backing of Ron Brooke and his technical staff to help us. The Nauta technique sometimes worked—and sometimes did not! Was it the weather or the Oxford water? More likely it was our inexperience, for later its reliability improved and we were able to mass-produce consistent sections.

"In 1965, I left for St. Thomas' Hospital Medical School in London, leaving Tom with the unenviable task of making the relevant chapters of my thesis into a paper. At that time, Ted Jones arrived in Oxford from Otago and together they worked through the material, and added some; and so the paper was written. It gave anatomical support to contemporary work on the visual cortex, using an accurate and relatively reliable technique. The superior colliculus was emphasized as a cornerstone between the retino-thalamo-cortical visual system and oculomotricity. It also came at a time when attention was being paid to callosal and other cortico-cortical connexions. For Ted and me, it represented an important step in our introduction to experimental neuroanatomy."

1. **Hubel D H & Wiesel T N.** Receptive fields, binocular interaction and functional architecture in the cat's visual system. *J. Physiol.—London* **160**:106-54, 1962. (Cited 2,015 times.)
2. **McGill J I, Powell T P S & Cowan W M.** The retinal representation upon the optic tectum and isthmo-optic nucleus in the pigeon. *J. Anatomy* **100**:5-33, 1966. (Cited 110 times.)
3. **Nauta W J H & Gygax P A.** Silver impregnation of degenerating axons in the central nervous system. A modified technic. *Stain Technol.* **29**:91-3, 1954. (Cited 650 times since 1955.)
4. **Hubel D H & Wiesel T N.** Receptive fields and functional architecture in two nonstriate visual areas (18 and 19) of the cat. *J. Neurophysiology* **28**:229-89, 1965. (Cited 945 times.)