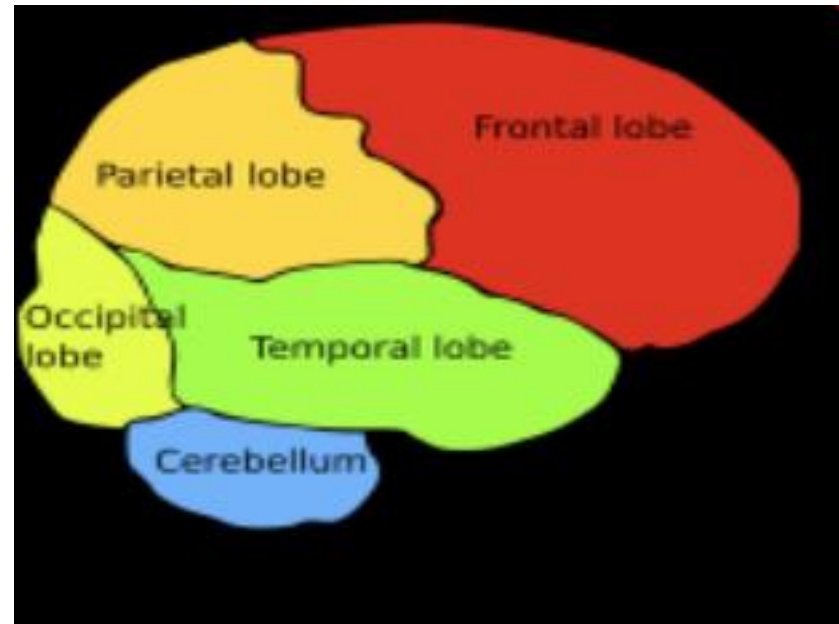
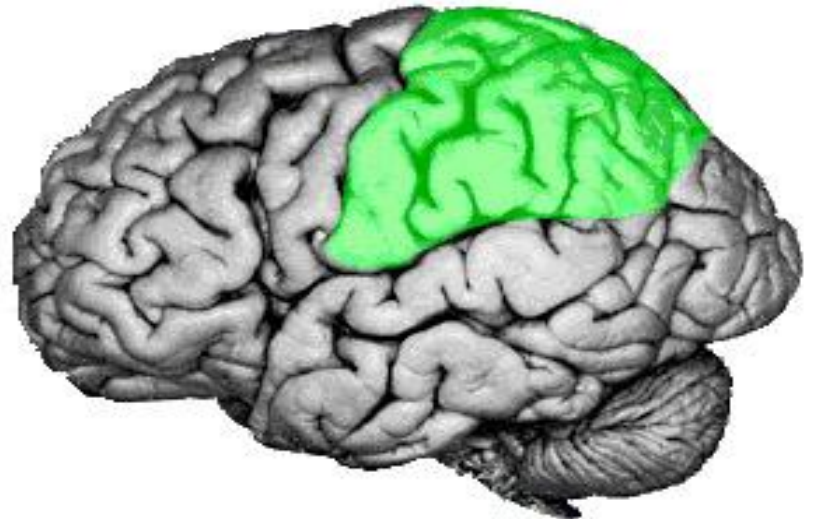
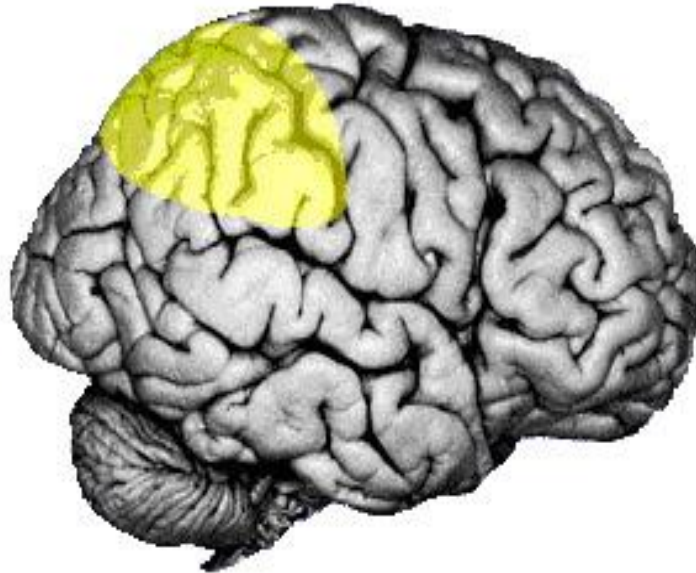
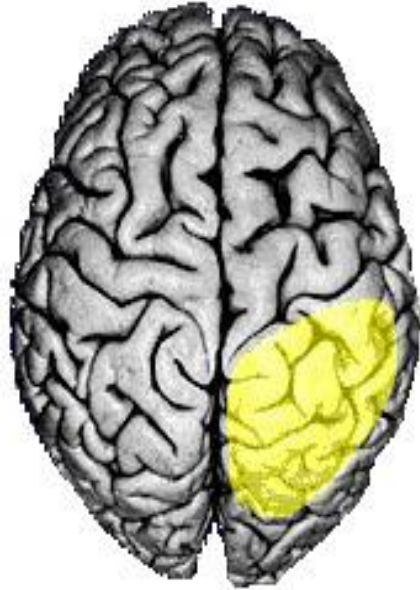


# The Parietal Lobe

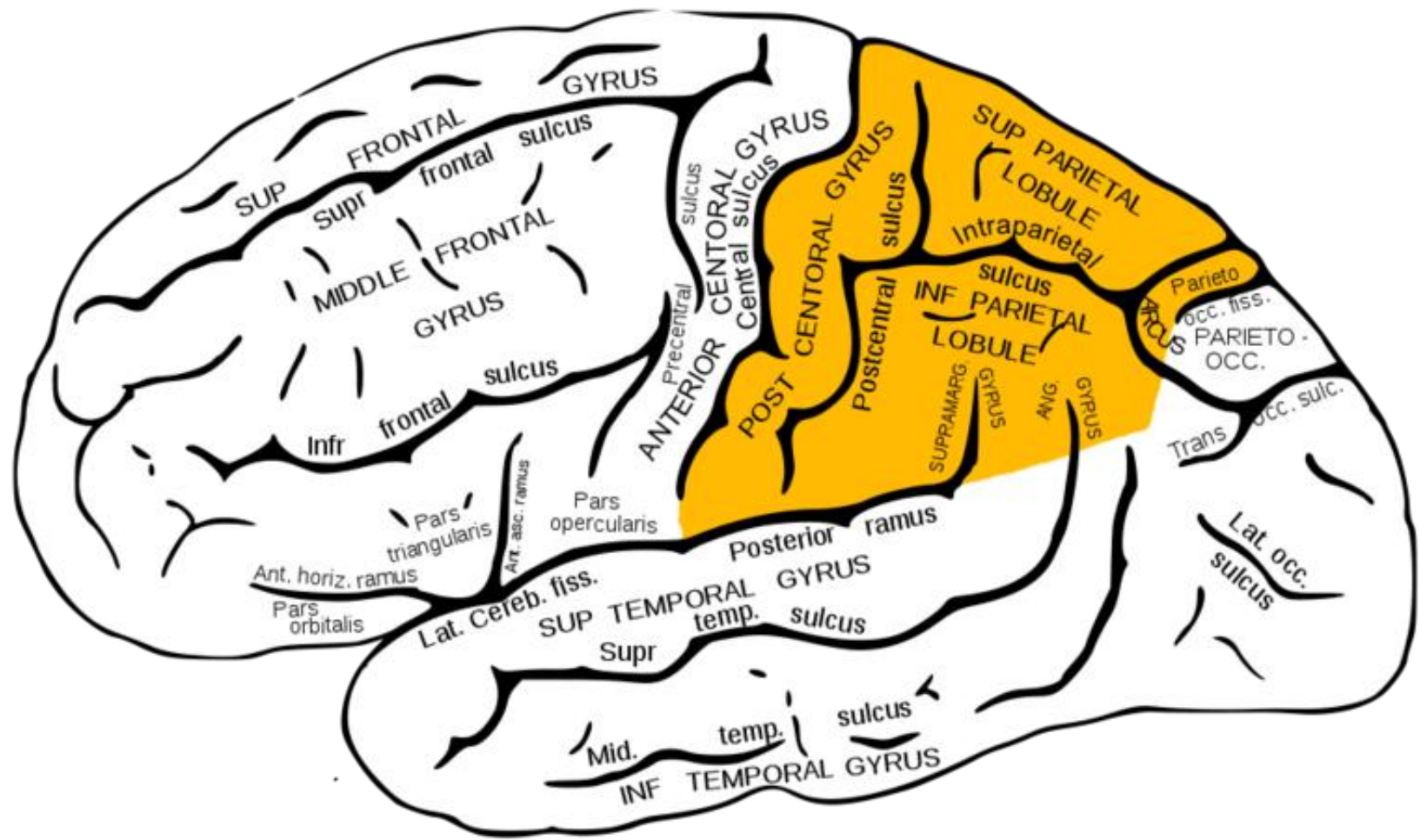


# Parietal lobe

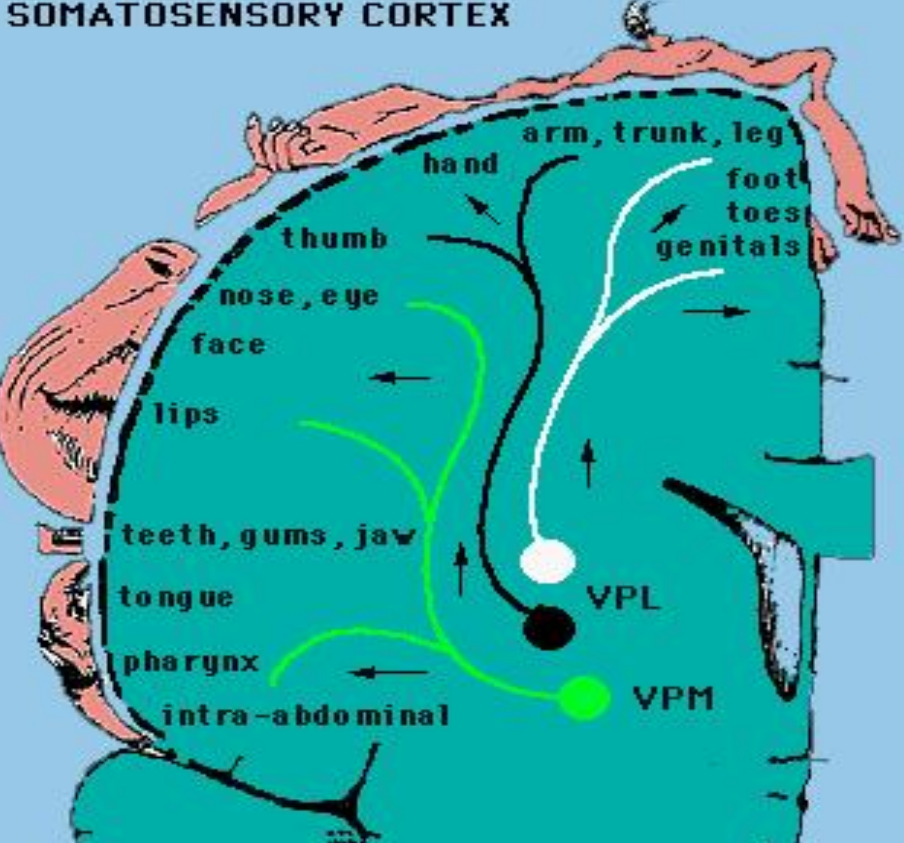


# Parietal lobe

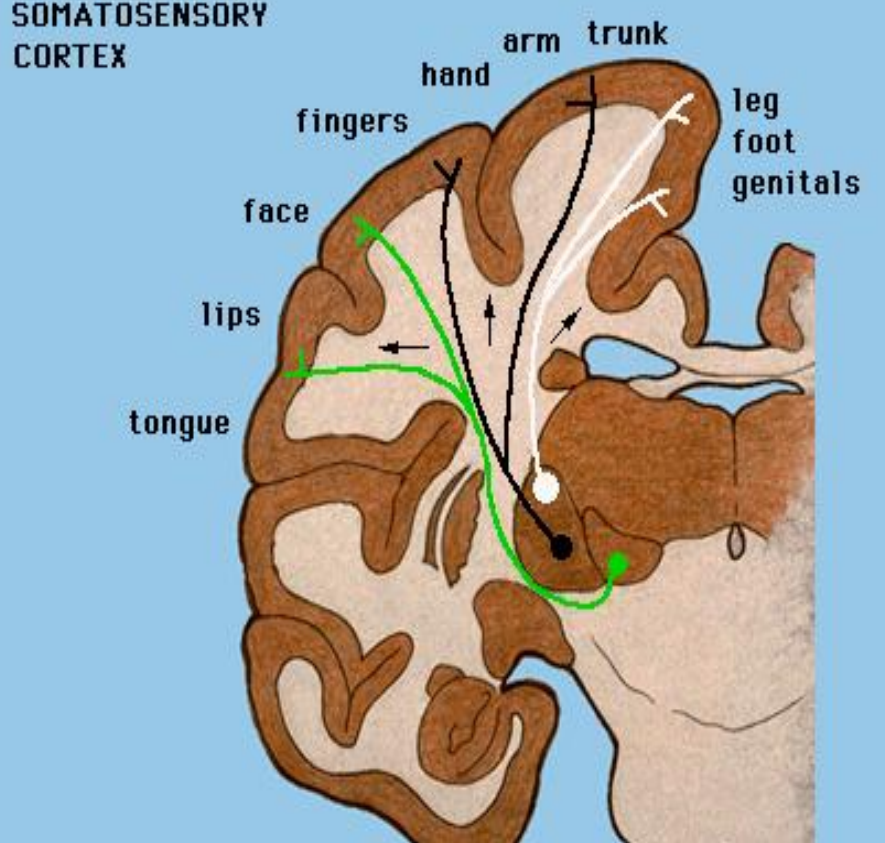
- The parietal lobe is divided into three major sections:  
***postcentral gyrus, superior parietal lobule and inferior parietal lobule.***
- The postcentral gyrus lies posterior and parallel to the central sulcus and anterior to the postcentral sulcus.
- **The postcentral gyrus is the primary somatosensory cortex (SI) upon which cortical perception of general body and facial sensation is laid topographically.**
- The parietal lobe is further subdivided by the intraparietal sulcus (DeArmond) into superior and inferior parietal lobules.
- **The superior parietal lobule is the somatosensory association cortex.**
- **The inferior parietal lobule consists of the supramarginal and angular gyri.**
- In the left hemisphere, this region of the cortex is important for the understanding of speech and symbolic language and it is part of a larger cortical area known as Wernicke's area.
- In the right hemisphere, this area is specialized for the perception of spatial orientation.

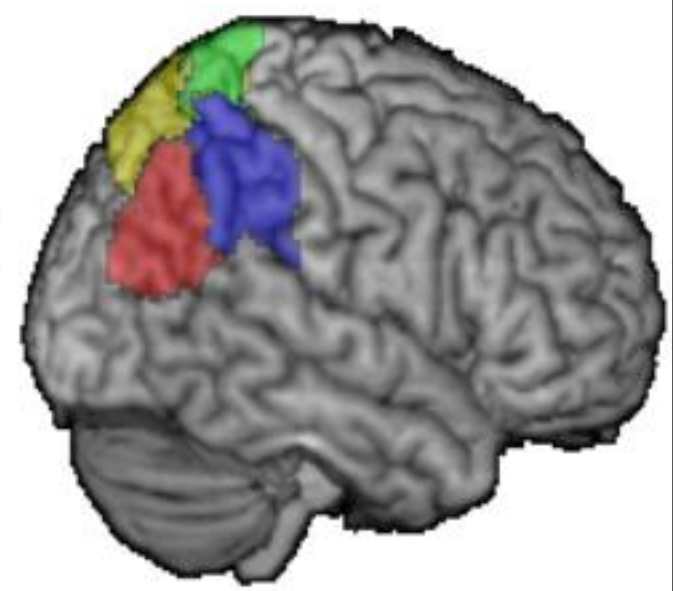
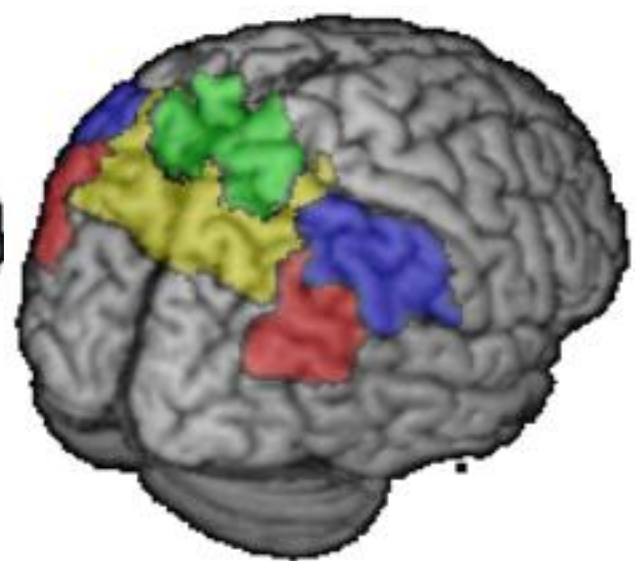
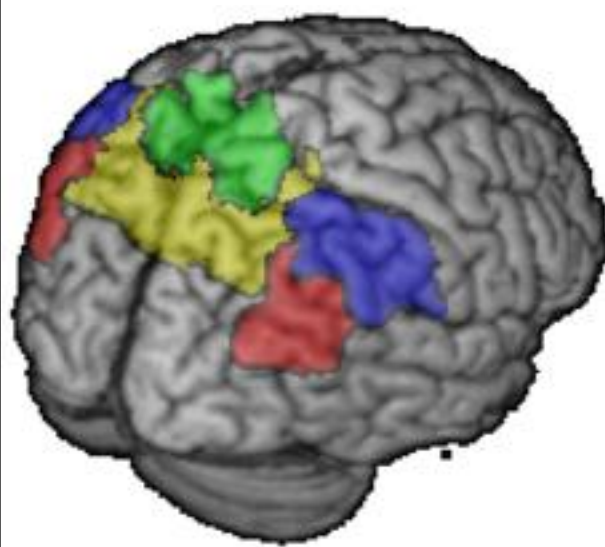


# SOMATOSENSORY CORTEX



# SOMATOSENSORY CORTEX





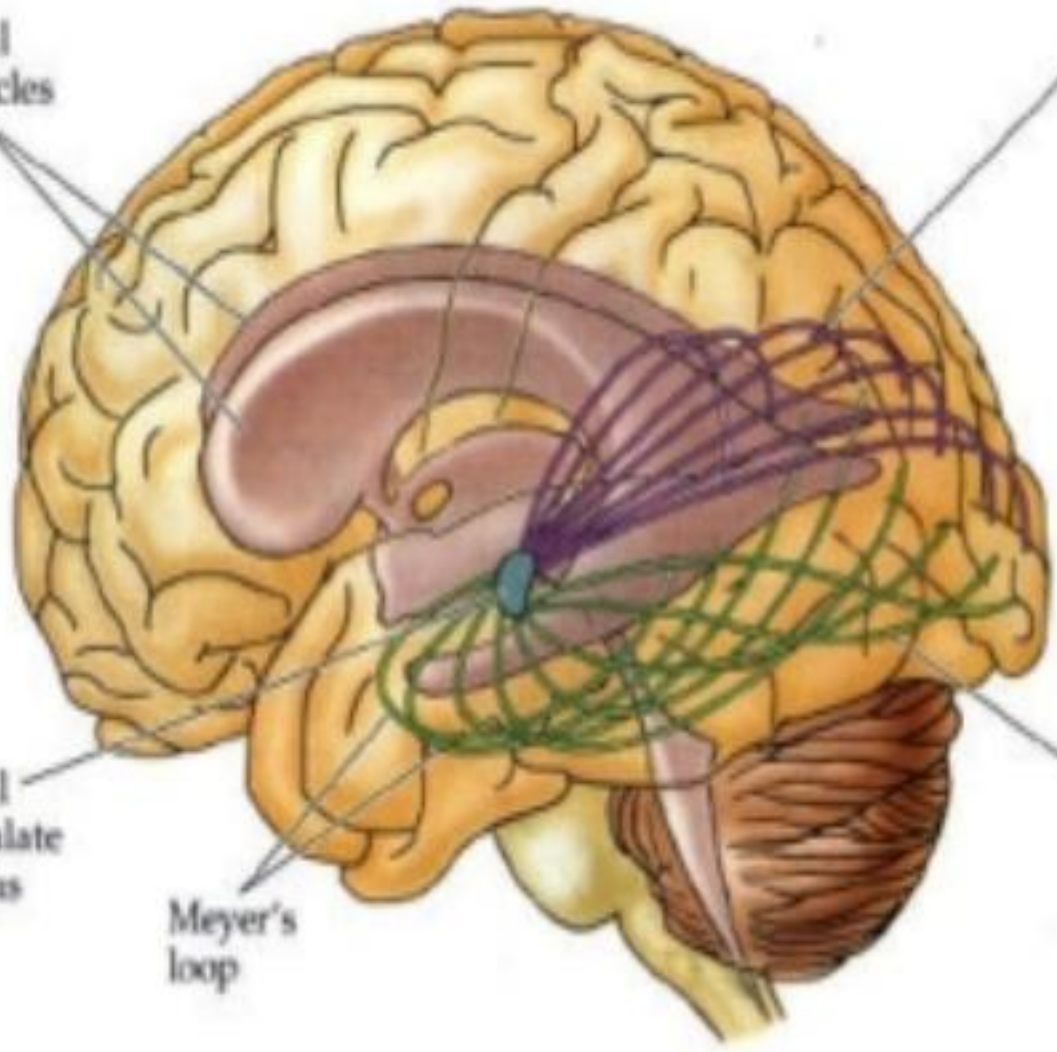
Lateral ventricles

Fibers representing superior retinal quadrants (inferior visual field)

Lateral geniculate nucleus

Meyer's loop

Fibers representing inferior retinal quadrants (superior visual field)



## Cortical sensory functions:

- ***Stereognosis***: ability to recognize and identify objects by feeling them. The absence of this ability is termed *astereognosis*.
- ***Graphesthesia***: ability to recognize symbols written on the skin. The absence of this ability is termed *graphanesthesia*.
- ***Two-point discrimination***: ability to recognize simultaneous stimulation by two blunt points. Measured by the distance between the points required for recognition.
- ***Touch localization*** (topognosis): ability to localize stimuli to parts of the body. *Topagnosia* is the absence of this ability.
- ***Double simultaneous stimulation***: ability to perceive a sensory stimulus when corresponding areas on the opposite side of the body are stimulated simultaneously. (*sensory extinction*)



## **Two-point discrimination**

- Ordinarily, only the fingerpads are tested but other areas of the body can be tested in selective circumstances.
- Tongue tip: 1 mm
- Fingertip: 2 to 4 mm
- Dorsum of fingers: 4 to 6 mm
- Palm: 8 to 12 mm
- Dorsum of hand: 20 to 30 mm (DeJong,1967)

## **Topognosis**

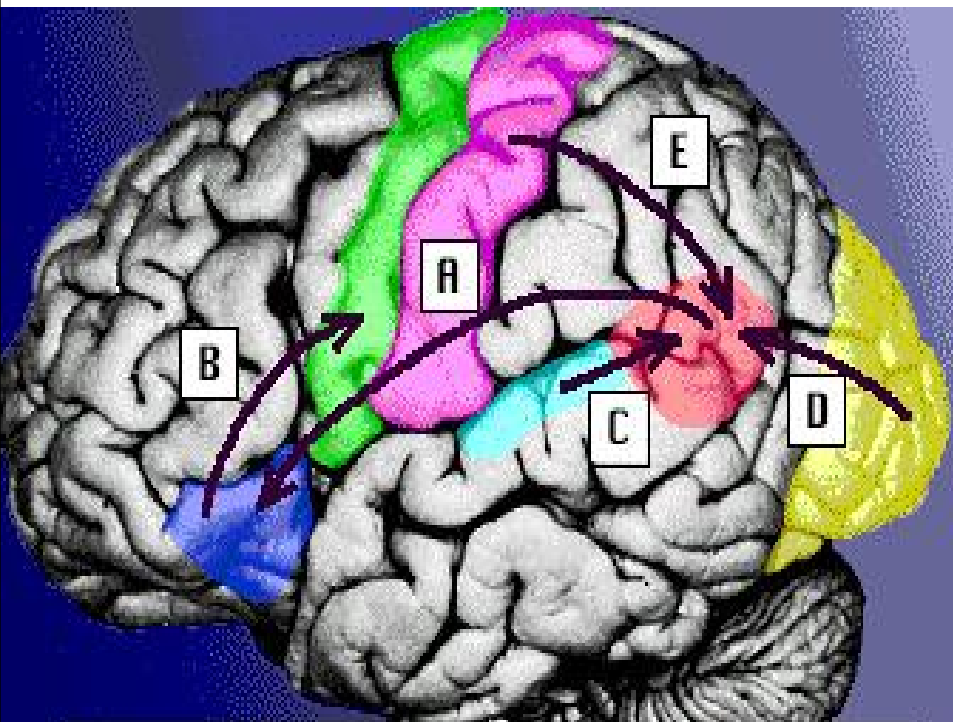
- Ask the patient to describe or point to various parts of the body tested with tactile stimulation. This can be done with tactile testing.

## **Double simultaneous stimulation**

- Patients with parietal lobe lesions may recognize stimuli on one side of the body when applied independently but not recognize or distinguish that stimulus when bilateral stimuli are applied.

- Integrating somatosensory with visual and auditory information to construct 'body schema' and its relation to extrapersonal space.
- Also in the execution of voluntary complex motor acts.
- Comprehension of verbal and written language.
- The recognition and utilization of numbers, arithmetic principles and calculations.

# Aphasia and Acalculia

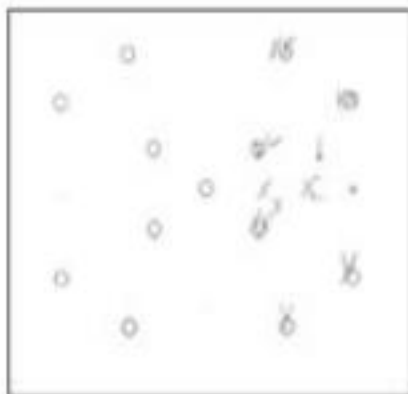


## **Hemianesthesia**

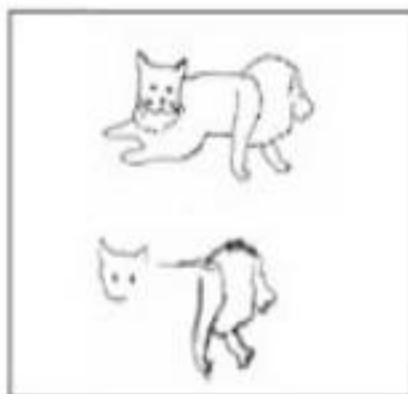
- Lesion of primary somatosensory areas will produce a loss of tactile, proprioceptive and other sensations arising from the skin surface on the side contralateral to the lesion. If the patient neglects the contralateral side and behaves as if the side does not exist then the lesion probably includes association areas in the parietal lobe that mediate complete body schema. Often hemianesthesia coexists with hemineglect.
- Asteriognosis
- Graphanesthesia
- Topagnosia
- Sensory extinction

- **Anosognosia & Hemispatial neglect (Anton-Babinski syndrome)** – inability to recognise part of one's own body.
- It includes a somatosensory defect that encompasses loss of the stored body schema as well as conceptual negation of paralysis and a disturbed visual perception and neglect of the body.
- Patients with visual spatial impairment have great difficulty localizing objects in two and three dimensional space. Stereopsis (binocular depth perception) is often impaired.
- Unilateral anosognosias associated with additional abnormalities like blunted emotionality, confusion, and allocheiria.

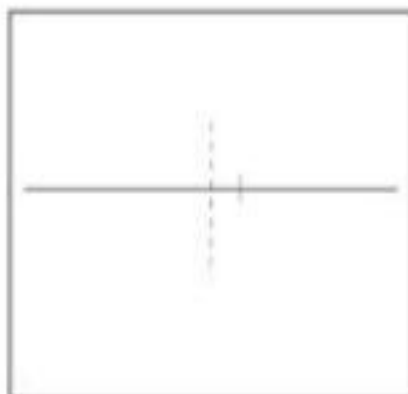
- Hemi-spatial neglect is more frequent following right parietal lobe lesions. It has been theorized that **the right hemisphere maintains the complete body schema and visual spatial array for both sides of space.** However, the left hemisphere only maintains the right side of space.



**A.** Performance in a circle cancellation task by a right-brain-damaged patient. Left neglect is revealed by left-sided omissions. On the right-hand side the patient made perseveration errors, both "simple" (ie, repeated crossings) and "complex" (ie, the gratuitous addition of a circle partially drawn by the patient and a subsequent crossing out).<sup>28</sup>



**B.** Performance in a tracing task by a right-brain-damaged patient. Left neglect is revealed by the incomplete left-sided drawing and by the patient's identification of the chimeric drawing as a lion, considering the right-hand side of the chimera. The partial tracing of the left-hand side of the chimera did not allow its identification.<sup>29</sup>

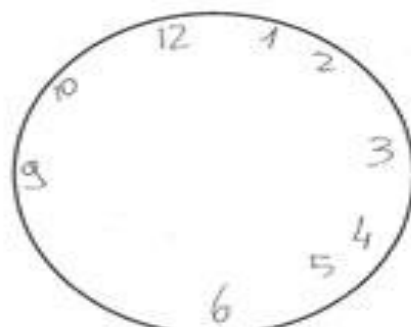


**C.** Performance in a horizontal line bisection task by a right-brain-damaged patient. Left neglect is indexed by the rightward error, resulting from an underestimation of the left-side extent of the line, or an overestimation of its right-side extent.<sup>30</sup>

**FIGURE 3.**  
**Clock drawing by right-brain-damaged patients**



**A.** Spatial disorganization



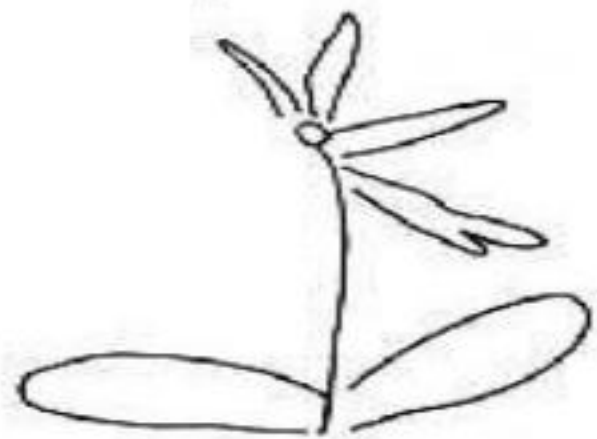
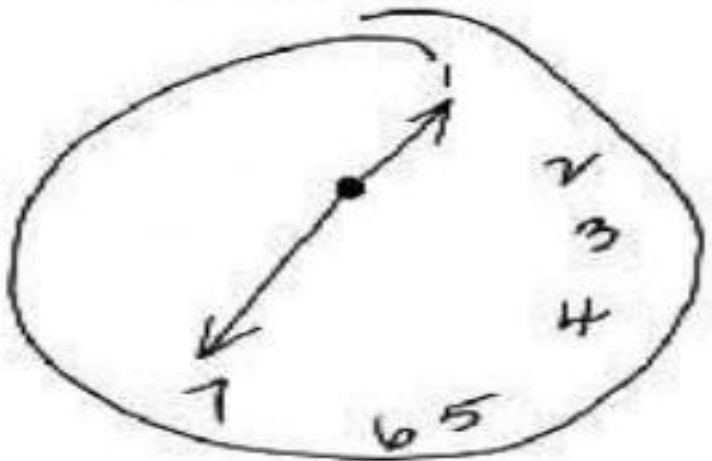
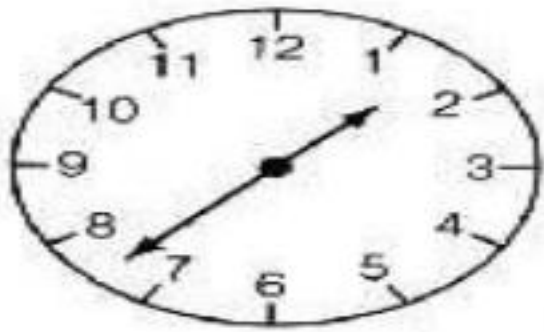
**B.** Left-sided omissions (hours 7, 8, and 11) with preserved spatial organization

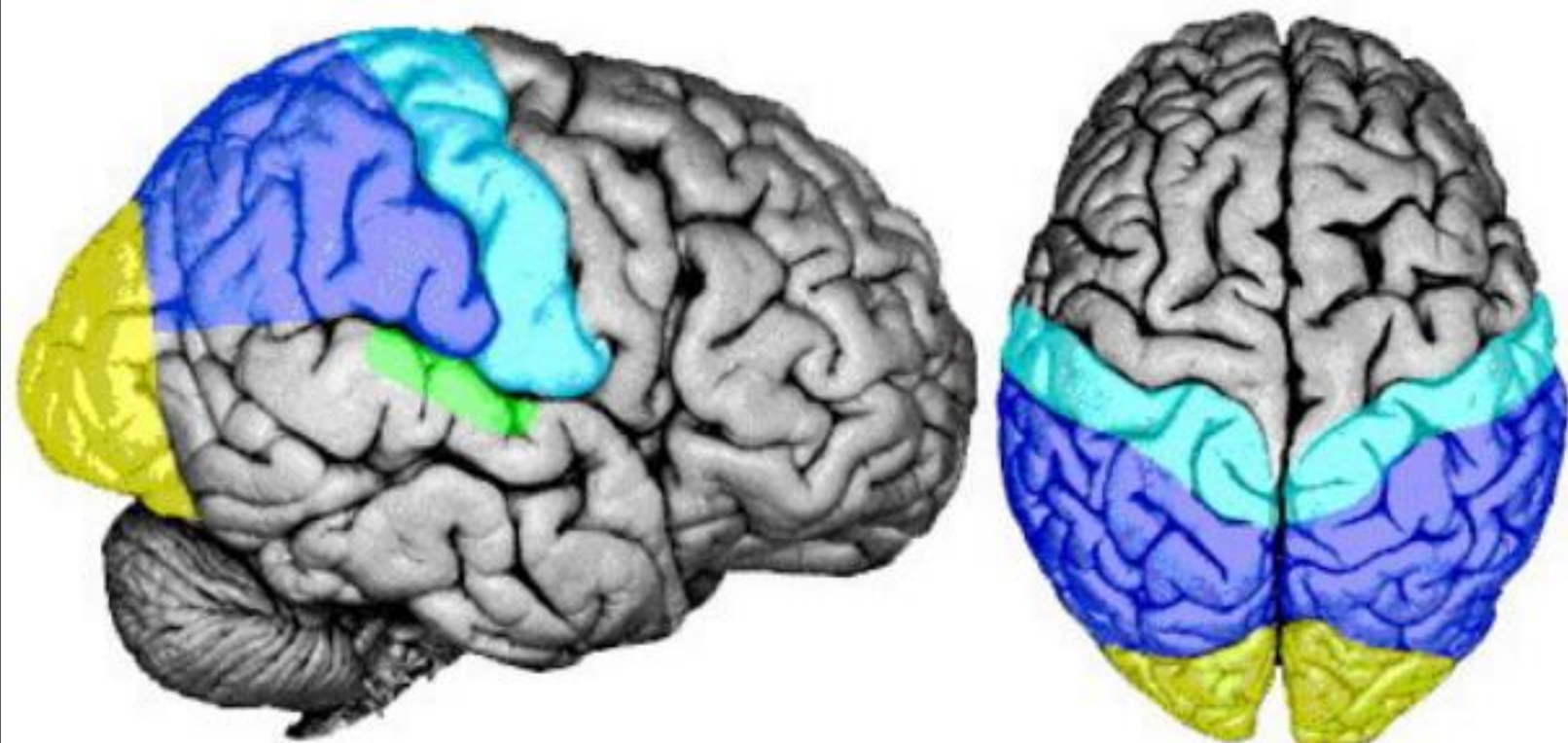


**C.** Hours are drawn on the right-hand side of the clock face, with spatial disorganization and perseveration (ie, the series 1–6 is drawn twice). Three left-sided hours (11, 7, and 8) are mislocated on the right-hand side, and a "zero" is added

- Dressing apraxia
- Constructional apraxia- inability to summate spatial impressions a defect also called 'amorphosynthesis'.
- Rejection behaviour – loss of exploratory behaviour with contralateral arm and even tendency to avoid tactile stimuli.
- Topographical Disorientation
- Motor Impersistence - may have difficulty sustaining motor actions or gestures. (RT side lesions)







**Light Blue** Parietal/  
Somatosensory

**Dark Blue** Parietal/  
Association Area

**Yellow** Occipital/Vision

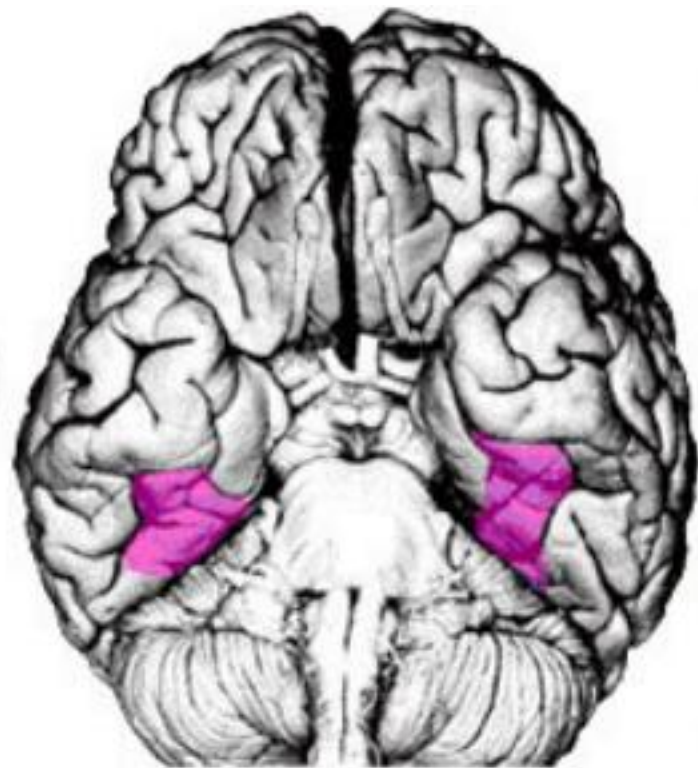
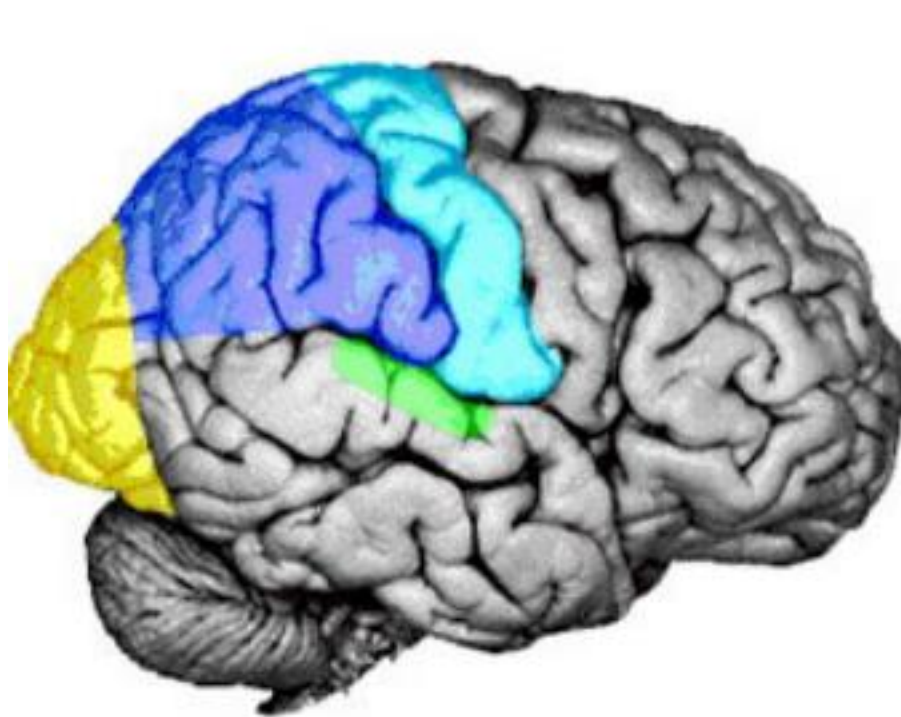
**Green** Auditory

## Gerstmann's Syndrome



It is due to left or dominant parietal lesion. (angular gyrus)

The syndrome described by Josef Gerstmann includes:

- finger agnosia (the inability to recognize, & name individual fingers of both hands)
- left-right disorientation
- agraphia
- acalculia.



-  Parietal/  
Somatosensory
-  Parietal/  
Association Area

-  Occipital/Vision
-  Auditory

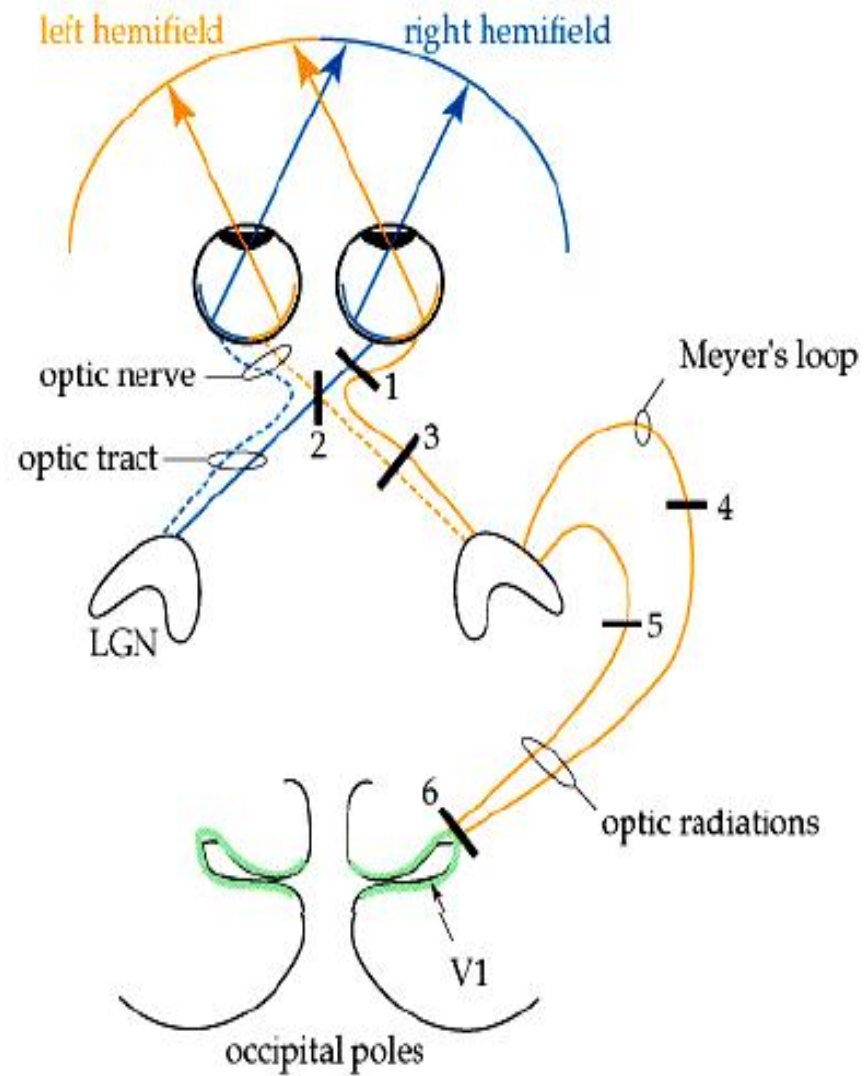
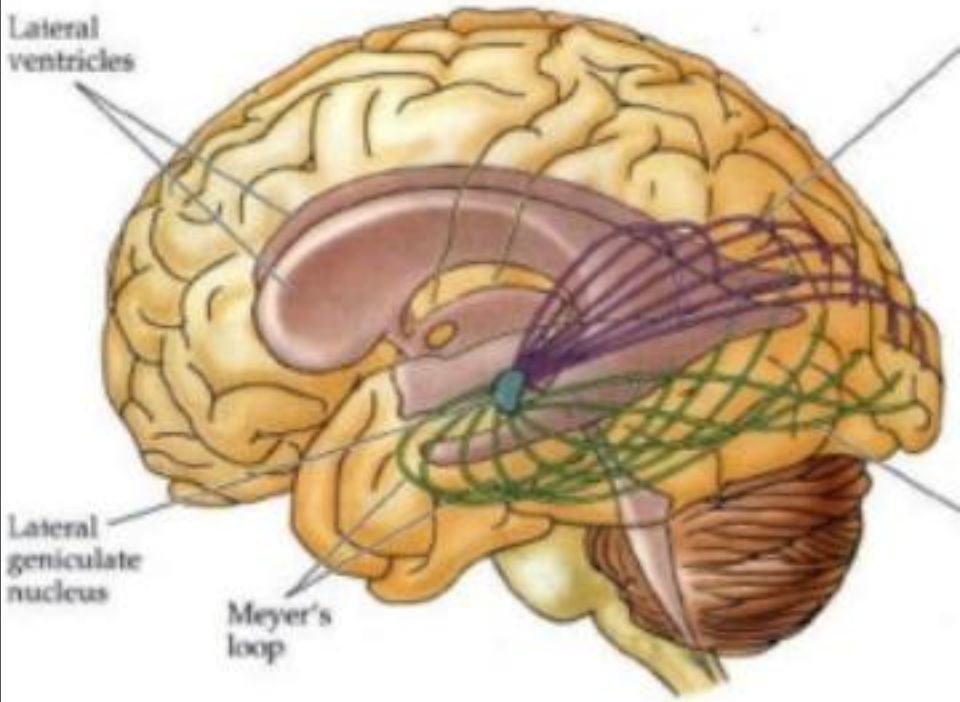
## **Balint Syndrome**

This syndrome results from the injury of both parietal lobes. It consists of three cardinal symptoms:

- 1) **optic ataxia**, in which the patient cannot use visual information to accurately coordinate actions;
- 2) **optic apraxia** in which the patient has difficulty attending to the peripheral fields when actively attending to the environment.

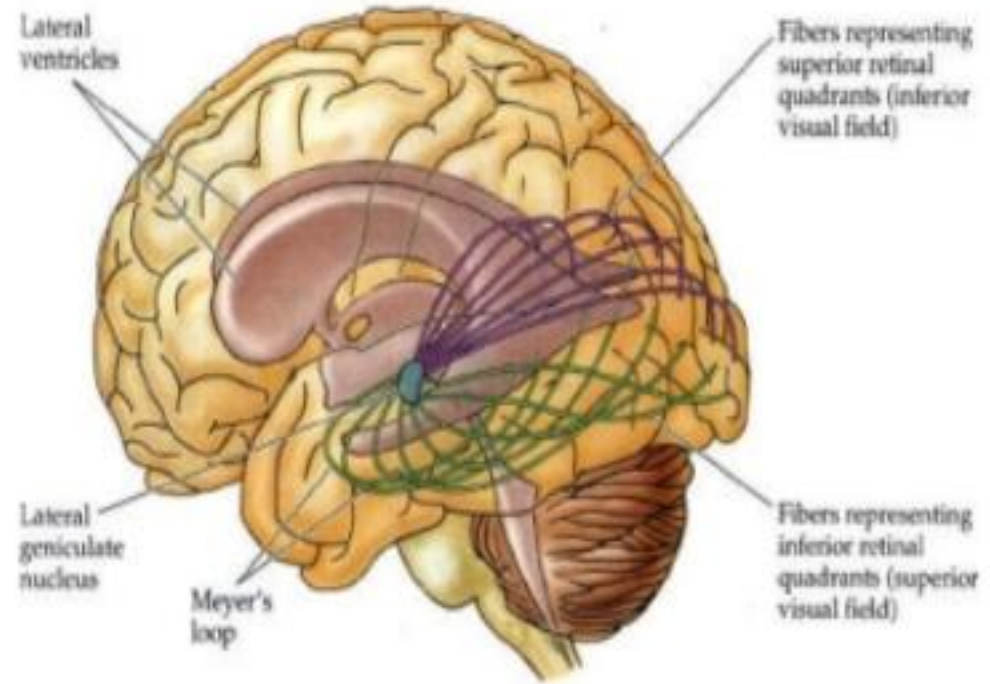
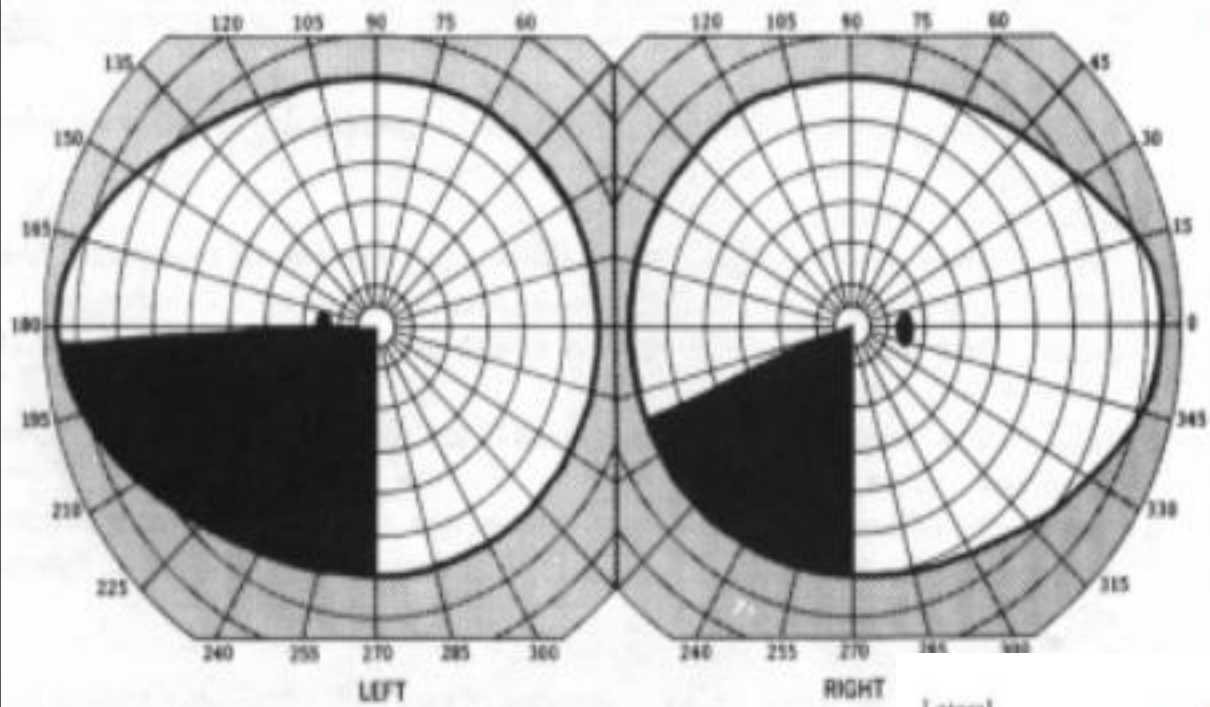
This ability to describe and recognize details but inability to recognize the whole visual array is called **simultanagnosia**.

The optic ataxia is manifested as difficulty estimating distances in visual space and coordinating actions consistent with the proper spatial arrangement.



## **Visual disorders**

- Incongruous inferior quadrantanopia
- Loss of ipsilateral OKN
- Loss of stereoscopic vision
- Impairment of smooth pursuits
- Lt sided visual neglect
- Topographagnosia





**THANK YOU**