Introduction to Neuro

&

Cognitive Technology

The 2 Components:

Neuro Research
&
Cognitive Studies

Neuro Research:

Neuroscience,

Neurophysiology,

Neuroimaging

Cognitive Studies:

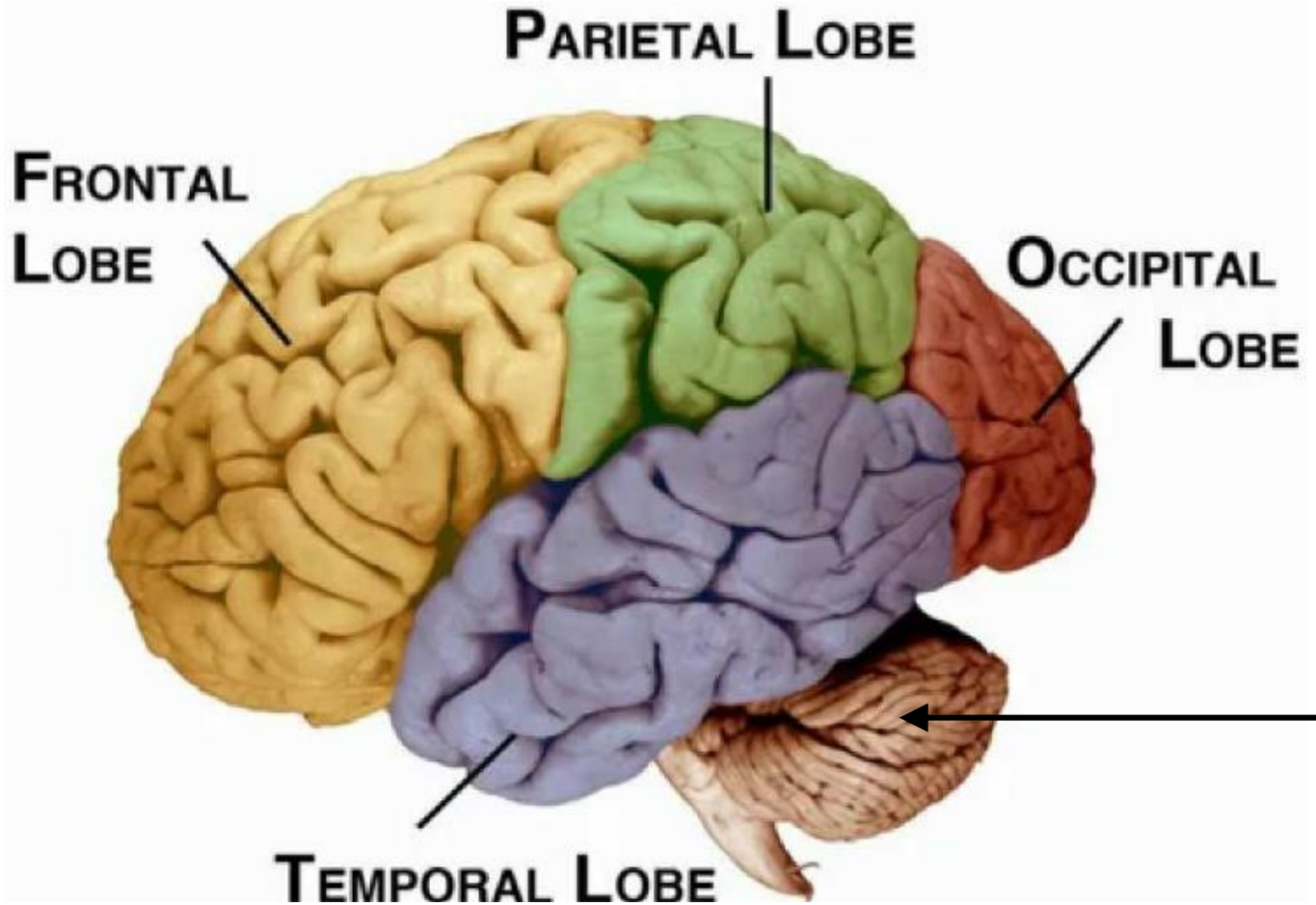
Functioning of the Mind

Where is the Mind located ?

The Human Brain:

Cerebral Functions

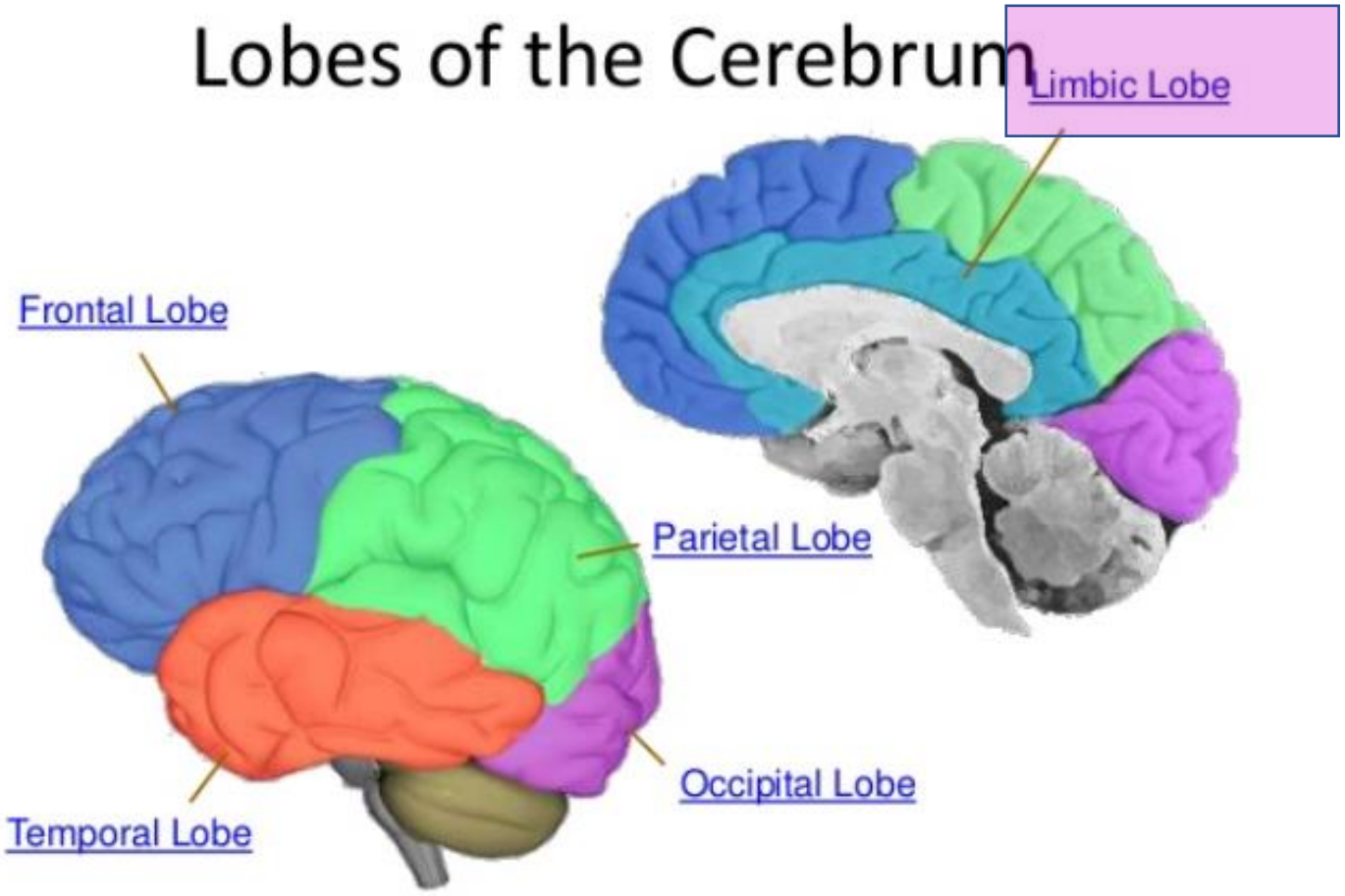
Cerebrum / Cerebral Hemispheres (5 Lobes)
&
Cerebellum



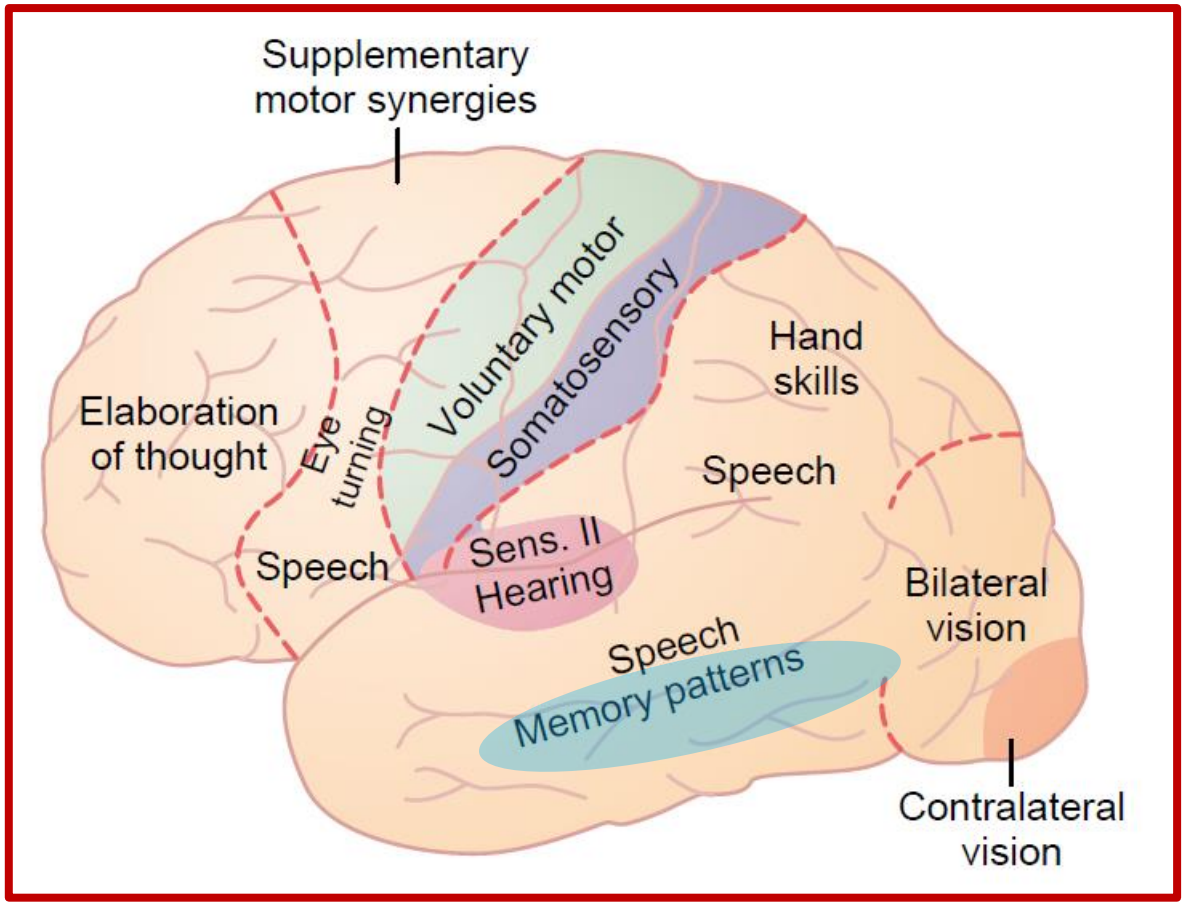
Behavioral & Emotional Mechanisms:

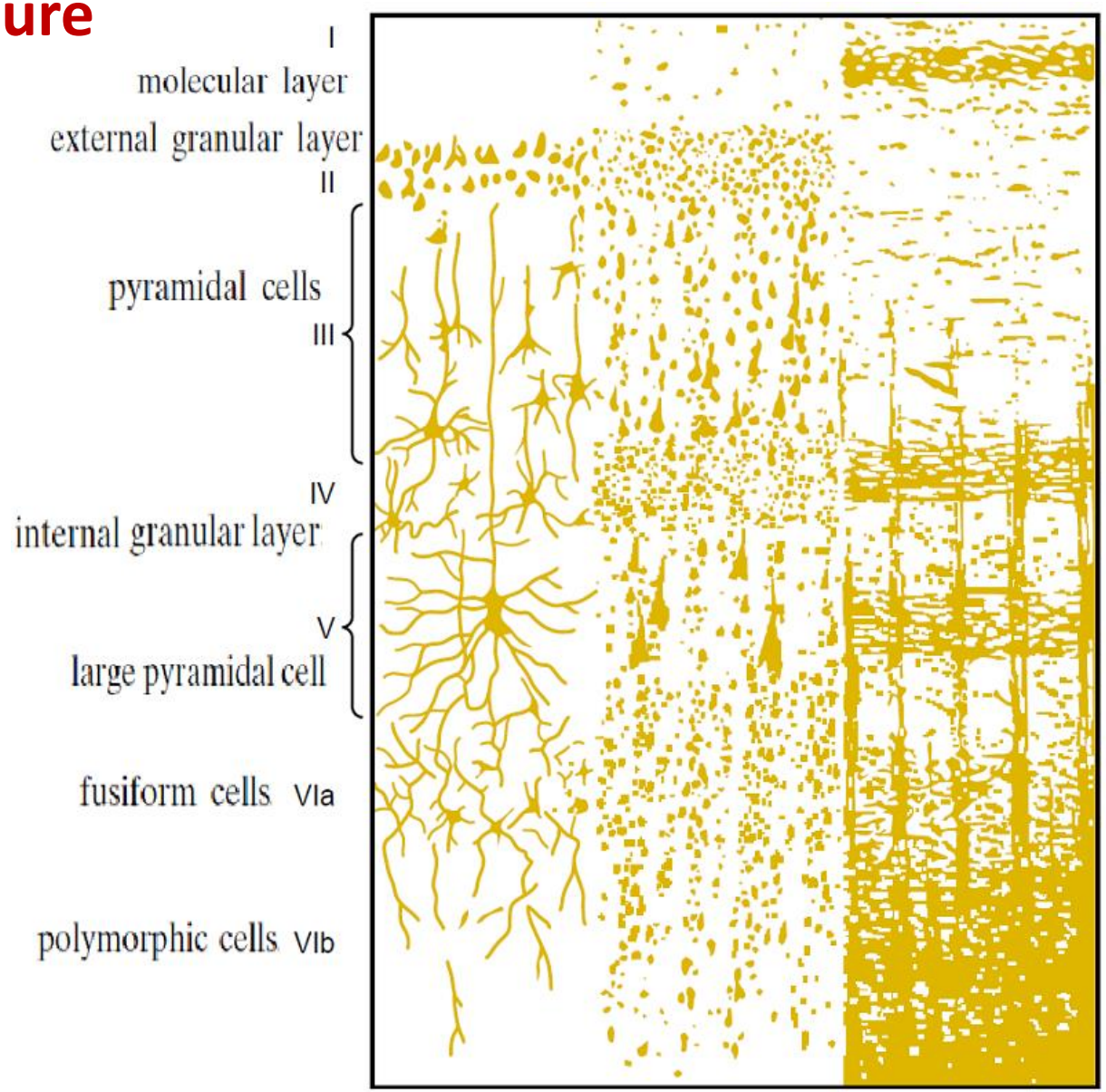
Limbic Lobe: Medial surface:

Hypo-Thalamus (GPS) & Hippo-Campus (Physio. Controller)



Functional Areas & Structure





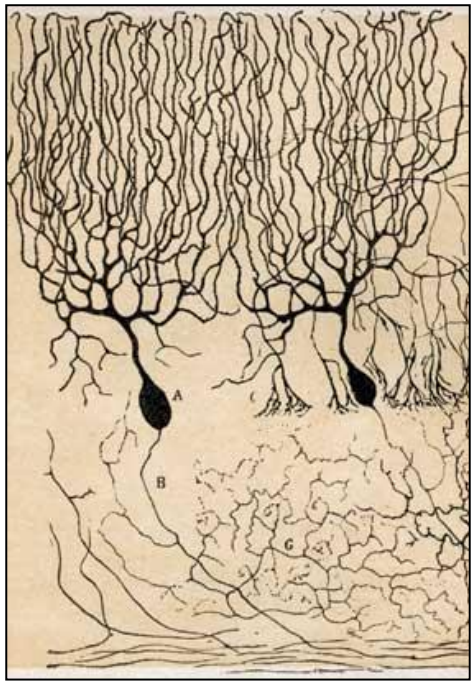
BME Contribution → Birth of Digital Computer & I.T. Era

A LOGICAL CALCULUS OF THE IDEAS IMMANENT IN NERVOUS ACTIVITY

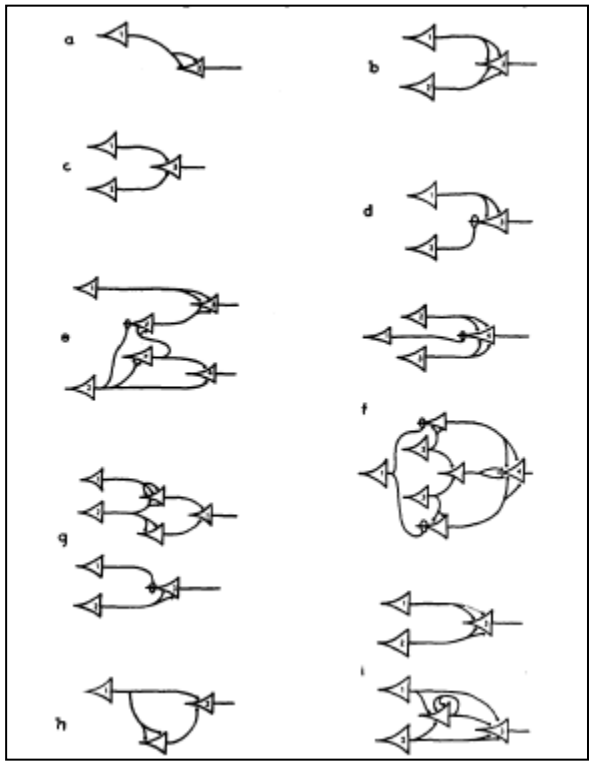
Warren S. McCulloch and Walter H. Pitts

Bulletin of Math. Biophysics, 5, 115-133 (1943).

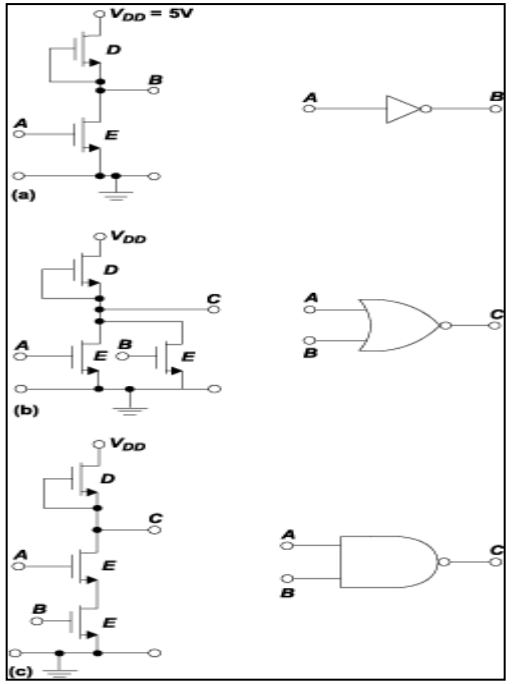
Cajal, 1906



McCulloch, 1943



ENIVAC Computer, 1946

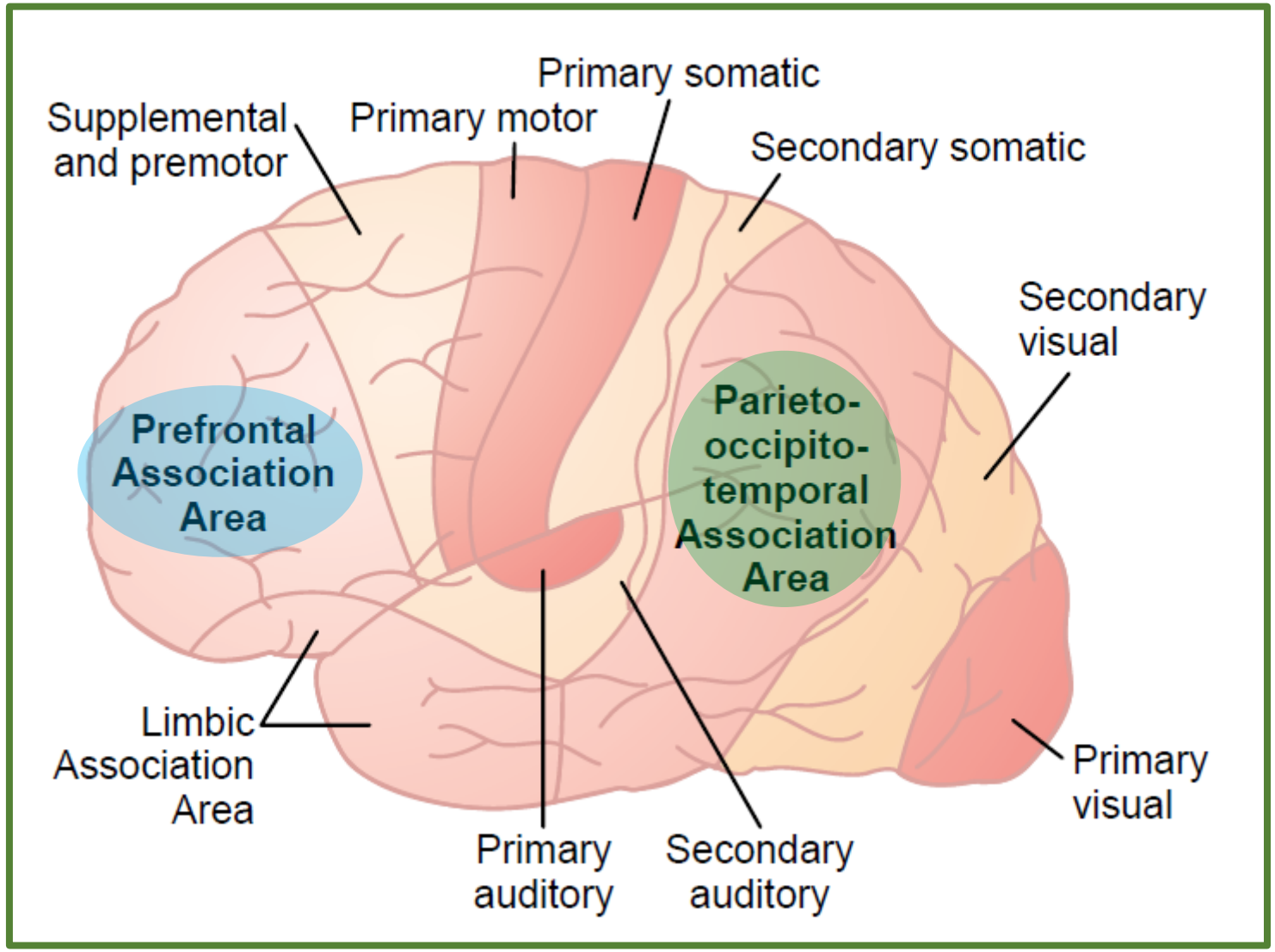


"Von Neumann Computer Architecture".

W. von Neumann: "Computers & The Brain" book. 1946.

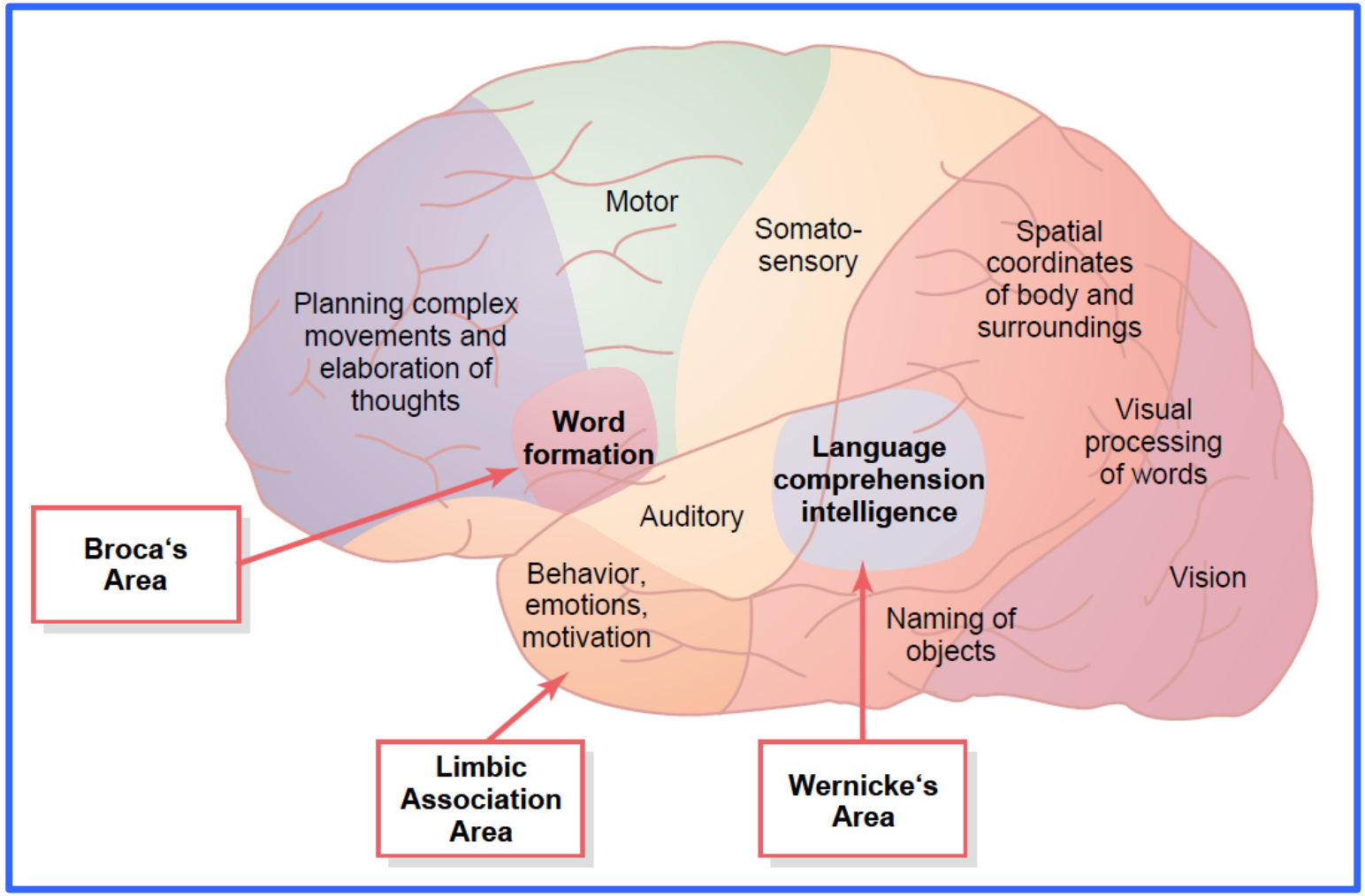
Motor & Sensory areas: Primary & Secondary

ASSOCIATION areas

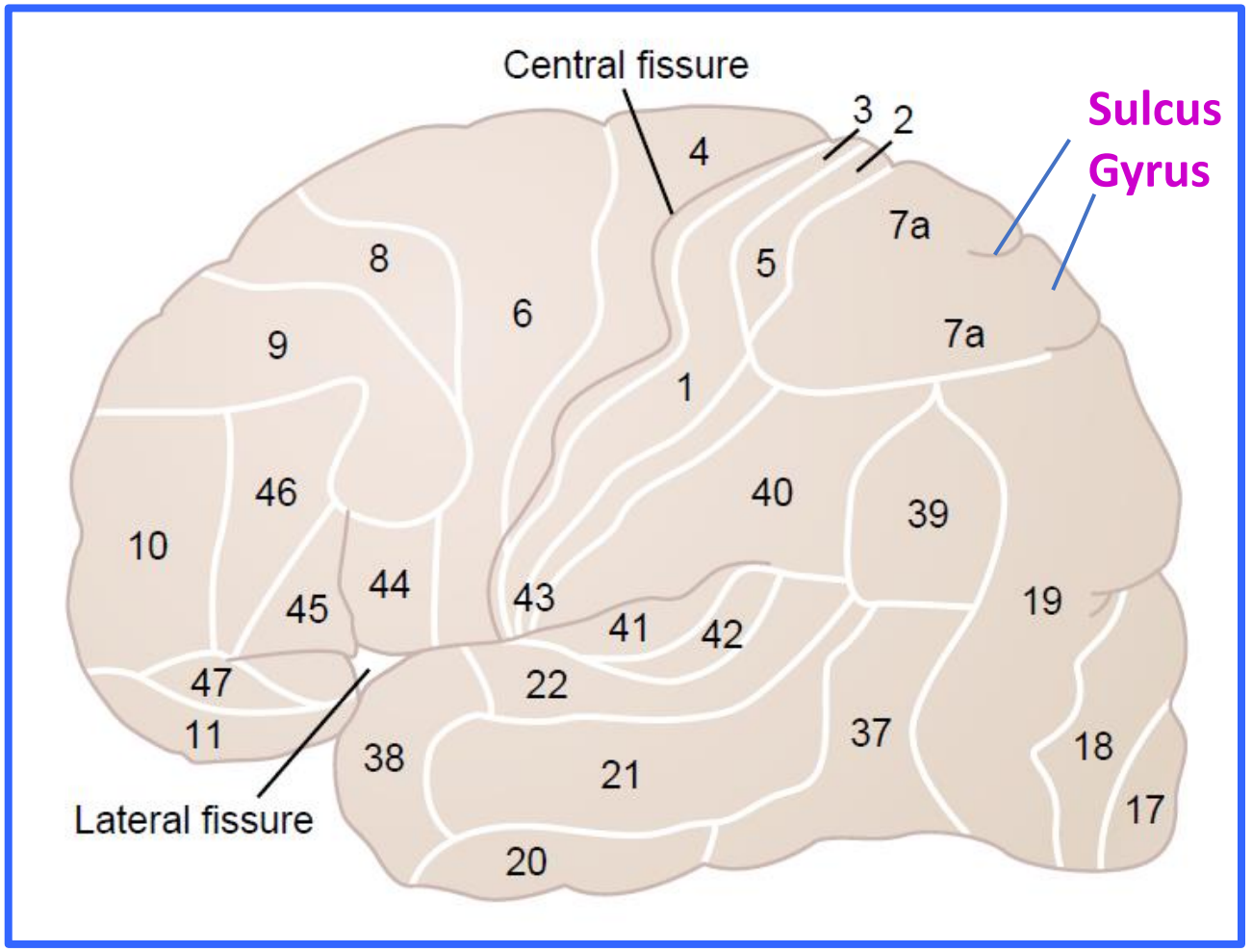


“ Language Areas ” : Hearing speech, comprehension & speech production

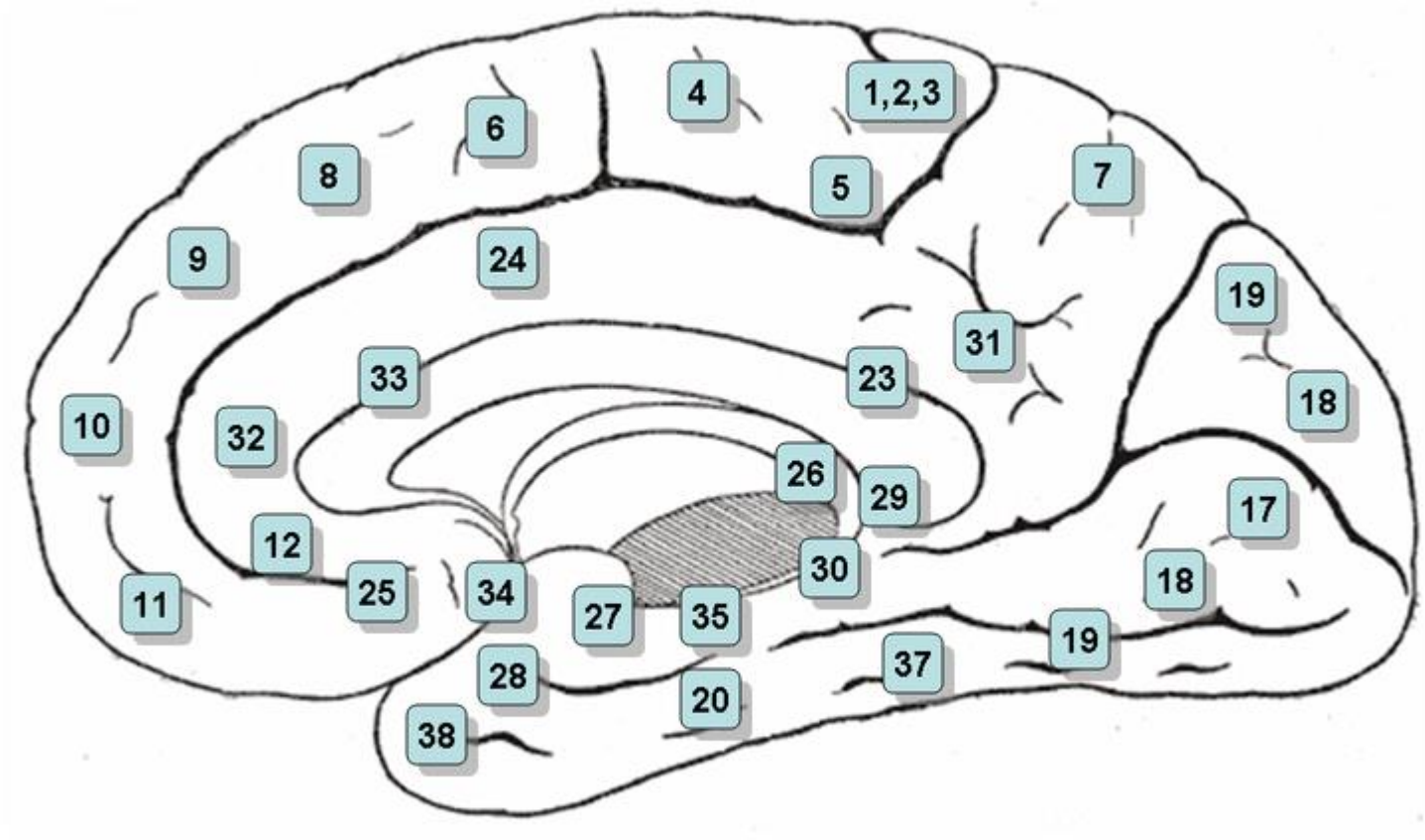
Normally in Left Brain : [But 1/4th of Left Handed people have in Right Brain]



Brodmann's Areas in Brain Atlas: Lateral Surface



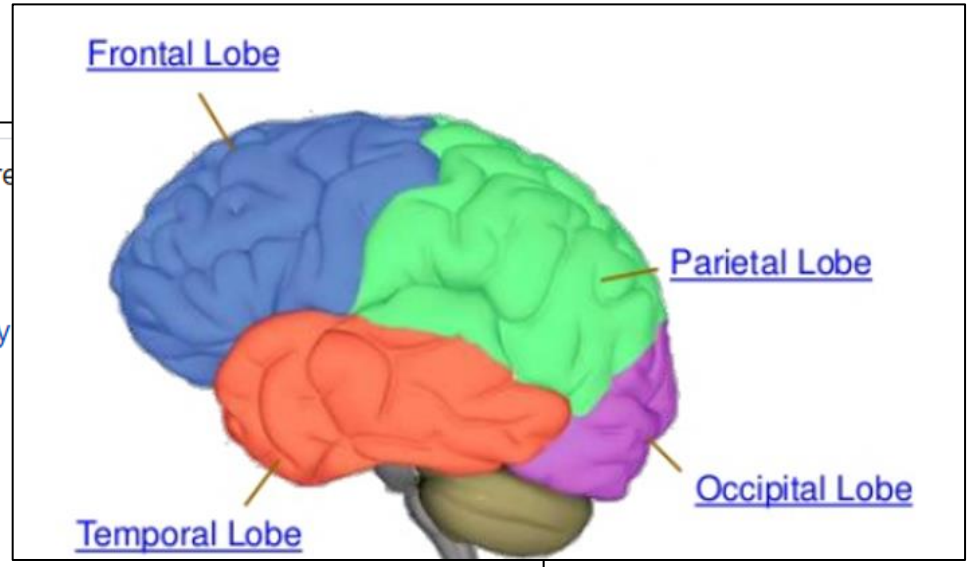
Brodmann's Areas in Brain Atlas: Medial Surface

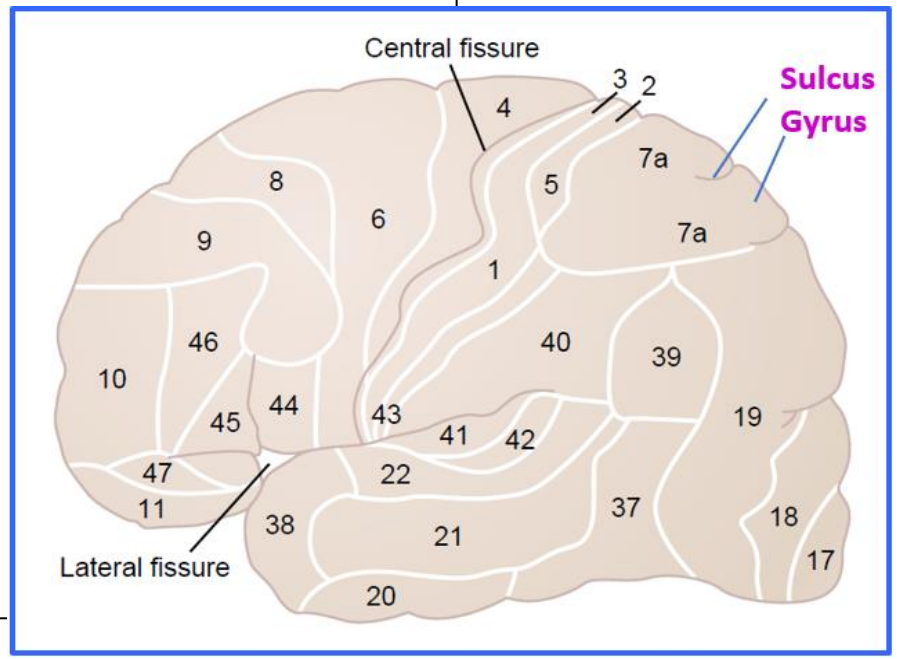


Reference Information

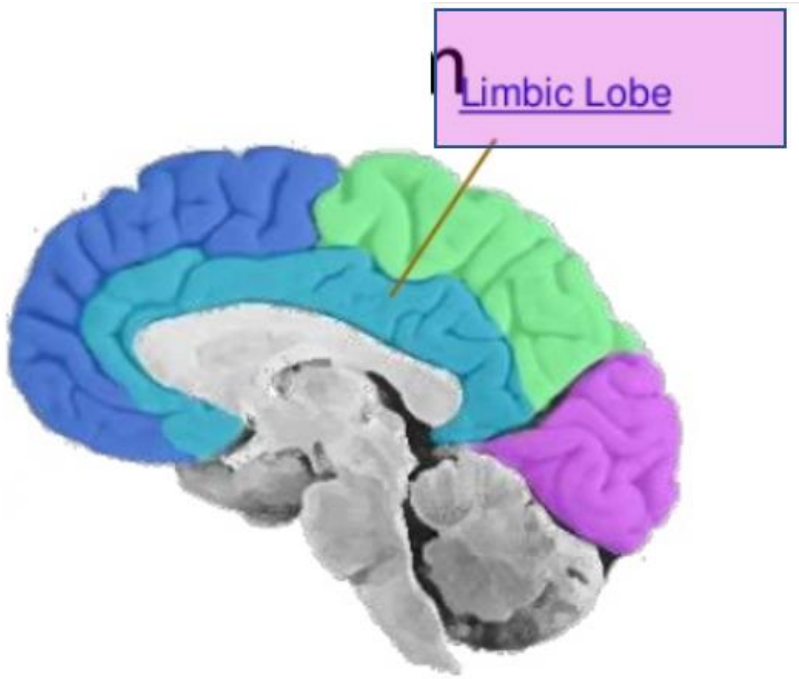
Brodmann's Areas: Lateral Surface

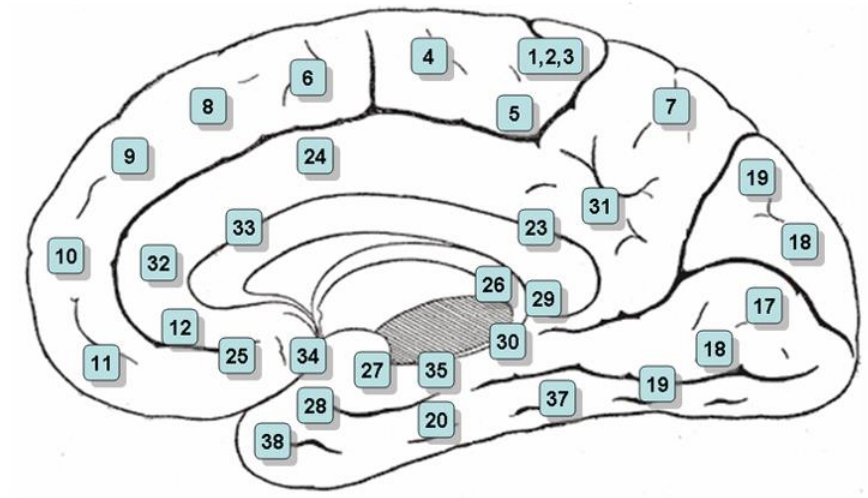
- Areas 3, 1 and 2 – Primary somatosensory cortex in the postcentral gyrus (frequently referred to as Are
- Area 4– Primary motor cortex
- Area 5 – Superior parietal lobule
- Area 6 – Premotor cortex and Supplementary Motor Cortex (Secondary Motor Cortex) (Supplementary
- Area 7 – Visuo-Motor Coordination
- Area 8 – Includes Frontal eye fields
- Area 9 – Dorsolateral prefrontal cortex
- Area 10 – Anterior prefrontal cortex (most rostral part of superior and middle frontal gyri)
- Area 11 – Orbitofrontal area (orbital and rectus gyri, plus part of the rostral part of the superior frontal gyrus)
- Area 12 – Orbitofrontal area (used to be part of BA11, refers to the area between the superior frontal gyrus and the inferior rostral sulcus)
- Area 13 and Area 14* – Insular cortex
- Area 15* – Anterior Temporal lobe
- Area 16 – Insular cortex
- Area 17 – Primary visual cortex (V1)
- Area 18 – Secondary visual cortex (V2)
- Area 19 – Associative visual cortex (V3, V4, V5)
- Area 20 – Inferior temporal gyrus
- Area 21 – Middle temporal gyrus
- Area 22 – Part of the superior temporal gyrus, included in Wernicke's area
- Area 23 – Ventral posterior cingulate cortex
- Area 24 – Ventral anterior cingulate cortex.
- Area 25 – Subgenual area (part of the Ventromedial prefrontal cortex)[5]





Brodmann's Areas: Medial Surface





- Area 26 – Ectosplenial portion of the retrosplenial region of the cerebral cortex
- Area 27 – Piriform cortex
- Area 28 – Ventral entorhinal cortex
- Area 29 – Retrosplenial cortex
- Area 30 – Subdivision of retrosplenial cortex
- Area 31 – Dorsal Posterior cingulate cortex
- Area 32 – Dorsal anterior cingulate cortex
- Area 33 – Part of anterior cingulate cortex
- Area 34 – Dorsal entorhinal cortex (on the Parahippocampal gyrus)
- Area 35 – Part of the perirhinal cortex (in the rhinal sulcus)
- Area 36 – Part of the perirhinal cortex (in the rhinal sulcus)
- Area 37 – Fusiform gyrus
- Area 38 – Temporopolar area (most rostral part of the superior and middle temporal gyri)
- Area 39 – Angular gyrus, considered by some to be part of Wernicke's area
- Area 40 – Supramarginal gyrus considered by some to be part of Wernicke's area
- Areas 41 and 42 – Auditory cortex
- Area 43 – Primary gustatory cortex
- Areas 44 and 45 – Broca's area, includes the opercular part and triangular part of the inferior frontal gyrus
- Area 46 – Dorsolateral prefrontal cortex
- Area 47 – Orbital part of inferior frontal gyrus
- Area 48 – Retrosubicular area (a small part of the medial surface of the temporal lobe)
- Area 49 – Parasubicular area in a rodent
- Area 52 – Parainsular area (at the junction of the temporal lobe and the insula)

(*) Area only found in non-human primates.

Some of the original Brodmann areas have been subdivided further, e.g., "23a" and "23b".[6]