USE OF LANGUAGE: speaking, listening, writing, reading (p 487)

Controlling centers found in L hemisphere in 90% population
(95% of R handed persons, 65% of L handed persons.)
L brain better at analysis
R hemisphere at holistic view

Two areas involved in language, seen in aphasics (without speech): (p 488)
- **Wernicke (#40)** SENSORY: auditory association: speech interpretation. Damage to temporal lobe near auditory center therefore affects comprehension.
- **Broca (#44)** p 488 MOTOR: controls muscles of mouth and tongue (speech) lateral L frontal lobe) damage causes impaired (slurred) speech.

Proposed model of language, communication:
- Connecting tract tells Broca's what Wernicke's thinks when speaking: coordinates speech
- **Angular gyrus** connects with visual cortex:
  - contains programs converting visual input into auditory pattern in Wernicke's area.
  - Damage to angular gyrus leads to alexia or agraphia

LIMBIC SYSTEM (see p 481 for diagram)
- limbic = border, boundary, “edge” because it lies between the cerebrum and thalamus, encircling the upper brain stem.
- Limbic system is a motivational system, includes dopamine pleasure receptors making you want to perform tasks, sexual arousal
- functions: 1) mediates emotional responses
  2) links conscious, intellectual with unconscious and autonomic functions of brain stem
  3) facilitates memory storage and retrieval

COMPONENTS OF LIMBIC SYSTEM: (p481)
- **hypothalamus** regulates autonomic NS, centers for rage, rear, pain, sex arousal, please
- **Olfactory bulbs** part of olfactory tract,(C.N. I).
- **rhinencephalon**: olfactory bulbs and associated areas
  - Associates smell with emotions and behavior resp.
- **mamillary bodies** on floor of hypothalamus, processes sensory, esp olfactory
- **Fornix** “arch” tracts connect hypothalamus especially hypothalamic mamillary bodies, to hippocampus
- **hippocampus** “sea horse” (or horse field)layer of cortex below lat ventricles, critical for long term memory.
- **amygdala** “almond” at end of caudate nucleus, links limbic to cerebrum, fight/flight, aggression, links memories to emotions
  - Important in learning, long-term memory and retrieval
- **cingulate gyrus** of the cerebrum, adjacent and above corpus callosum
- **basal ganglia (485)** “bottom knots”: collection of nuclei, inhibit motor actions
- **caudate nucleus** “tail” connected to amygdala by the caudate tail.

Figure AB-16: Limbic System

Diagram colors are consistent with Figure AB-17.