

Consciousness

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Consciousness

- An alert cognitive state in which you are aware of yourself and your situation; "he lost consciousness"
- Awareness : having knowledge; "he had no awareness of his mistakes"
- Actually...no-one knows!

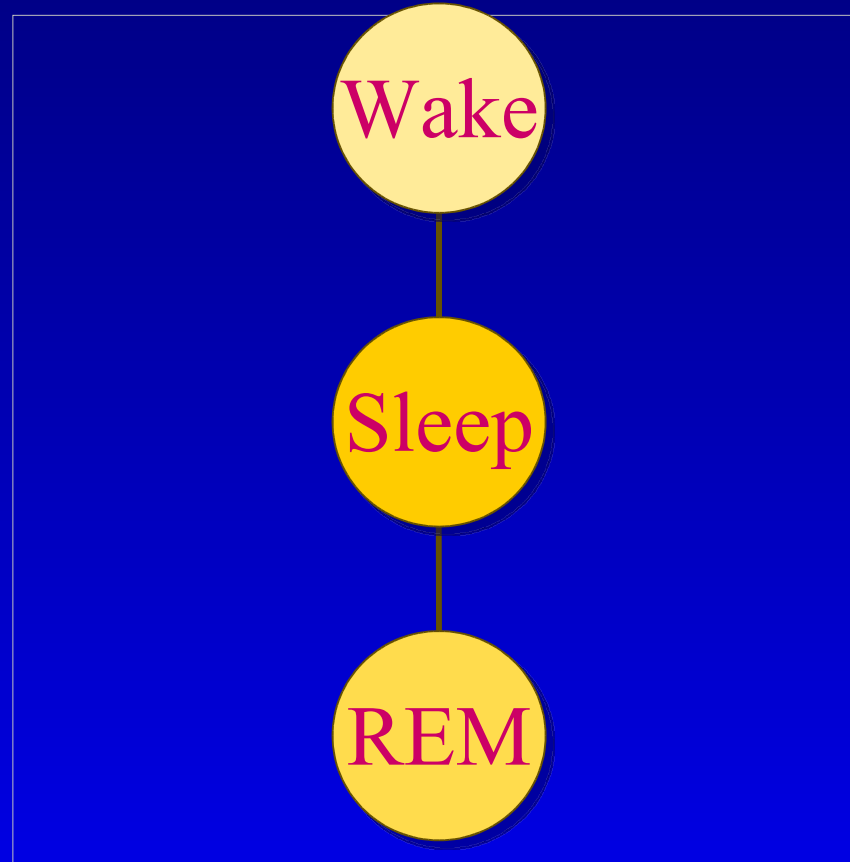


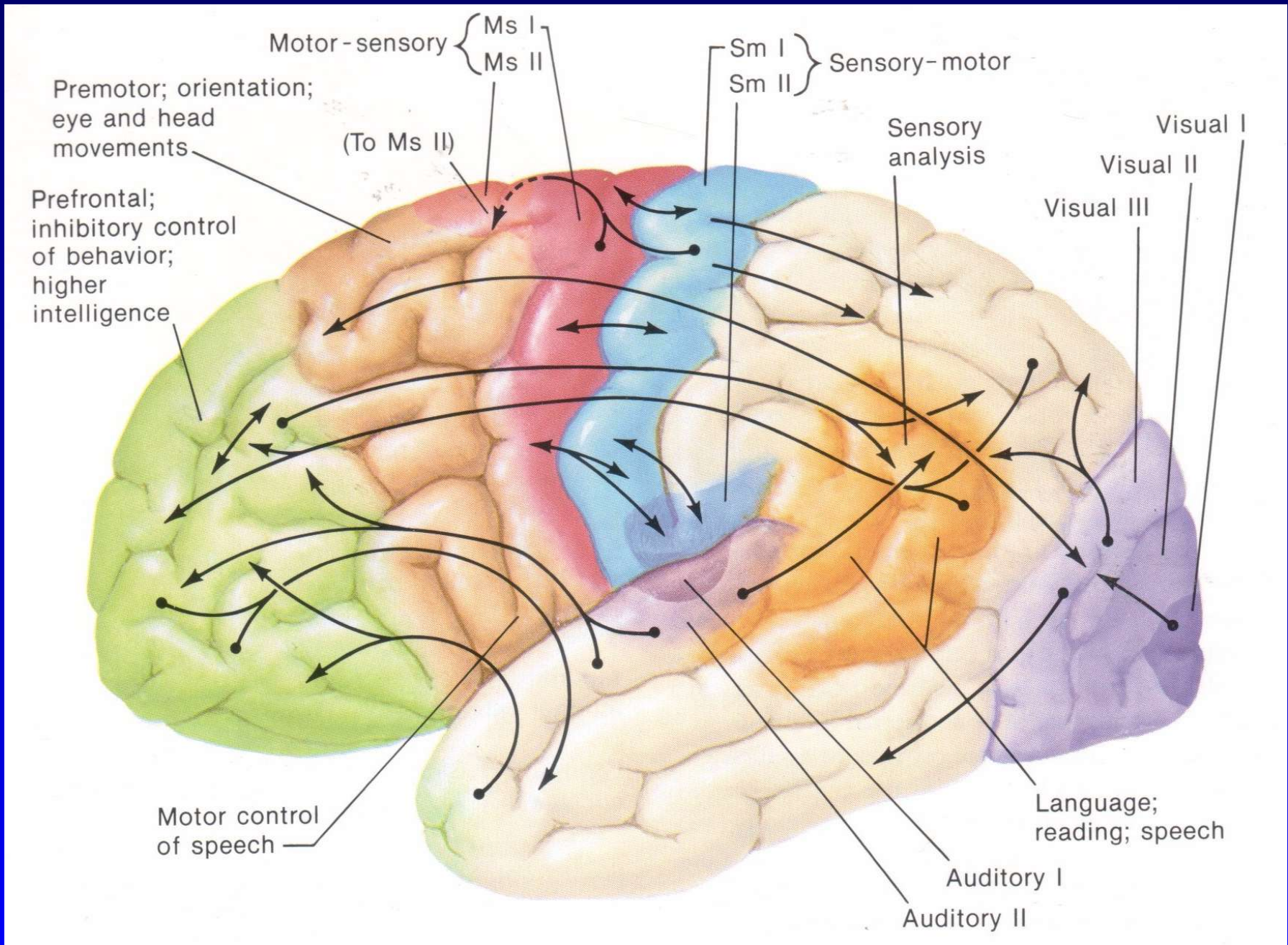
Historical Attempts

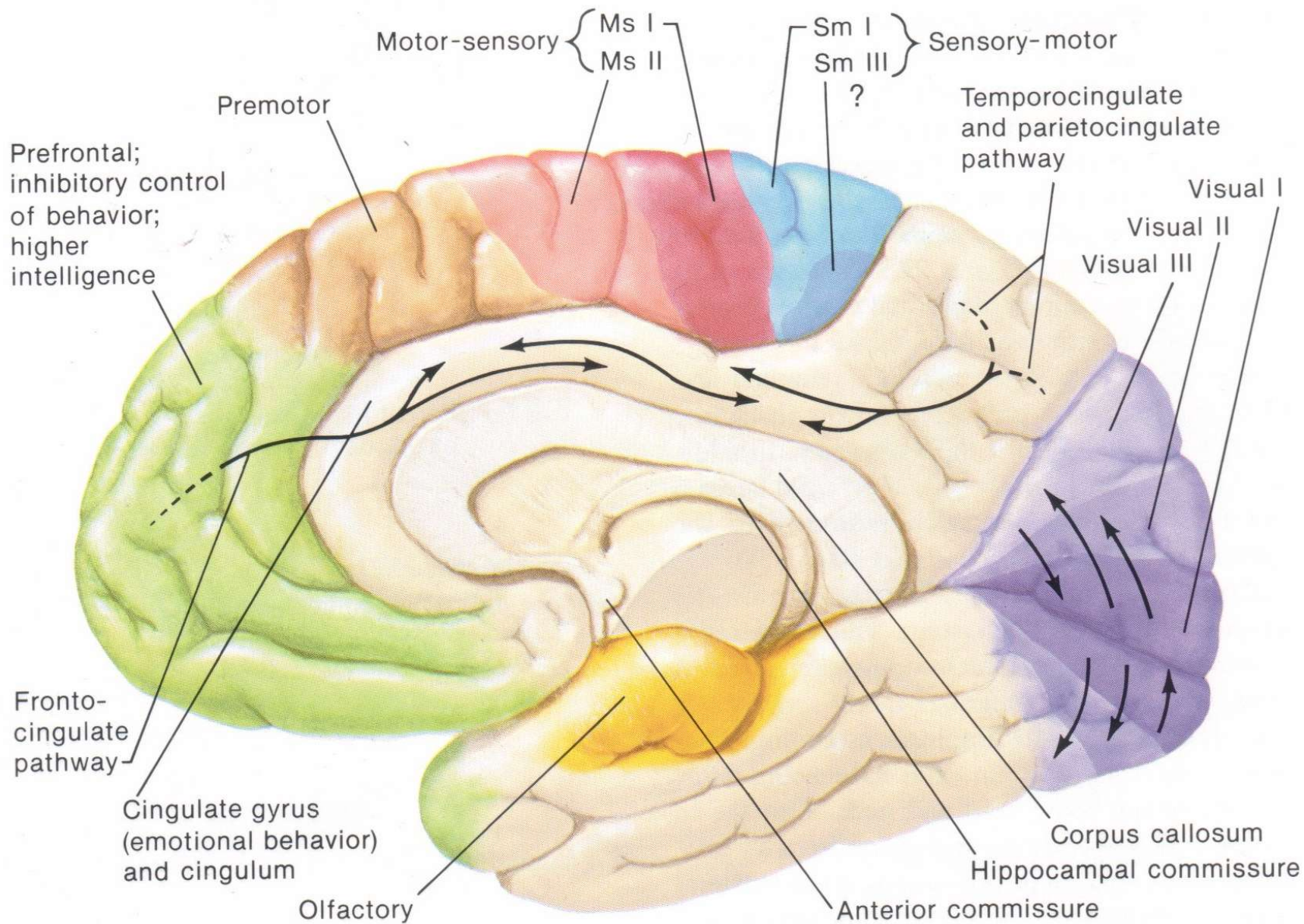
- Ancient World – Us vs. Them
- Rene Descartes – Brain \neq Mind
- Marvin Minsky – Brain = Mind
- Roger Penrose – Quantum
- Ray Kurzweil – Mechanism



States of Consciousness

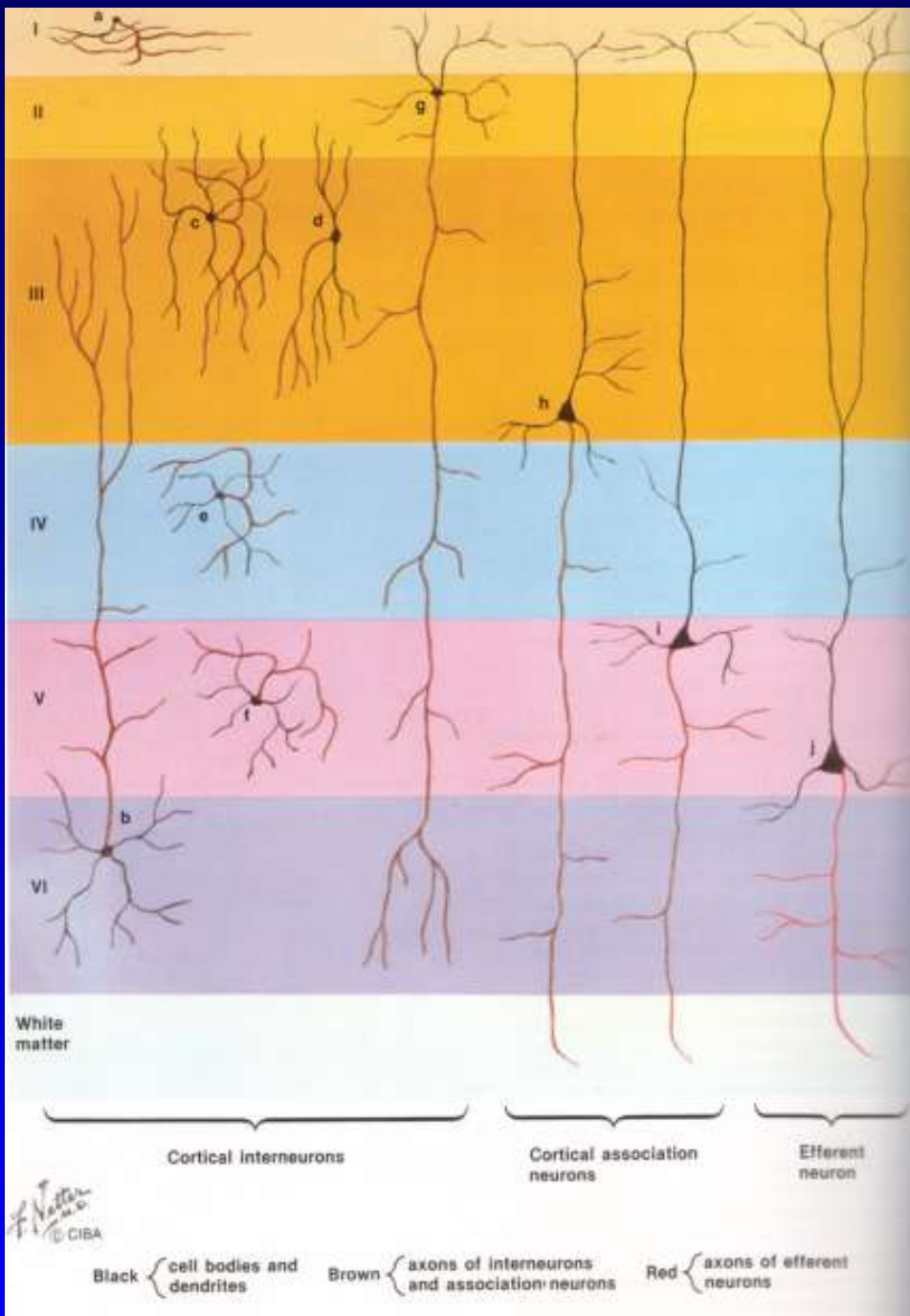




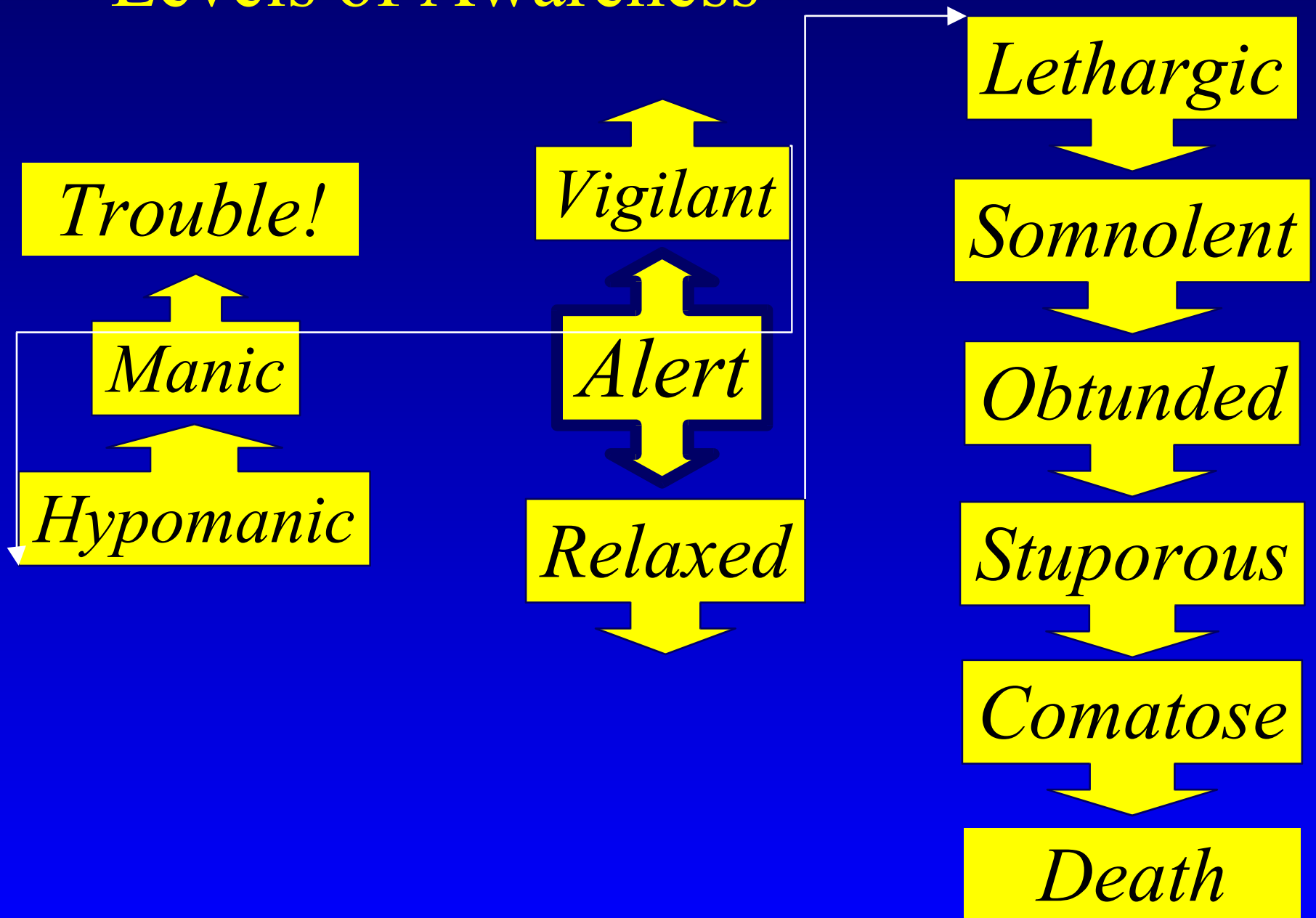


Six Layered Cortex

Interneurons
Association Neurons
Efferent Neurons
Columns
Fields
Modules



Levels of Awareness



Pathological States

- Trance
- Fugue
- Confusional State or Delirium
- Seizure or Status Epilepticus
- Catatonia
- Coma

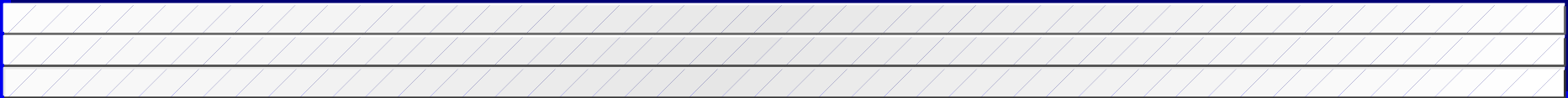
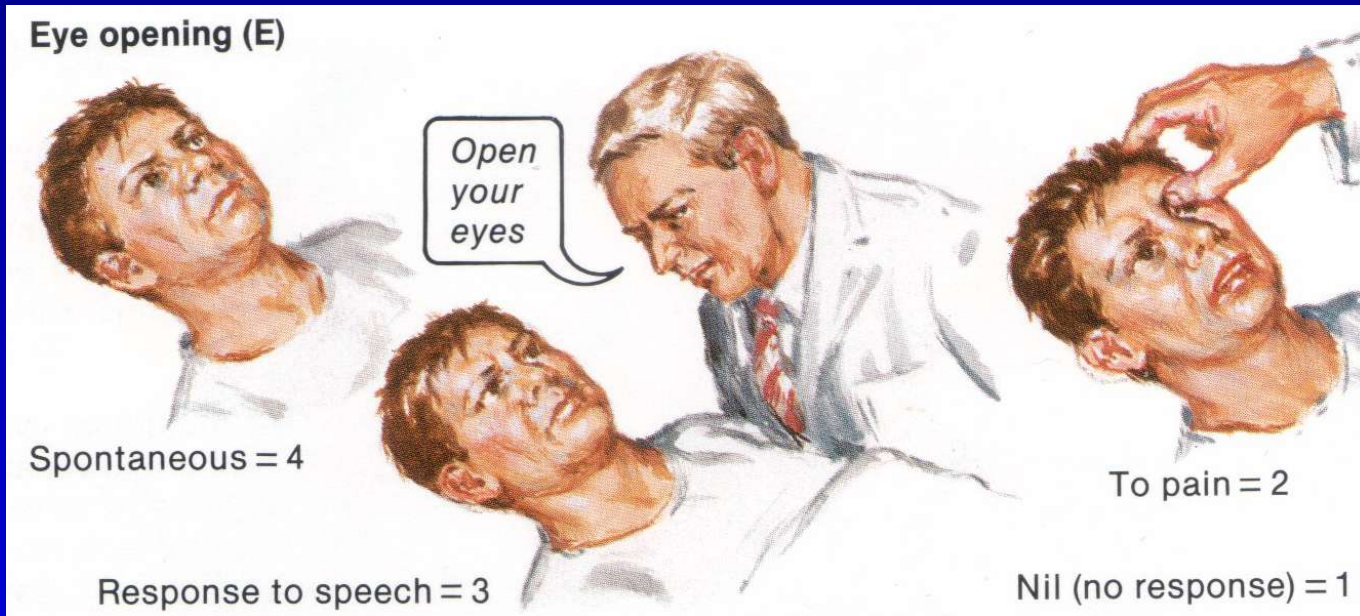


Coma Examination

- Glasgow Coma Scale
- Neurological Examination
 - ◆ Respiration
 - ◆ Doll's Eyes
- Apnea Examination



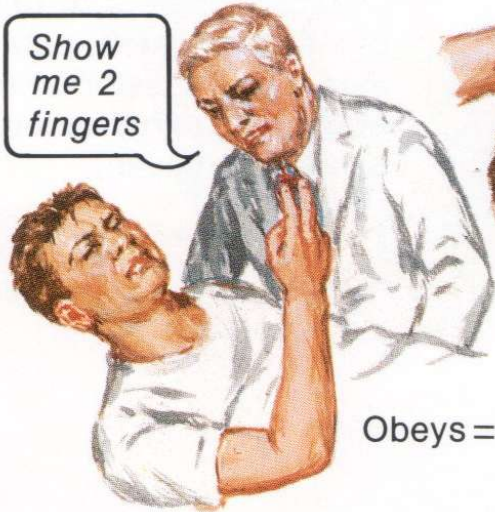
Glasgow Coma Scale I



Glasgow Coma Scale II

Motor response (M)

Show me 2 fingers



Obeys = 6



Localizes = 5



Withdraws = 4



Abnormal flexor response = 3

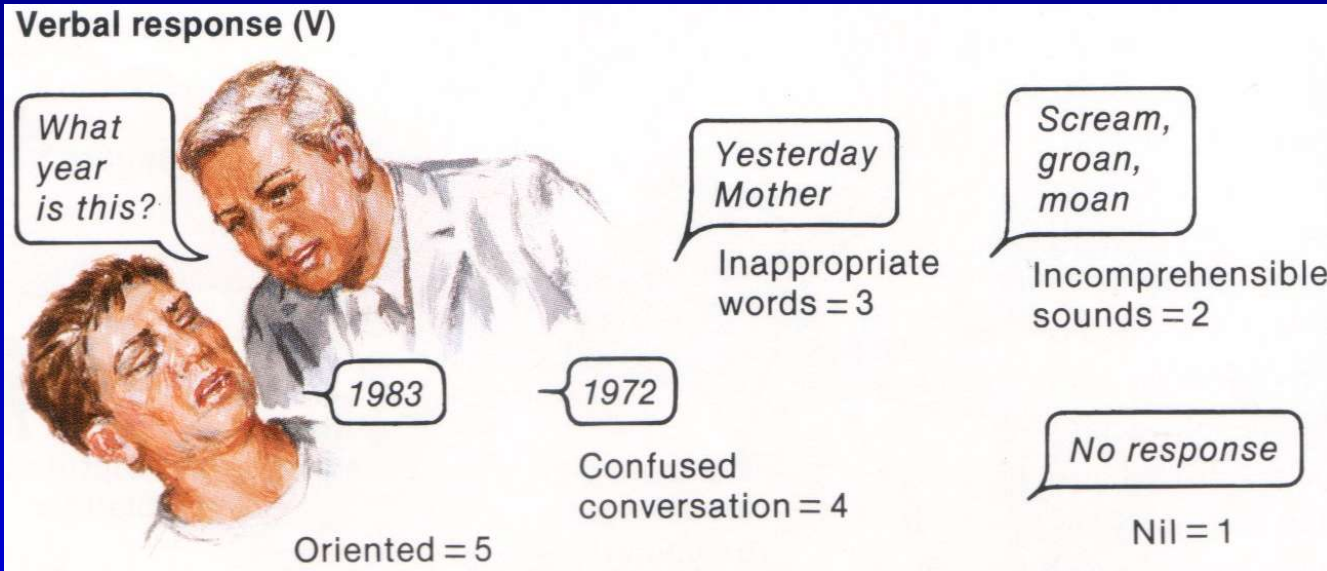
F. Netter M.D.
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Extensor response = 2

Nil (no response) = 1

Glasgow Coma Scale III

Verbal response (V)



The illustration shows a doctor leaning over a patient. The patient is lying down with their eyes closed. The doctor is looking at the patient's face. There are several speech bubbles and text boxes around the patient and doctor, illustrating different levels of verbal response.

- What year is this?** (Question)
- 1983** (Response: Oriented = 5)
- 1972** (Response: Confused conversation = 4)
- Yesterday Mother** (Response: Inappropriate words = 3)
- Scream, groan, moan** (Response: Incomprehensible sounds = 2)
- No response** (Response: Nil = 1)



GCS total score

- E+M+V
 - ◆ 15 = Wide awake
 - ◆ 3 = Deep coma
- Head injury
 - ◆ Lower number, worse prognosis
 - ◆ Doesn't mean as much in other conditions



Levels of Coma

- Persistent Vegetative State
 - ◆ Coma Vigil
 - ◆ Alpha Coma
- Decorticate Posturing - Flexion
- Decerebrate Posturing - Extension



Doll's Eyes

- Normal visual fixation reflex
 - ◆ Turn the head horizontally and vertically
- Conscious individual can suppress
- Comatose individual cannot suppress
- Absent or asymmetric:
 - ◆ Horizontal - brainstem injury
 - ◆ Vertical - midbrain injury



Breathing Patterns in Coma

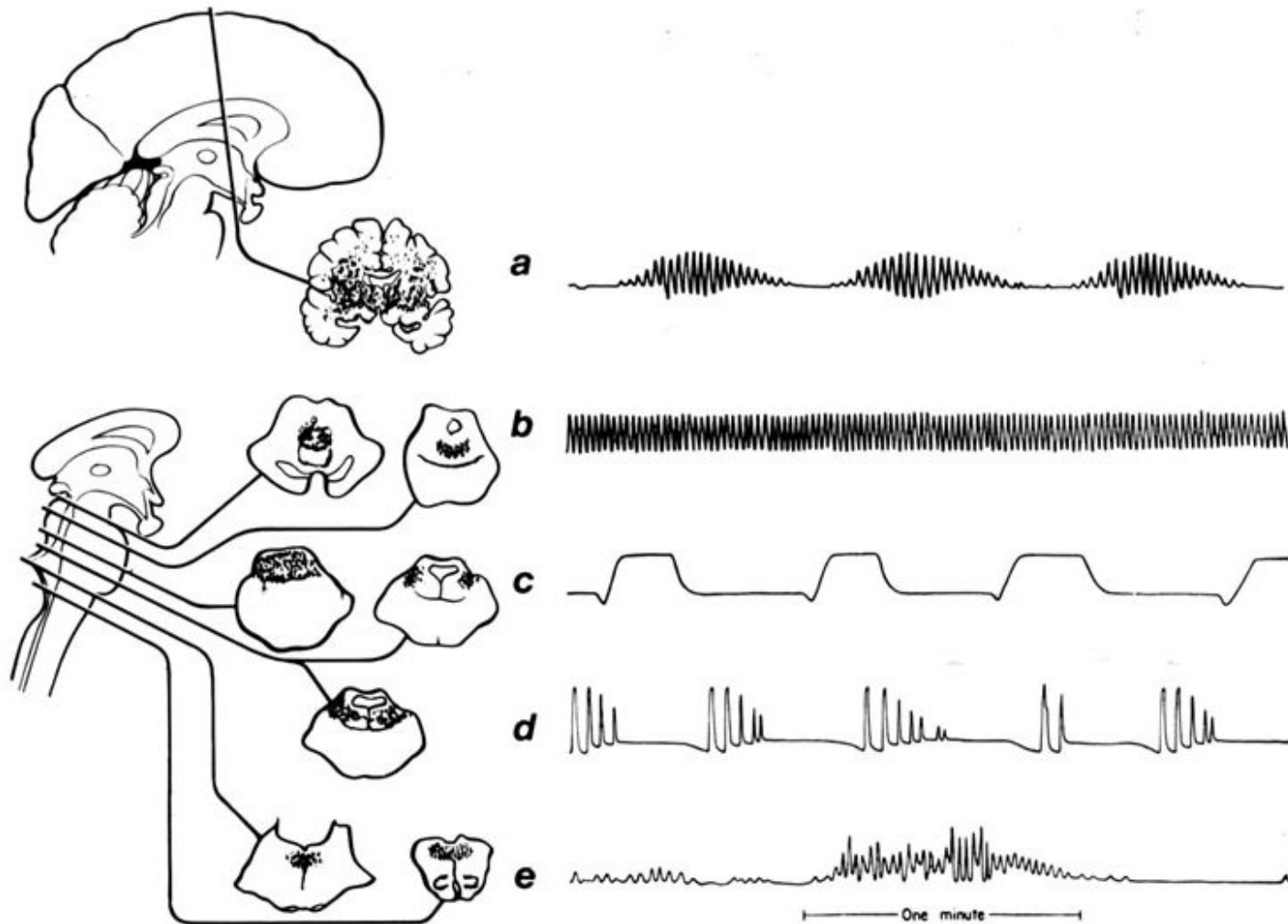


Figure 6. Abnormal respiratory patterns associated with pathologic lesions (shaded areas) at various levels of the brain. Tracings by chest-abdomen pneumograph, inspiration reads up. **a**, Cheyne-Stokes respiration. **b**, Central neurogenic hyperventilation. **c**, Apneusis. **d**, Cluster breathing. **e**, Ataxic breathing.

Apnea Examination

- Ventilator-dependent coma patient
 - ◆ Preparation for organ donation
- Must correct hypothermia and hypotension
- Preoxygenate with 100% O₂ for 10 minutes
- Measure arterial CO₂ concentration
 - ◆ Normal is 40 mmHg
 - ◆ Rises to 60 mmHg in 8-10 minutes



Current Problems I

- How do you detect state of consciousness?
 - ◆ Observation
 - Eye movements
 - Respiration
 - ◆ EEG
 - ◆ PET/SPECT
- Treatment of Coma
 - ◆ Underlying cause must be identified



Current Problems II

- Are there mixed states of consciousness?
 - ◆ Narcolepsy
 - ◆ Hypnagogic hallucinations
 - ◆ Hypnosis – Trance
 - ◆ Fugue



Current Problems III

- Is consciousness unique to humans?
 - ◆ Animals?
 - ◆ Plants?
 - ◆ Bacteria?
 - ◆ Viruses?
 - ◆ Machines?
 - ◆ Ideas?

