SENSATION AND PERCEPTION

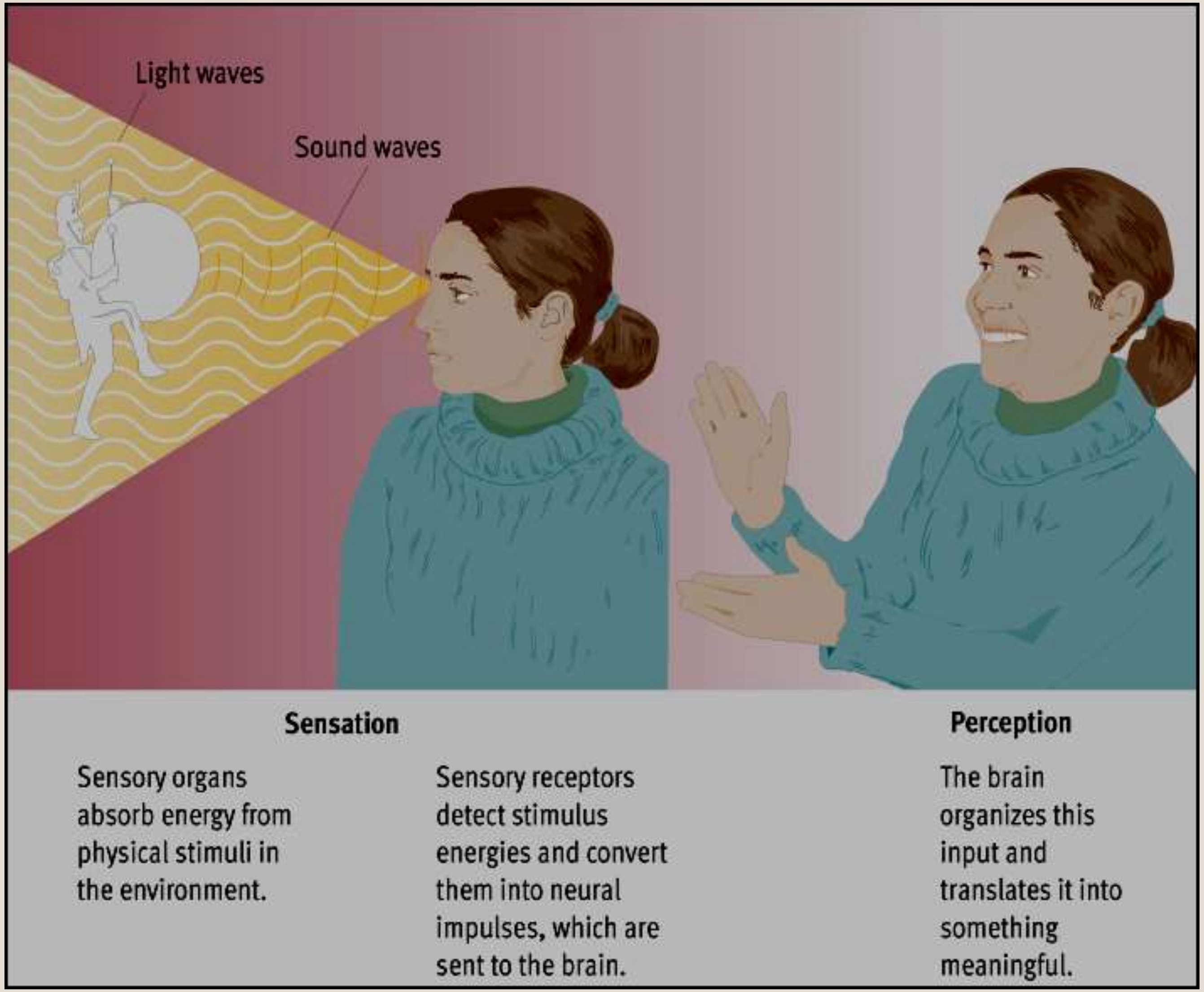

Figure 4.1

The distinction between sensation and perception. Sensation involves the stimulation of sensory organs, whereas perception involves the processing and interpretation of sensory input. As this illustration shows, the two processes merge at the point where sensory receptors convert physical energy into neural impulses.

Some key terms

- Perceptual Features: Basic stimulus patterns
- Sensory Coding: Converting important features of the world into neural messages understood by the brain
- Sensory Localization: Type of sensations you experience depends on which area of the brain is activated

General properties of sensory systems

- Sensation: Process of detecting physical energies with sensory organs
- Perception: Mental process of organizing sensations into meaningful patterns
- Data Reduction System: Any system that selects, analyzes, and condenses information (e.g., the sensory systems)
- Transducer: A device that converts energy from one system into energy in another (e.g., the receptors)

Vision

- Visible Spectrum: Part of the electromagnetic spectrum to which the eyes respond
- Lens: Structure in the eye that focuses light rays
- Photoreceptors: Light-sensitive cells in the eye—2 kinds
- Cornea: Transparent membrane covering the front of the eye; bends light rays
- Retina: Light-sensitive layer of cells in the back of the eye; contains the photoreceptors
  - Easily damaged from excessive exposure to light (staring at an eclipse)

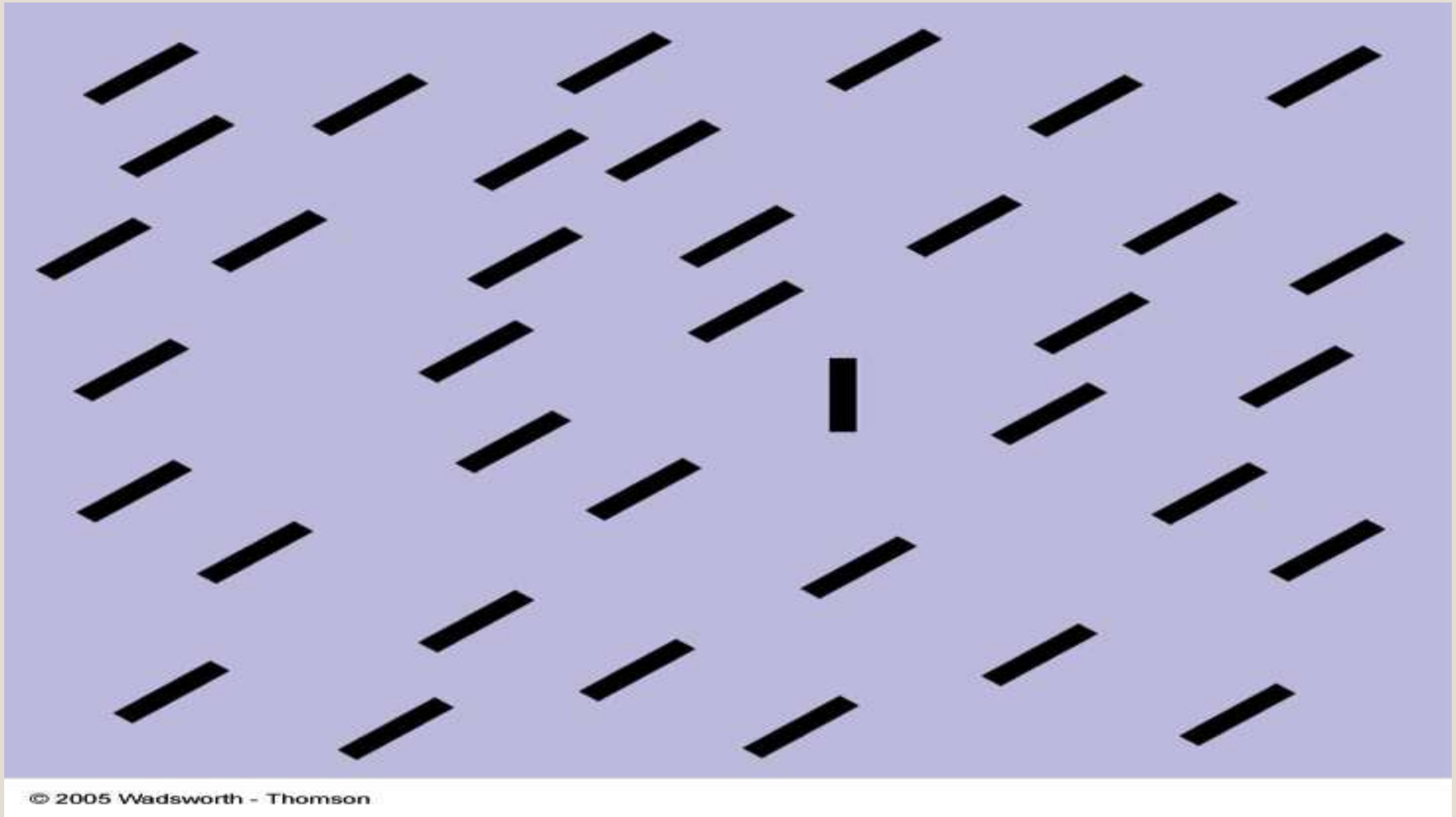

FIGURE 4.1 Visual pop-out. (Adapted from Ramachandran, 1992b.) Pop-out is so basic that babies as young as 3 months respond to it

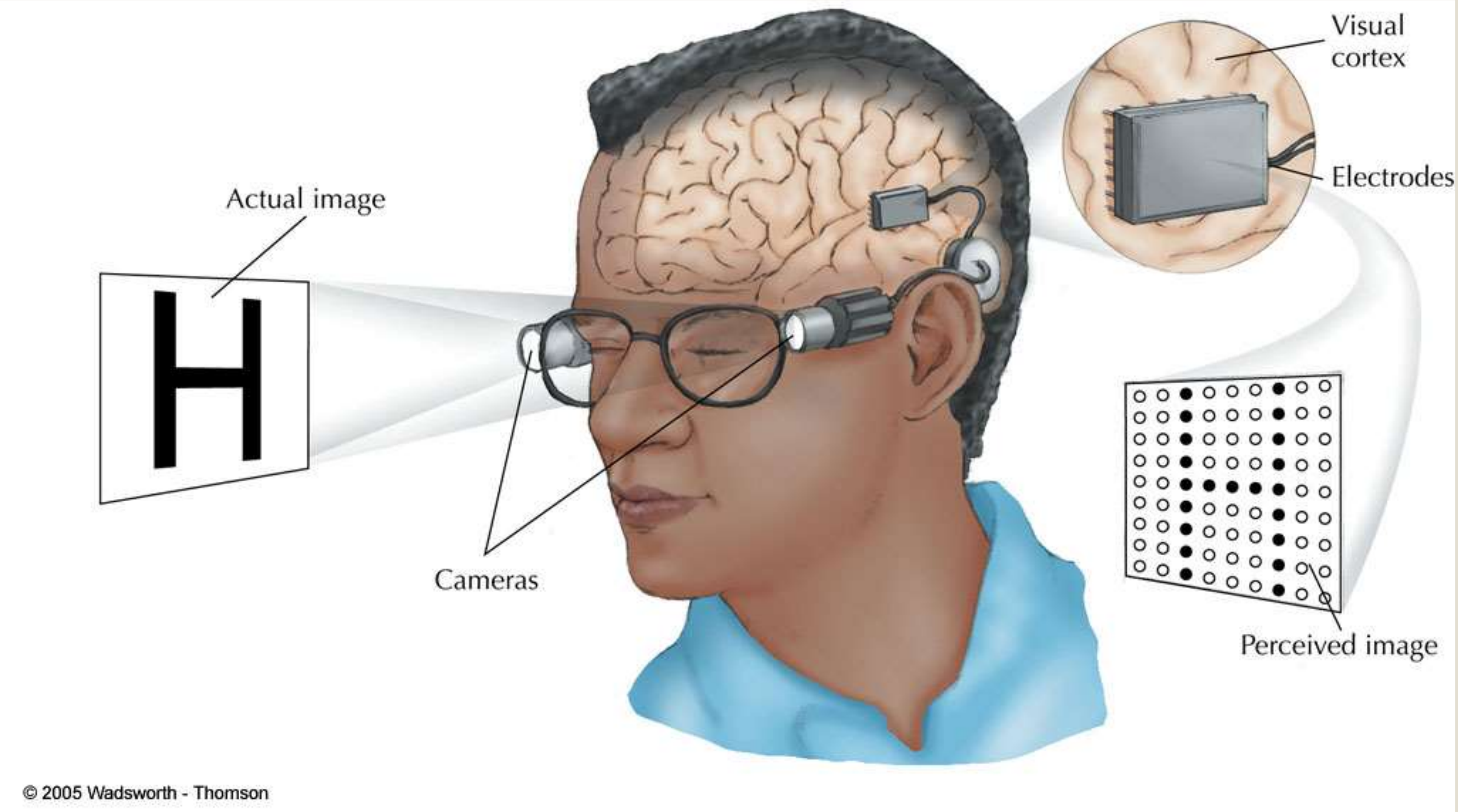

FIGURE 4.2 An artificial visual system.

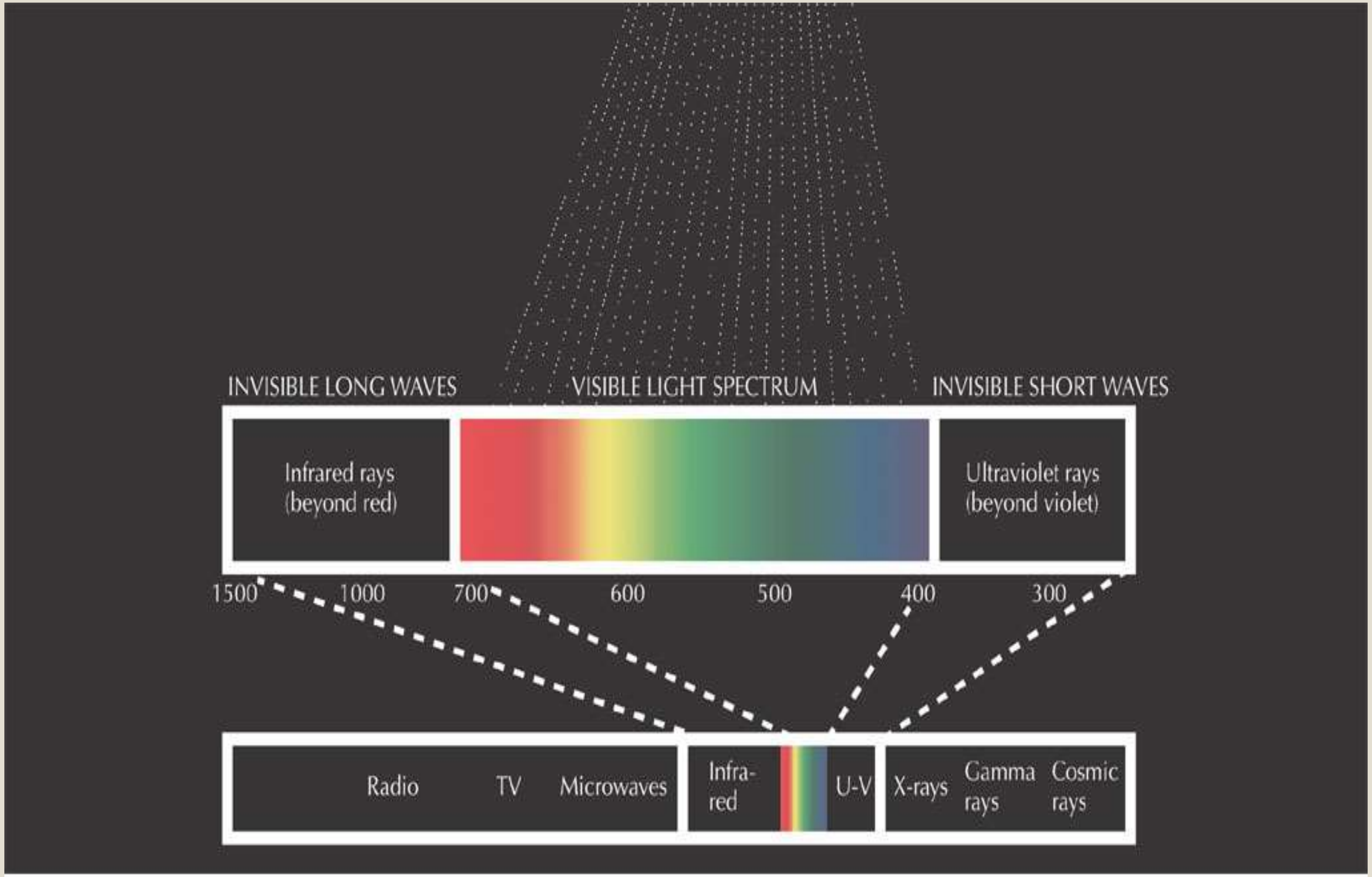

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FIGURE 4.3 The visible spectrum.

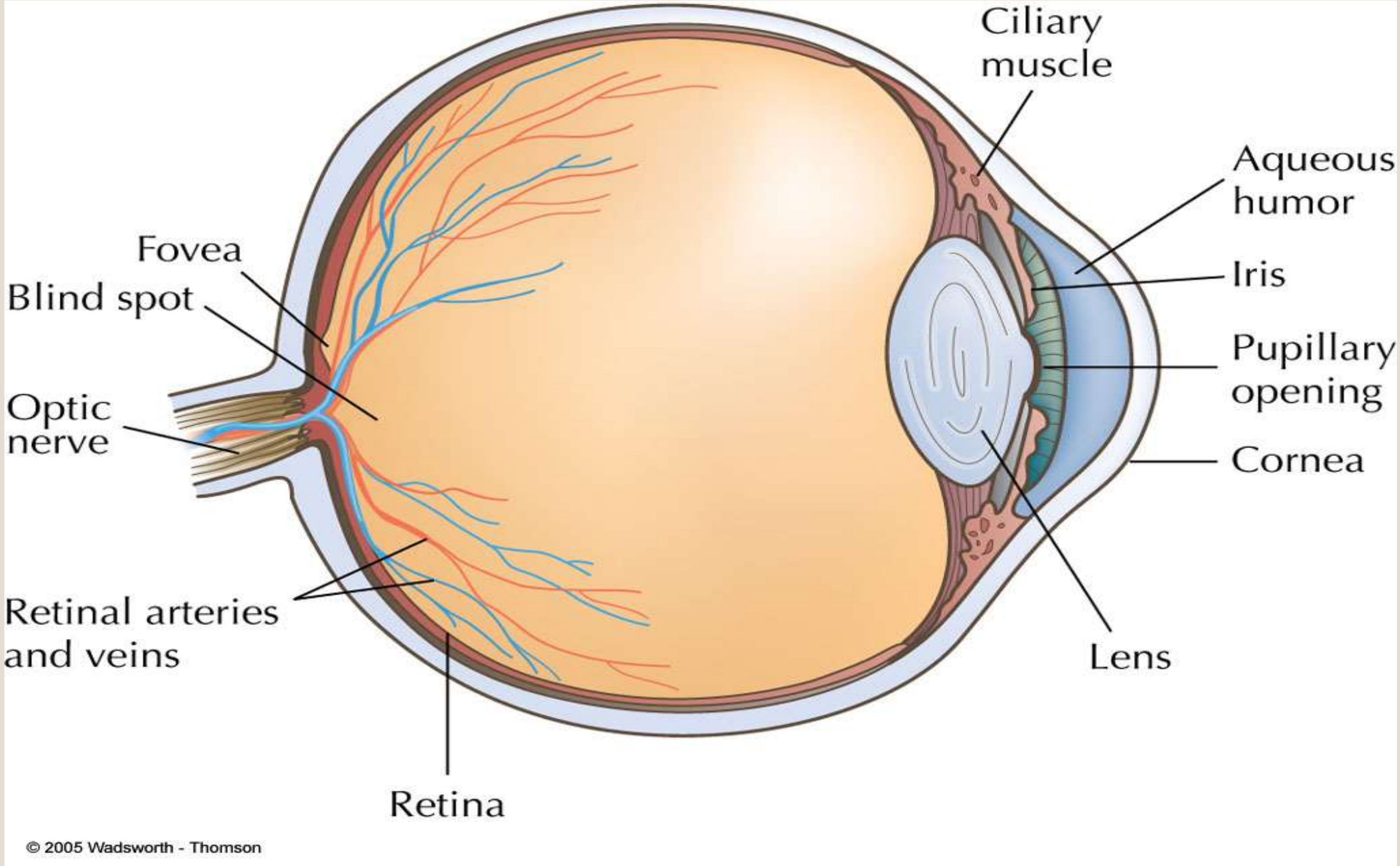

FIGURE 4.4 The human eye, a simplified view.

	Rods	Cones
Shape	Nearly cylindrical	Tapered at one end
Prevalence in human retina	90–95%	5–10%
Greatest incidence by species	In species that are active at night	In birds, primates, and other species that are active during the day
Area of the retina	Toward the periphery	Toward the fovea
Contribution to color vision	No direct contribution	Critical for color vision
Response to dim light	Strong	Weak
Contribution to perception in detail	Little	Much

TABLE 4.1 Differences Between Rods and Cones

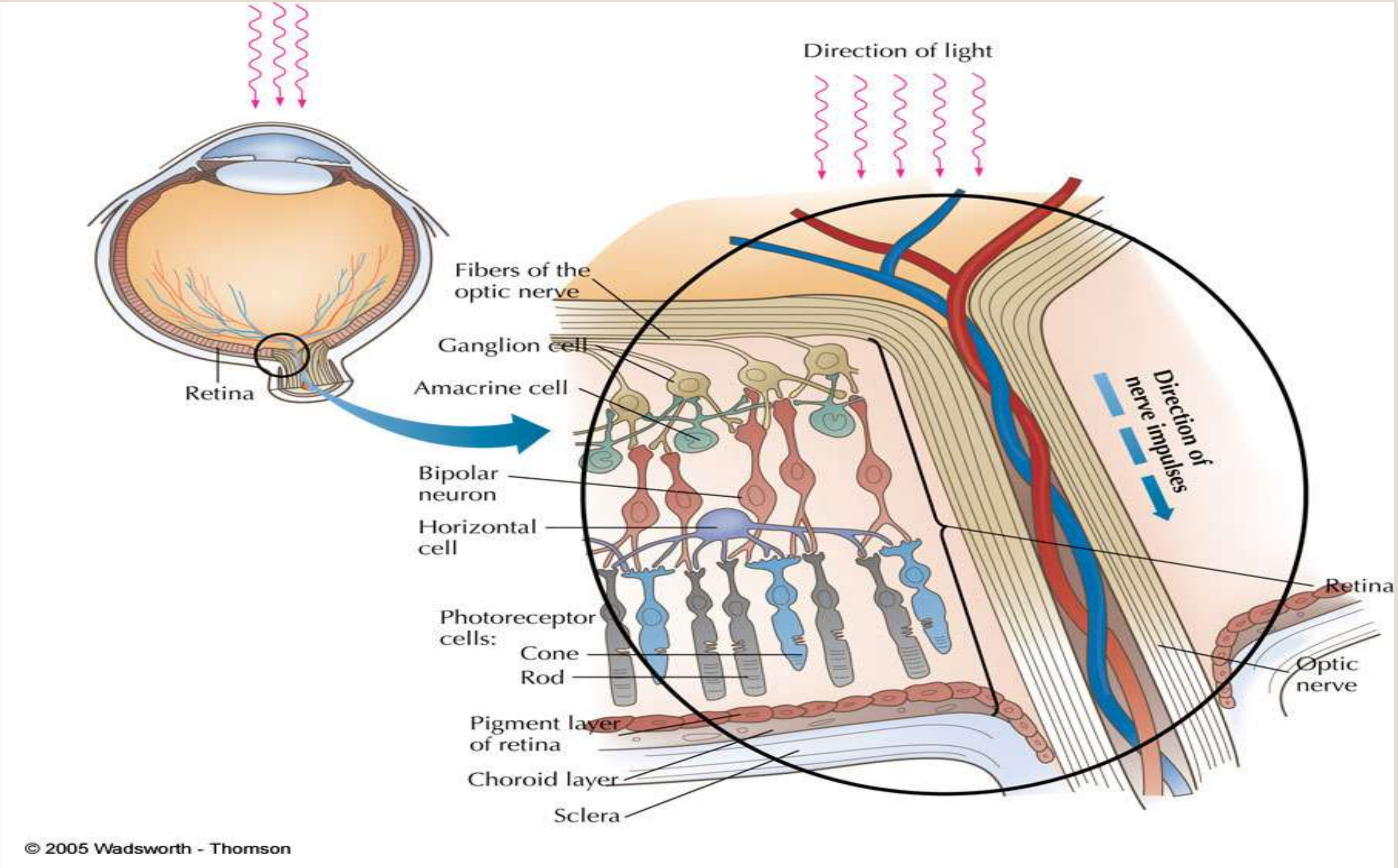

Fig.: 4.6: Anatomy of a retina

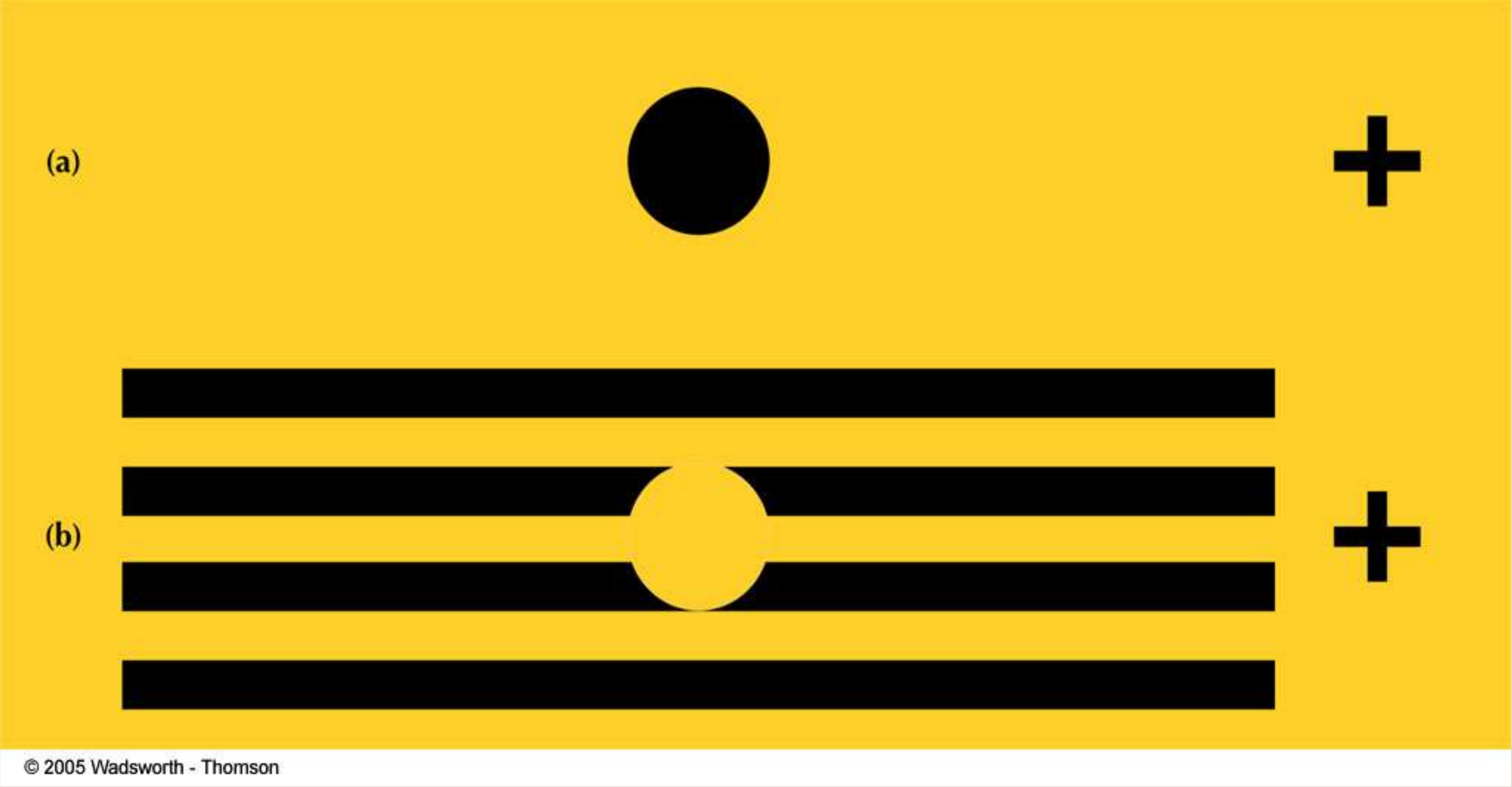

Fig.: 4.7: Experiencing a blind spot

Vision problems

◦ Hyperopia: Difficulty focusing nearby objects (farsightedness)

◦ Myopia: Difficulty focusing distant objects (nearsightedness)

◦ Astigmatism: Corneal, lens, or eye defect that causes some areas of vision to be out of focus; relatively common

◦ Presbyopia: Farsightedness caused by aging

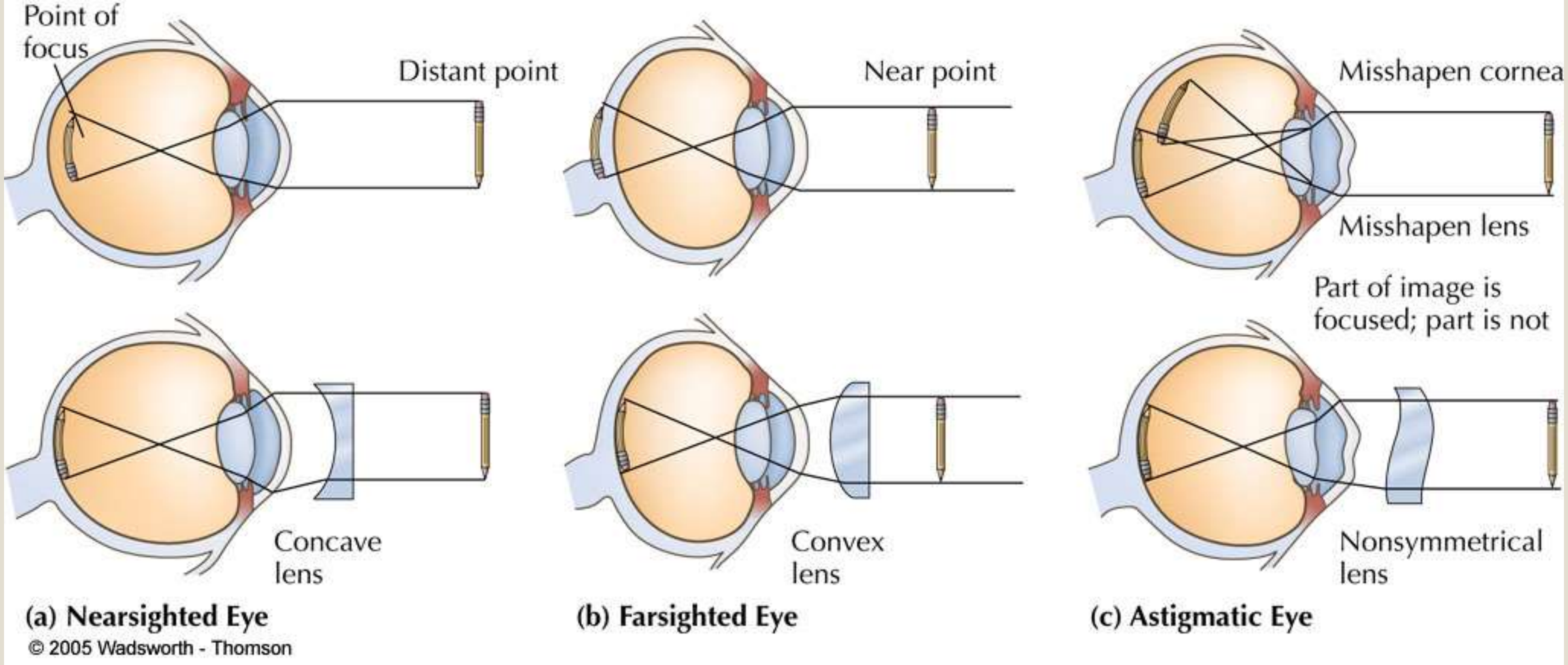

Fig. 4.5: Visual defects and corrective lens

Light control

- Cones: Visual receptors for colors and bright light (daylight); have 6.5 million
- Rods: Visual receptors for dim light; only produce black and white; have 100 million
- Blind Spot: Area of the retina lacking visual receptors

- Visual Acuity: Sharpness of visual perception
- Fovea: Area of the retina containing only cones
- Peripheral Vision: Vision at edges of visual field; side vision
  - Many superstar athletes have excellent peripheral vision

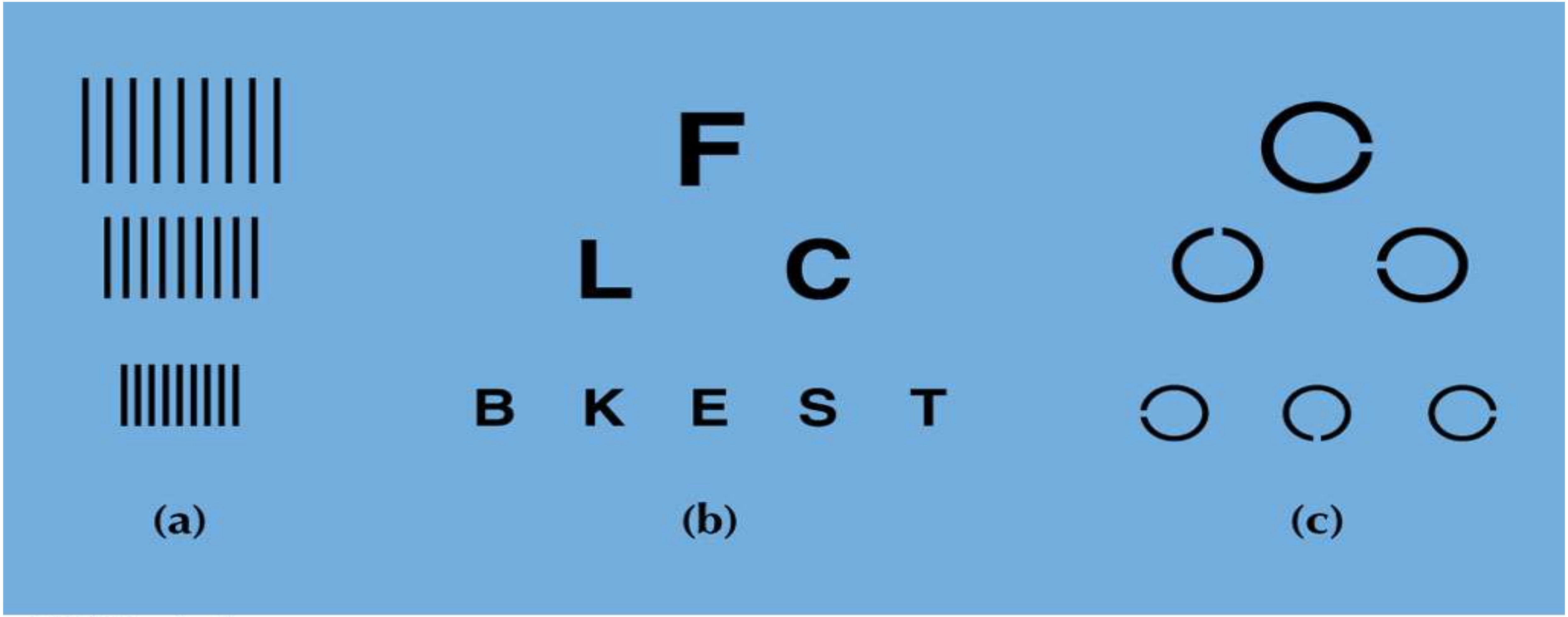

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FIGURE 4.8 Tests of visual acuity. Here are some common tests of visual acuity. In (a)sharpness is indicated by the smallest grating still seen as individual lines. The Snellen chart (b) requires that you read rows of letters of diminishing size until you can no longer distinguish them. The Landolt rings (c) require no familiarity with letters. All that is required is a report of which side has a break in it.

Colour vision

- Trichromatic Theory: Color vision theory that states we have three cone types: red, green, blue
  - Other colors produced by a combination of these
  - Black and white produced by rods

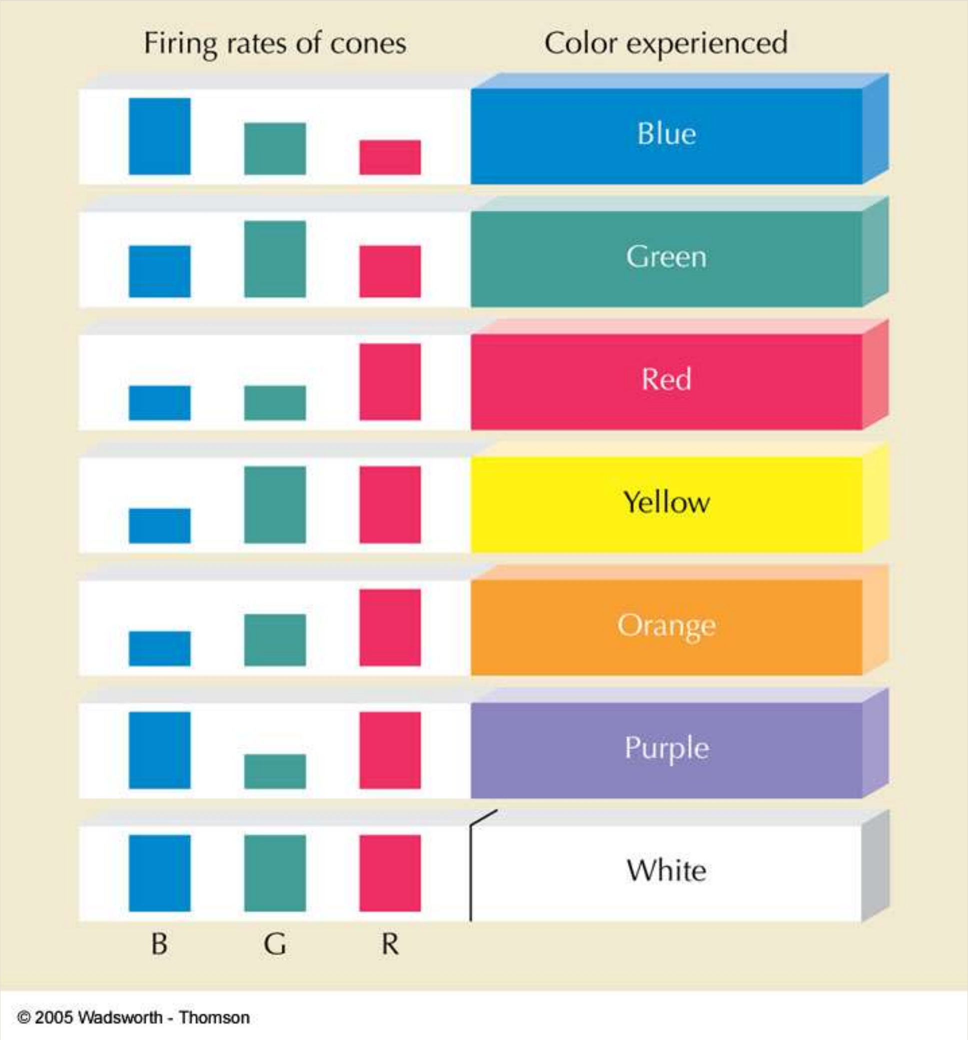


FIGURE 4.10 Firing rates of blue, green, and red cones in response to different colors. The taller the colored bar, the higher the firing rates for that type of cone. As you can see, colors are coded by differences in the activity of all three types of cones in the normal eye.

- Opponent Process Theory: Color vision theory based on three “systems”: red or green, blue or yellow, black or white
  - Exciting one color in a pair (red) blocks the excitation in the other member of the pair (green)
  - Afterimage: Visual sensation that remains after stimulus is removed (seeing flashbulb after the picture has been taken)

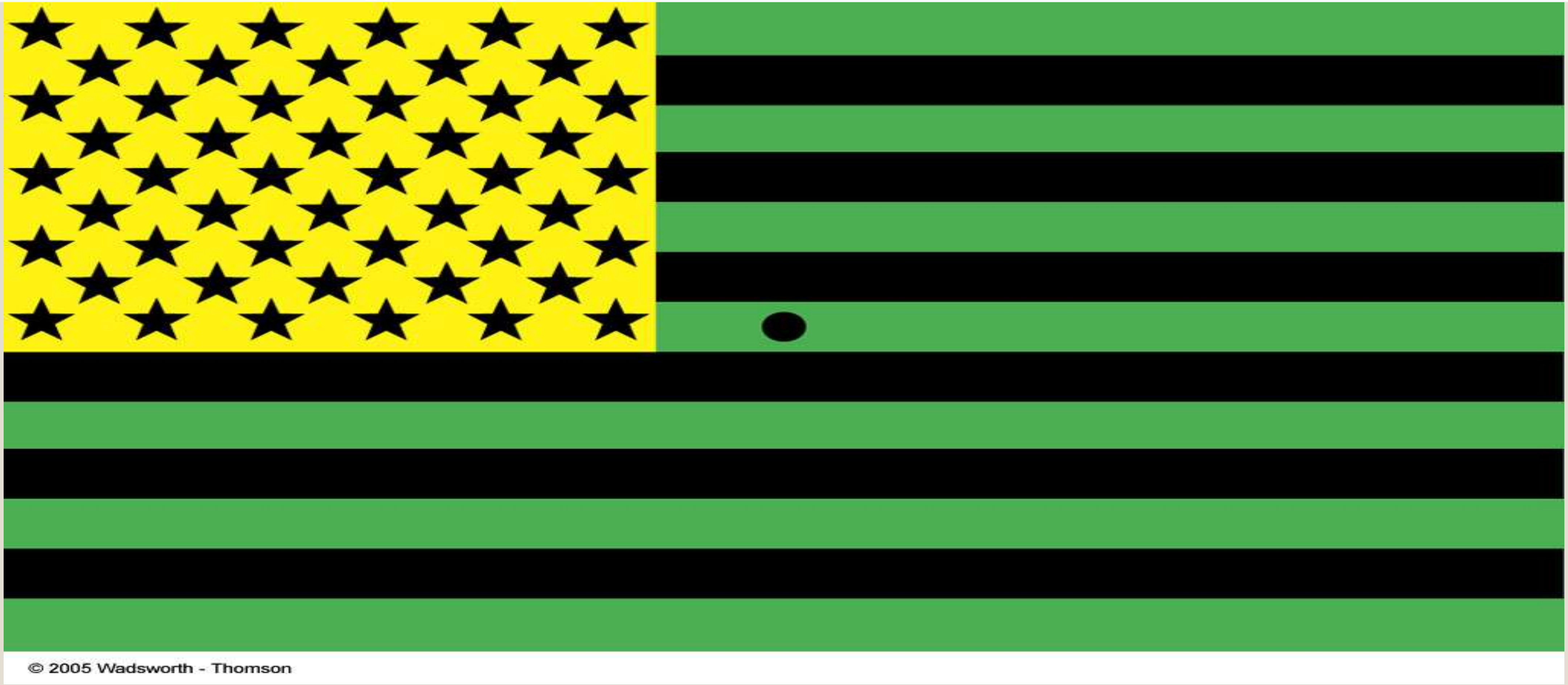
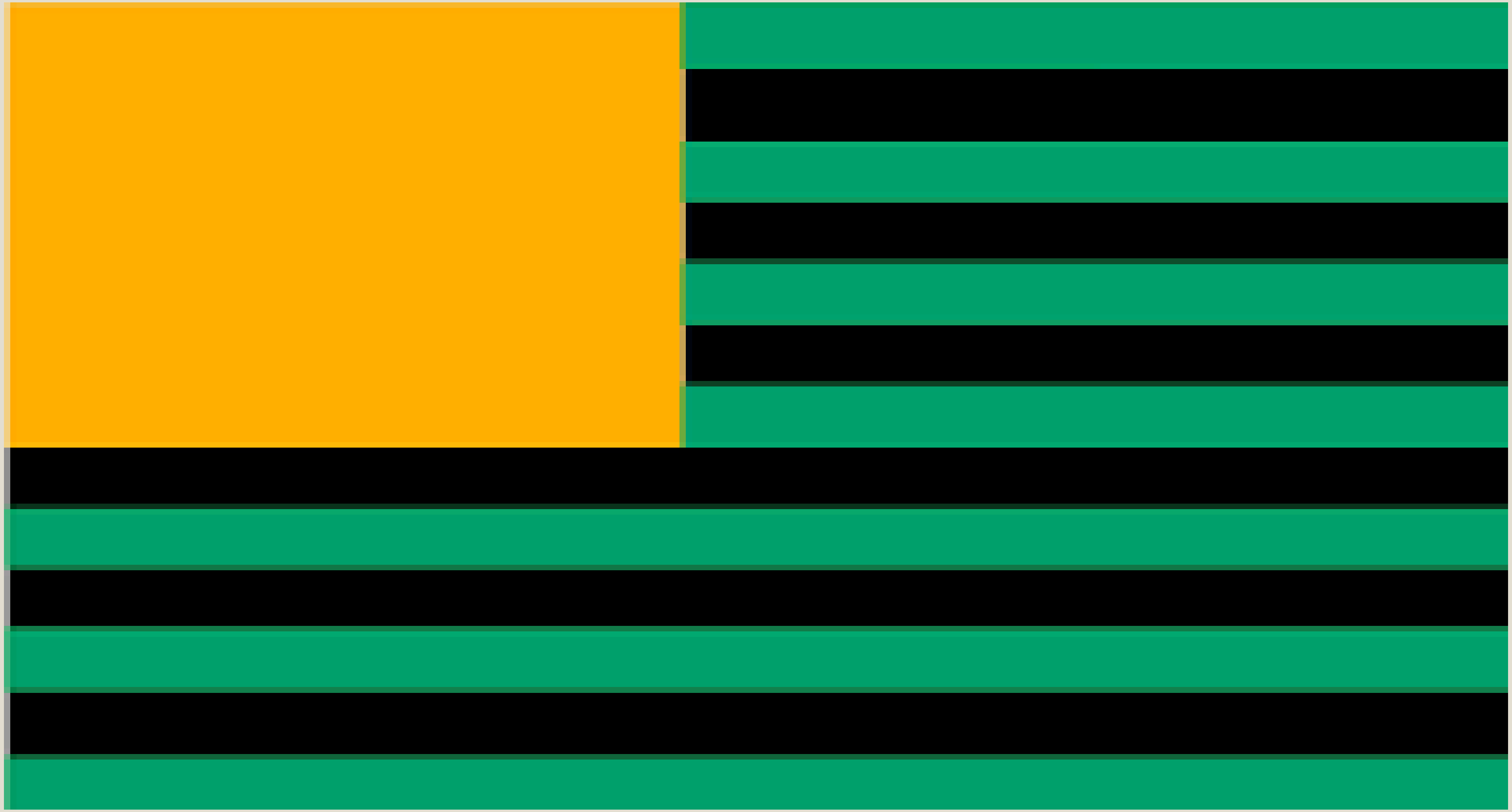


Fig. 4.9: Negative afterimages



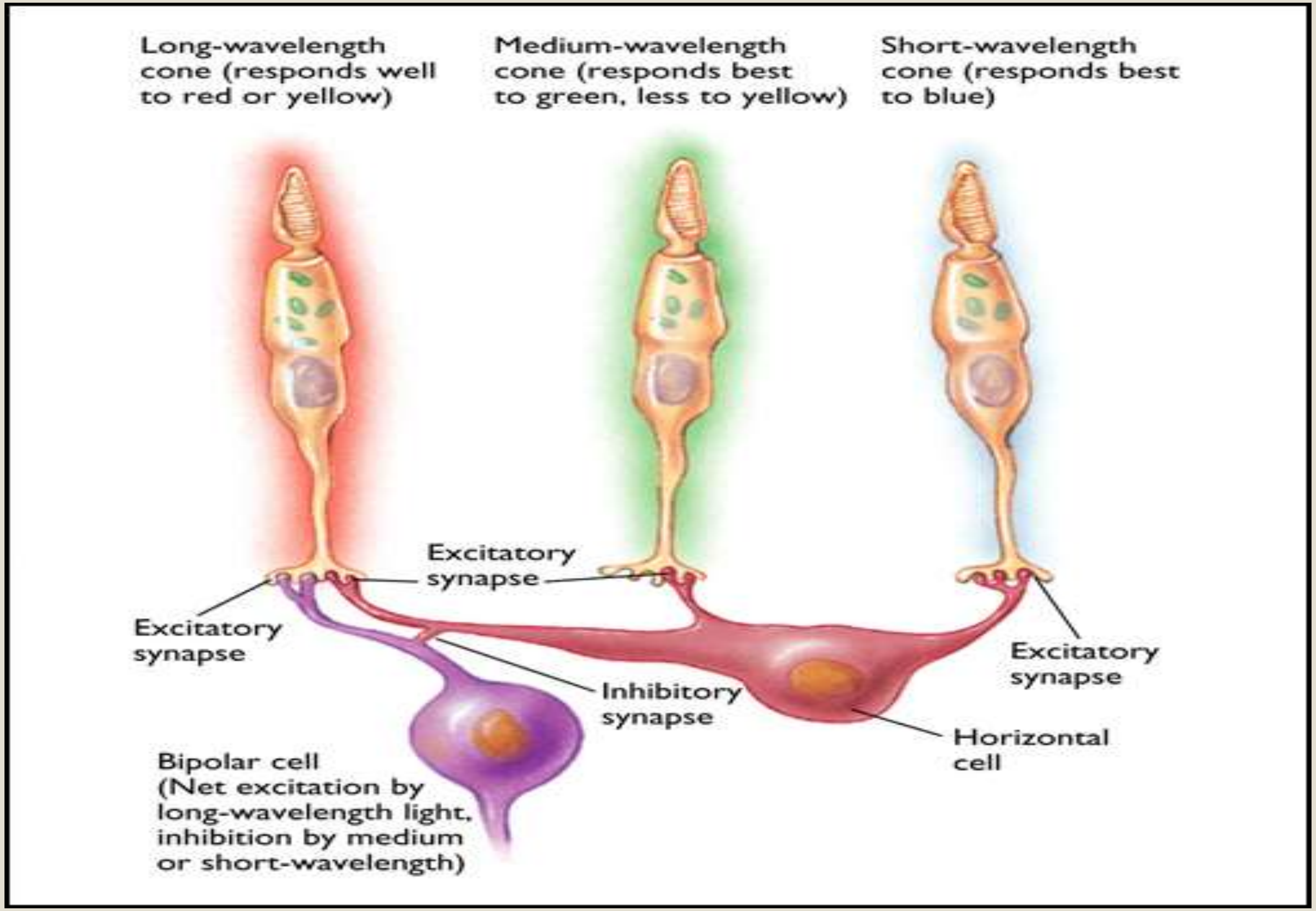
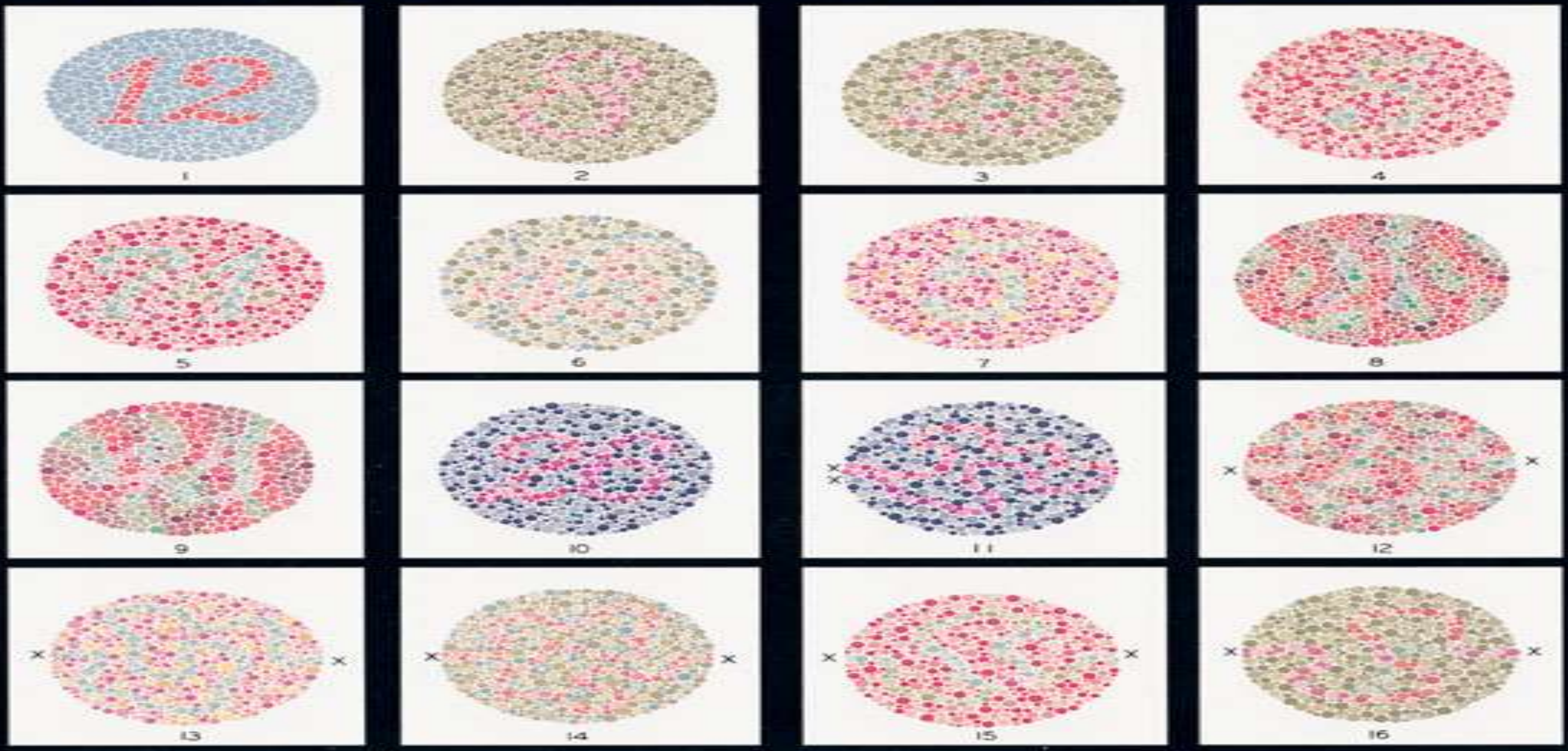


Fig.: 4.16: Explaining negative afterimages

Colour blindness

- Inability to perceive colors
  - Total color blindness is rare
- Color Weakness: Inability to distinguish some colors
  - Red-green is most common; much more common among men than women
  - Recessive, sex-linked trait on X chromosome
- Ishihara Test: Test for color blindness and color weakness

ARE YOU COLOR BLIND?



NO.	NORMAL EYE	COLOR BLIND EYE	NO.	NORMAL EYE	COLOR BLIND EYE
1	12	12	9	NOTHING	45
2	8	3	10	26	2 OR 6
3	29	70	11	2 LINES X TO X	LINE X TO X
4	5	2	12	NOTHING	LINE X TO X
5	74	21	13	LINE X TO X	NOTHING
6	45	NOTHING	14	LINE X TO X	NOTHING
7	5	NOTHING	15	LINE X TO X	NOTHING
8	NOTHING	5	16	LINE X TO X	LINE X TO X

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FIGURE 4.12 A replica of the Ishihara test for color blindness.

Dark adaptation

- Increased retinal sensitivity to light after entering the dark; similar to going from daylight into a dark movie theater
- Rhodopsin: Light-sensitive pigment in the rods

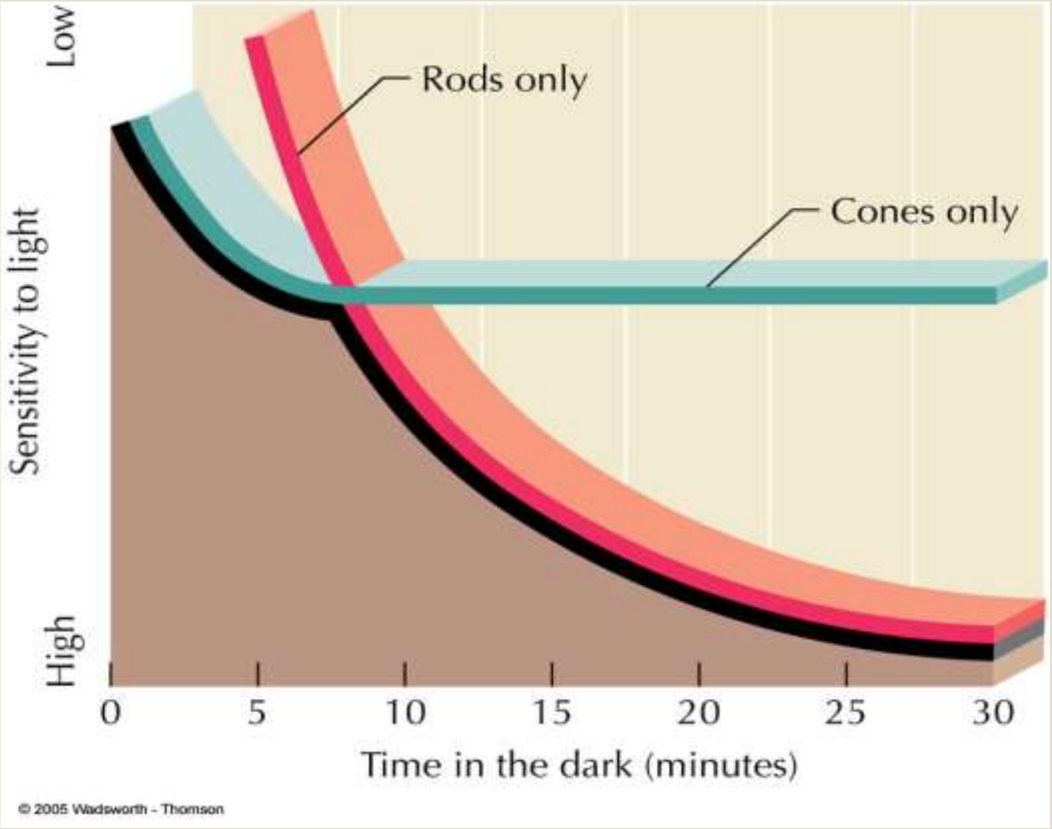


Fig. 4.13: Typical course of dark adaptation

Hearing

- Sound Waves: Rhythmic movement of air molecules
- Pitch: Higher or lower tone of a sound
- Loudness: Sound intensity

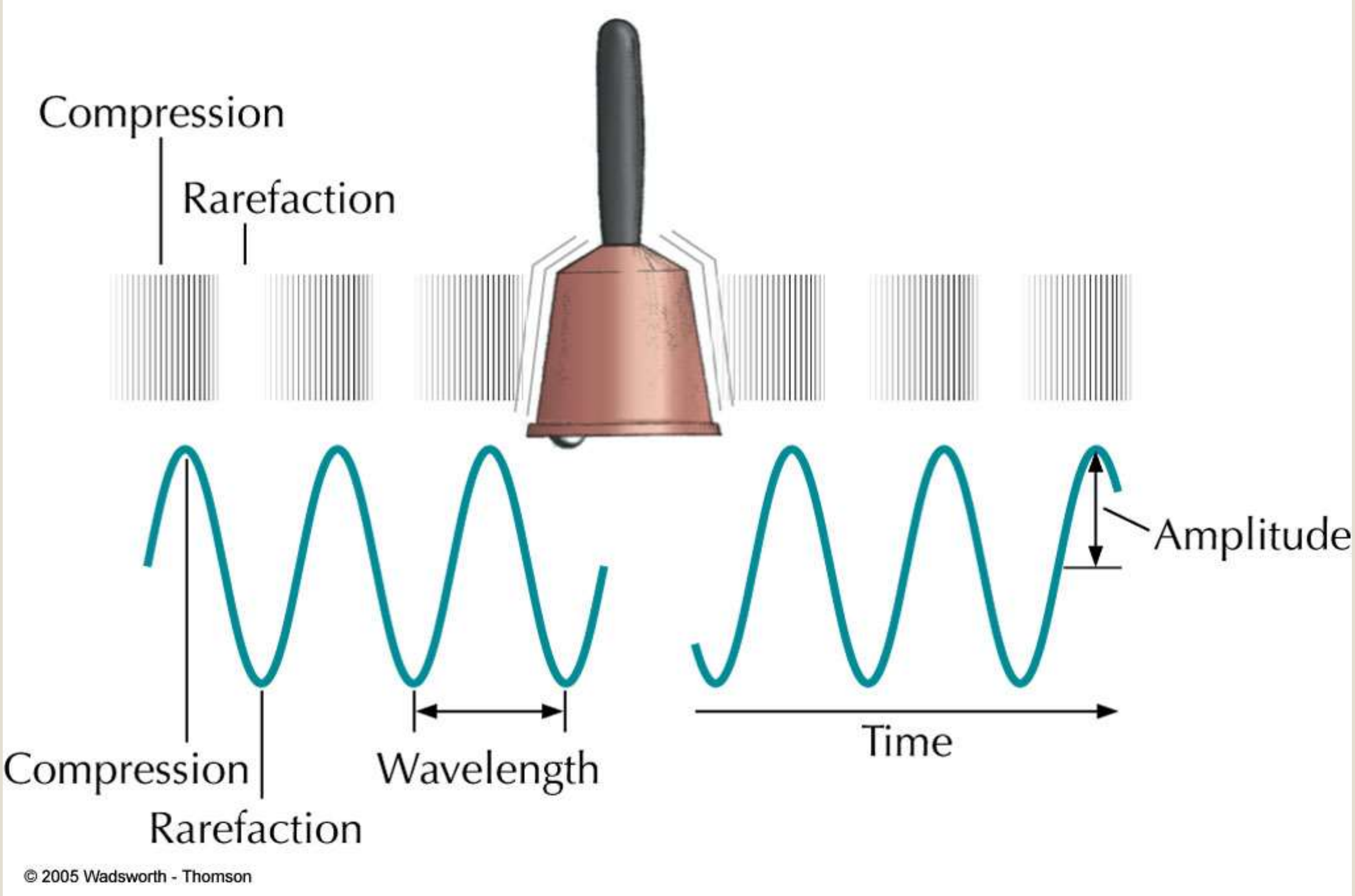


FIGURE 4.14 Waves of compression in the air, or vibrations, are the stimulus for hearing. The frequency of sound waves determines their pitch. The amplitude determines loudness.

Parts of the ear

- Pinna: External part of the ear
- Tympanic Membrane: Eardrum
- Auditory Ossicles: Three small bones that vibrate; link eardrum with the cochlea
    - Malleus (hammer)
    - Incus (anvil)
    - Stapes (stirrup)

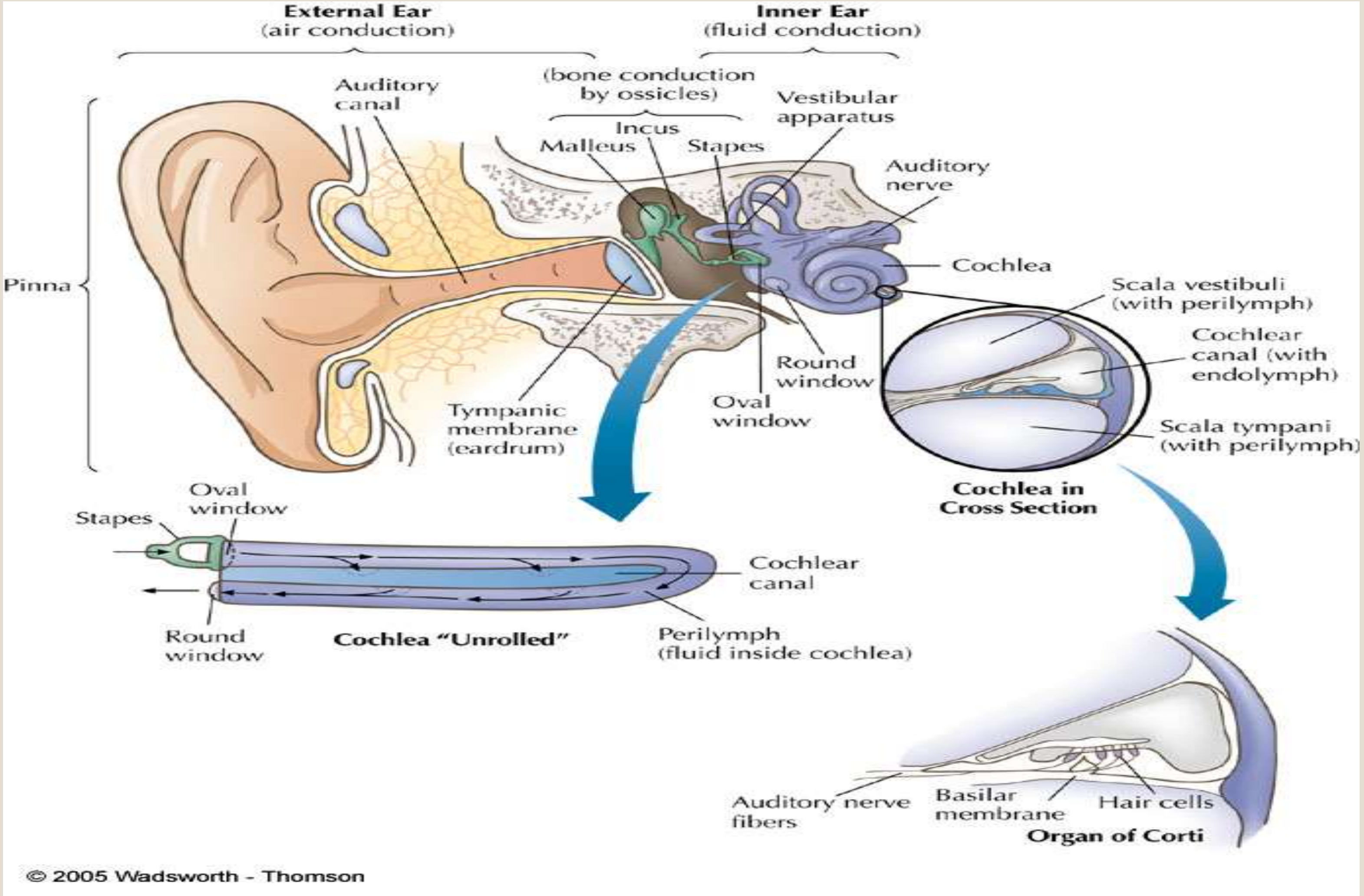


Fig. 4.15: Anatomy of the ear

- Cochlea: Organ that makes up inner ear; snail-shaped; organ of hearing
- Hair Cells: Receptor cells within cochlea that *transduce* vibrations into nerve impulses
  - Once dead they are **never** replaced
- Organ of Corti: Center part of the cochlea containing hair cells, canals, and membranes

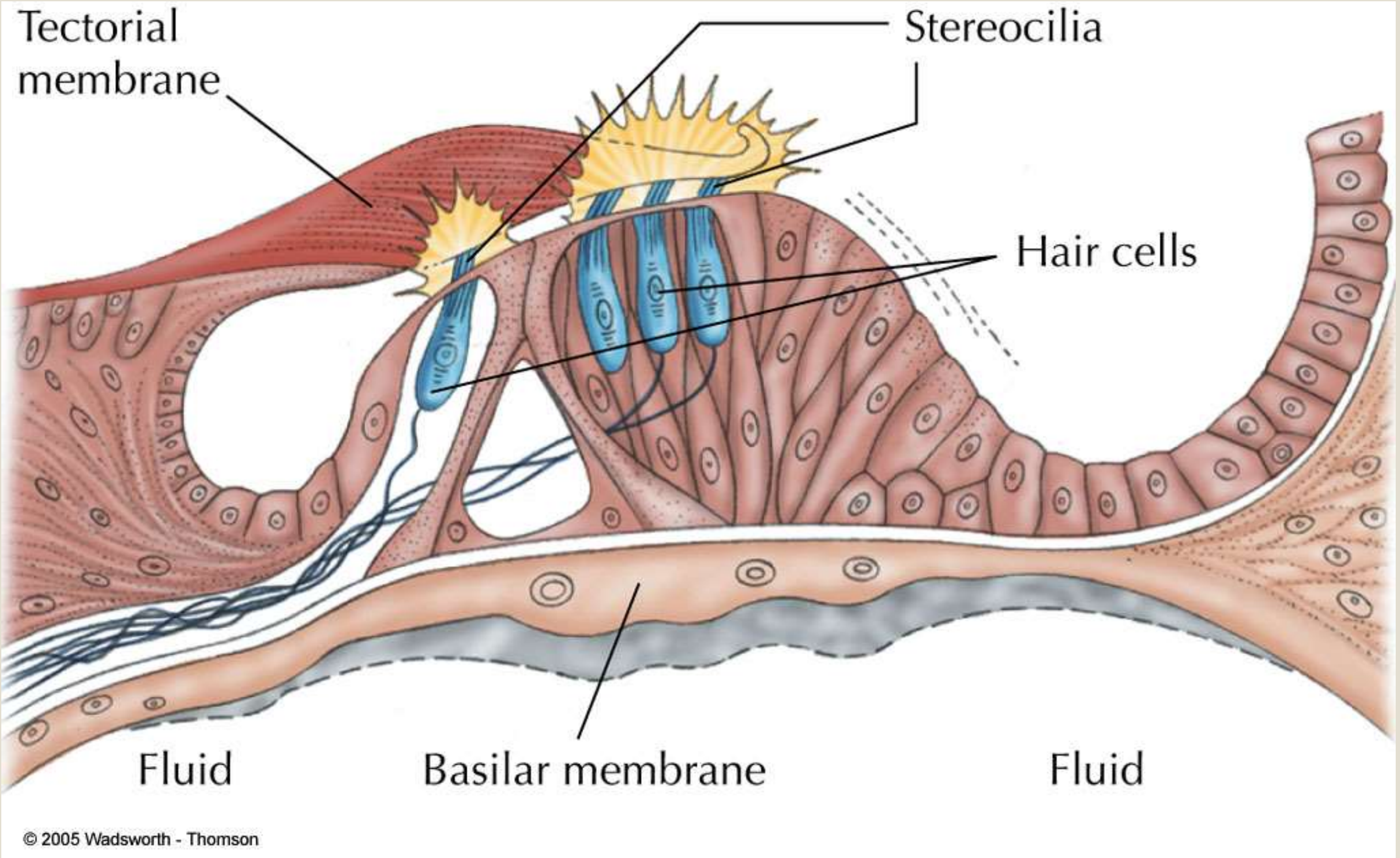


FIGURE 4.16 A closer view of the hair cells shows how movement of fluid in the cochlea causes the bristling “hairs” or cilia to bend, generating a nerve impulse.

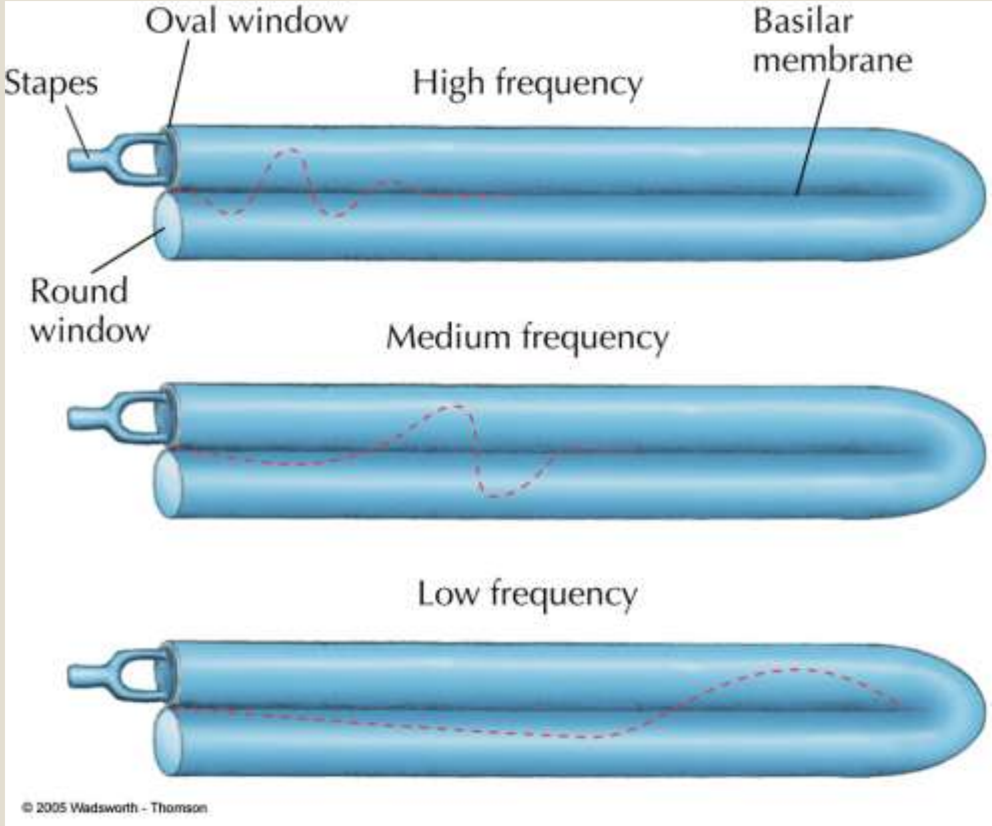
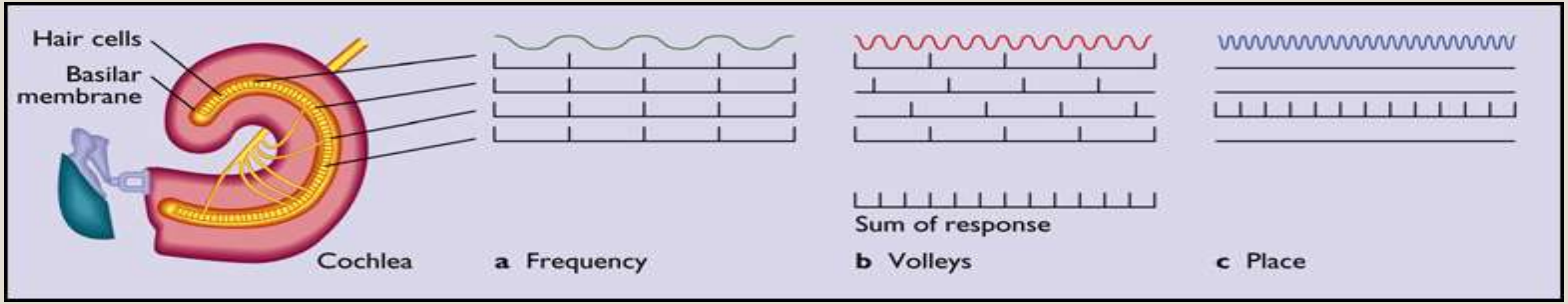


Fig. 4. 17: Cochlea unrolled

Detecting high/low sounds



- Frequency Theory: As pitch rises, nerve impulses of the same frequency flow into the auditory nerve
- Place Theory: Higher and lower tones excite specific areas of the cochlea

Localization of sounds

- How does the auditory system determine the source of a sound?
  - To estimate the approximate location of origin of a sound, the auditory system compares the messages received by the two ears.
  - The sound waves will arrive at the closer ear slightly sooner (if coming from the right, it arrives at the right ear just a little before it arrives at the left ear.)

Figure 4.24

The stereophonic hearing of our ears enables us to determine where a sound is coming from. The ear located closest to the sound will receive the sound waves first. A change of less than one ten-thousandth of 1 second can alter our perception of the location of a sound source.

Deafness

- Conduction Deafness: Poor transfer of sounds from tympanic membrane to inner ear
  - Compensate with amplifier (hearing aid)
- Nerve Deafness: Caused by damage to hair cells or auditory nerve
  - Hearing aids useless in these cases, since auditory messages cannot reach the brain
  - Cochlear Implant: Electronic device that stimulates auditory nerves; still not very successful

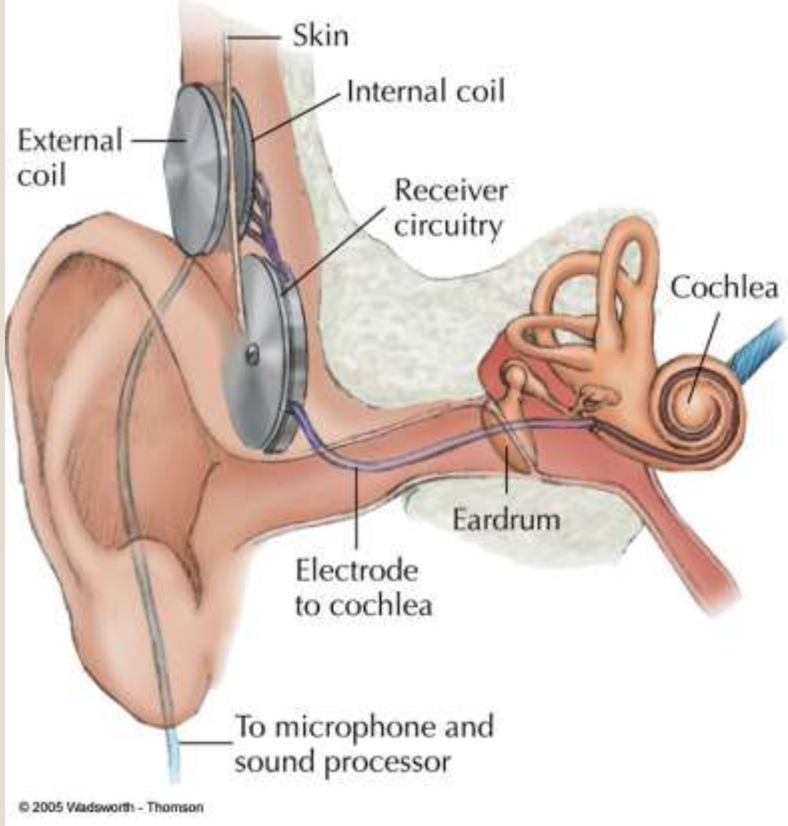


FIGURE 4.18 A cochlear implant, or “artificial ear.”

Preventable hearing problems

- Stimulation Deafness: Damage caused by exposing hair cells to excessively loud sounds
  - Typical at rock concerts
  - By age 65, 40% of hair cells are gone

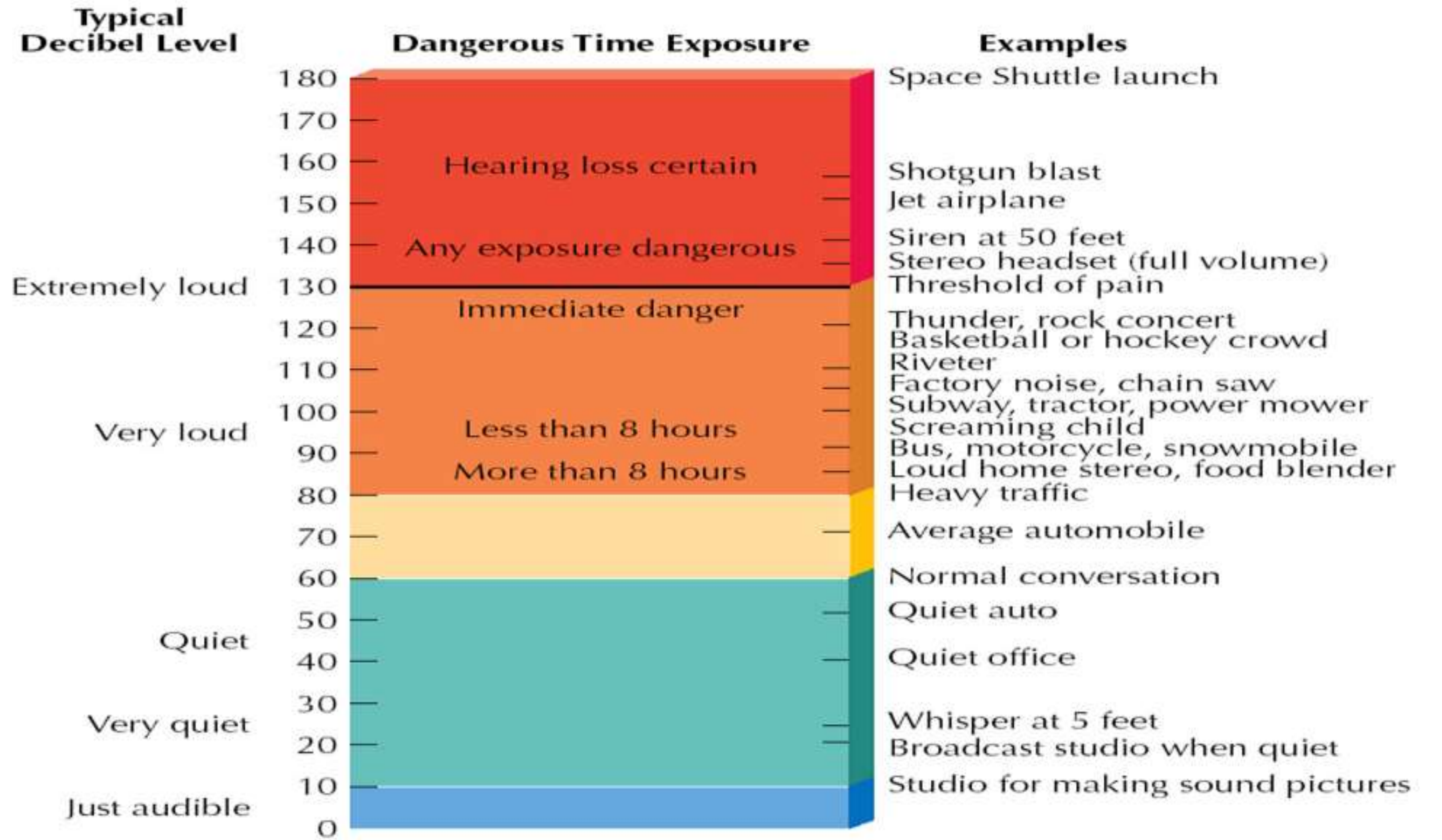


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FIGURE 4.20 The loudness of sound is measured in decibels. Zero decibels is the faintest sound most people can hear. Sounds of 110 decibels are uncomfortably loud. Prolonged exposure to sounds above 85 decibels may damage the inner ear. Rock music, which may be 120 decibels, has caused hearing loss in musicians and may affect audiences as well. Sounds of 130 decibels pose an immediate danger to hearing.

Smell and taste

- Olfaction: Sense of smell
- Anosmia: Defective sense of smell
- Lock and Key Theory: Odors are related to the shape of chemical molecules

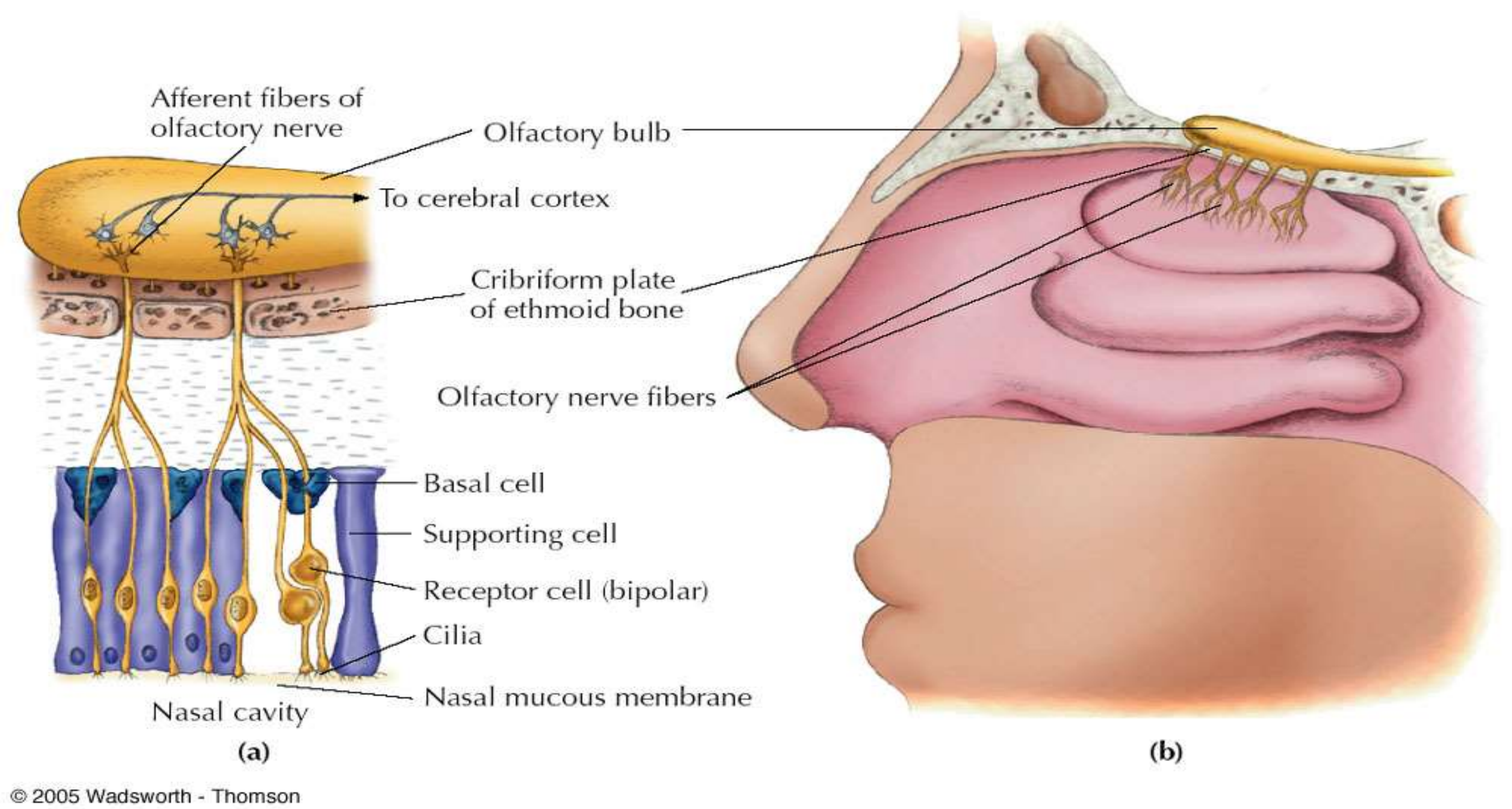

FIGURE 4.21 (a) Olfactory nerve fibers respond to gaseous molecules. Receptor cells are shown in cross section to the left. (b) Olfactory receptors are located in the upper nasal cavity. (c) On the right, an extreme close-up of an olfactory receptor shows fibers that sense gaseous molecules of various shapes.

Gustation

- Gustation: Sense of taste
- Taste Buds: Taste-receptor cells
  - Four Taste Sensations: sweet, salty, sour, bitter
  - Most sensitive to bitter, least sensitive to sweet
  - Umami: Possible fifth taste sensation; brothy taste

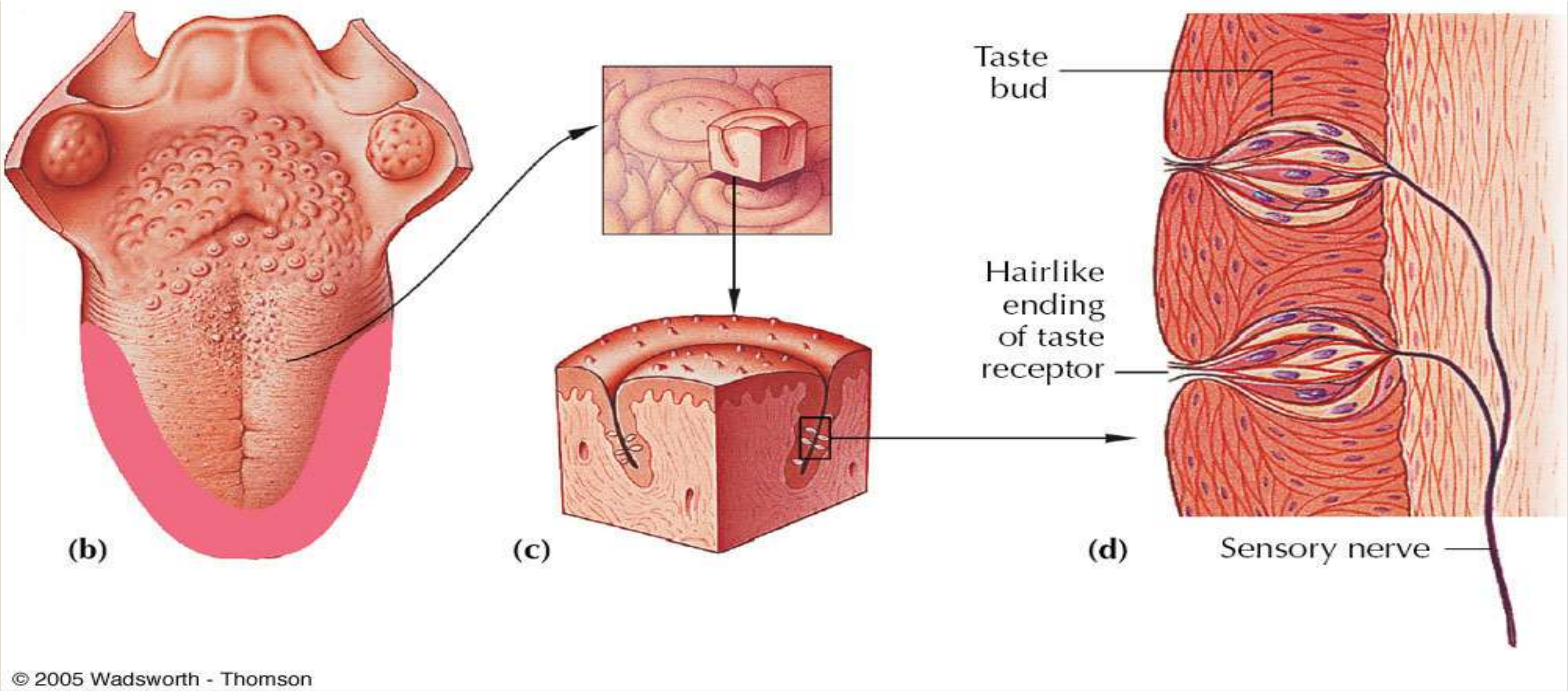

FIGURE 4.22 Receptors for taste

Somesthetic sensation

- Skin Senses (Touch): Light touch, pressure, pain, heat, cold, warmth
- Kinesthetic: Detect body position and movement
- Vestibular: Balance, position in space, and acceleration

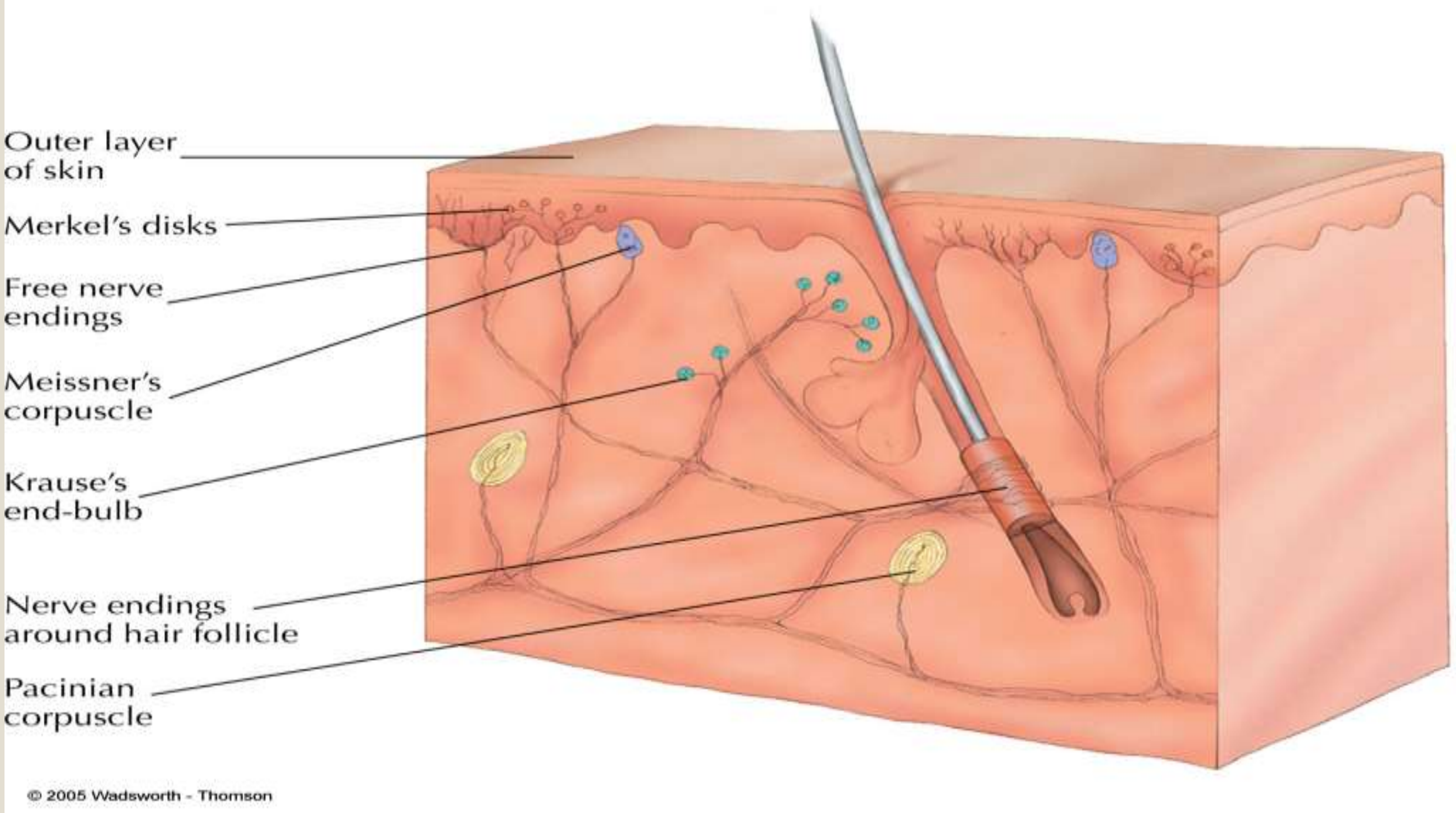

FIGURE 4.23 The skin senses include touch, pressure, pain, cold, and warmth: different forms the skin receptors can take.

Pain

- Warning System: Pain carried by large nerve fibers; sharp, bright, fast pain that tells you body damage may be occurring (e.g., knife cut)
- Reminding System: Small Nerve Fibers: Slower, nagging, aching, widespread; gets worse if stimulus is repeated; reminds system that body has been injured

Vestibular system

- Otolith Organs: Sensitive to movement, acceleration, and gravity
- Semicircular Canals: Fluid-filled tubes in ears that are sensory organs for balance
- Crista: “Float” that detects movement in semicircular canals

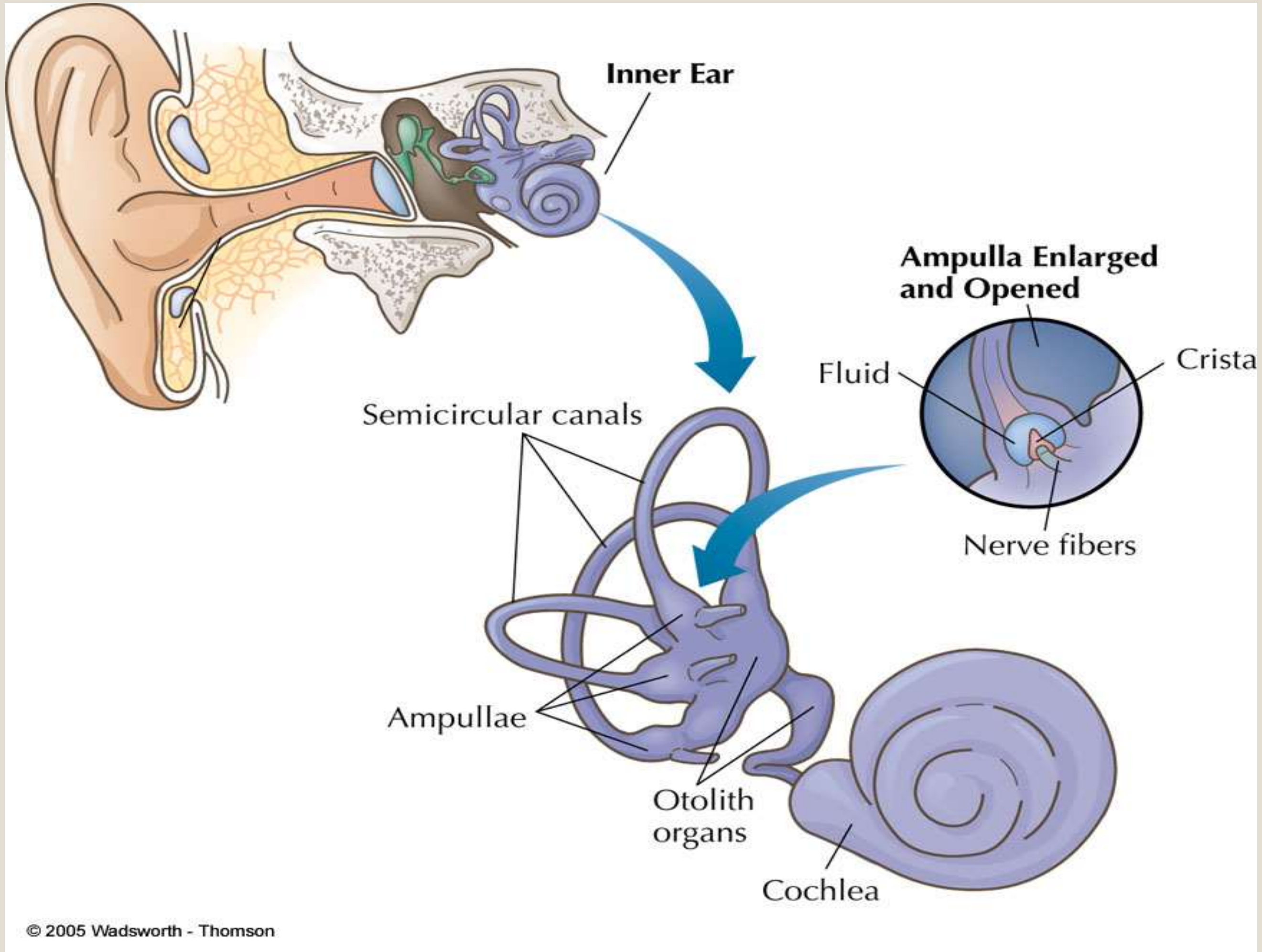

FIGURE 4.24 The vestibular system

Vestibular system and motion sickness

- Motion sickness is directly related to vestibular system.
- Sensory Conflict Theory: Motion sickness occurs because vestibular system sensations do not match sensations from the eyes and body.
  - After spinning and stopping, fluid in semicircular canals is still spinning, but head is not.
  - Mismatch leads to sickness.
- Medications, relaxation, and lying down might help.

Adaptation, attention and sensory gating

- Sensory Adaptation: When sensory receptors respond less to unchanging stimuli
- Selective Attention: Voluntarily focusing on a specific sensory input
- Sensory Gating: When some incoming nerve impulses are blocked while others are allowed to reach the brain


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FIGURE 4.25 The attentional “spotlight” can be widened or narrowed. If you focus on local details in this drawing you will see the letter A repeated 13 times. If you broaden your field of attention to encompass the overall pattern, you will see the letter H.

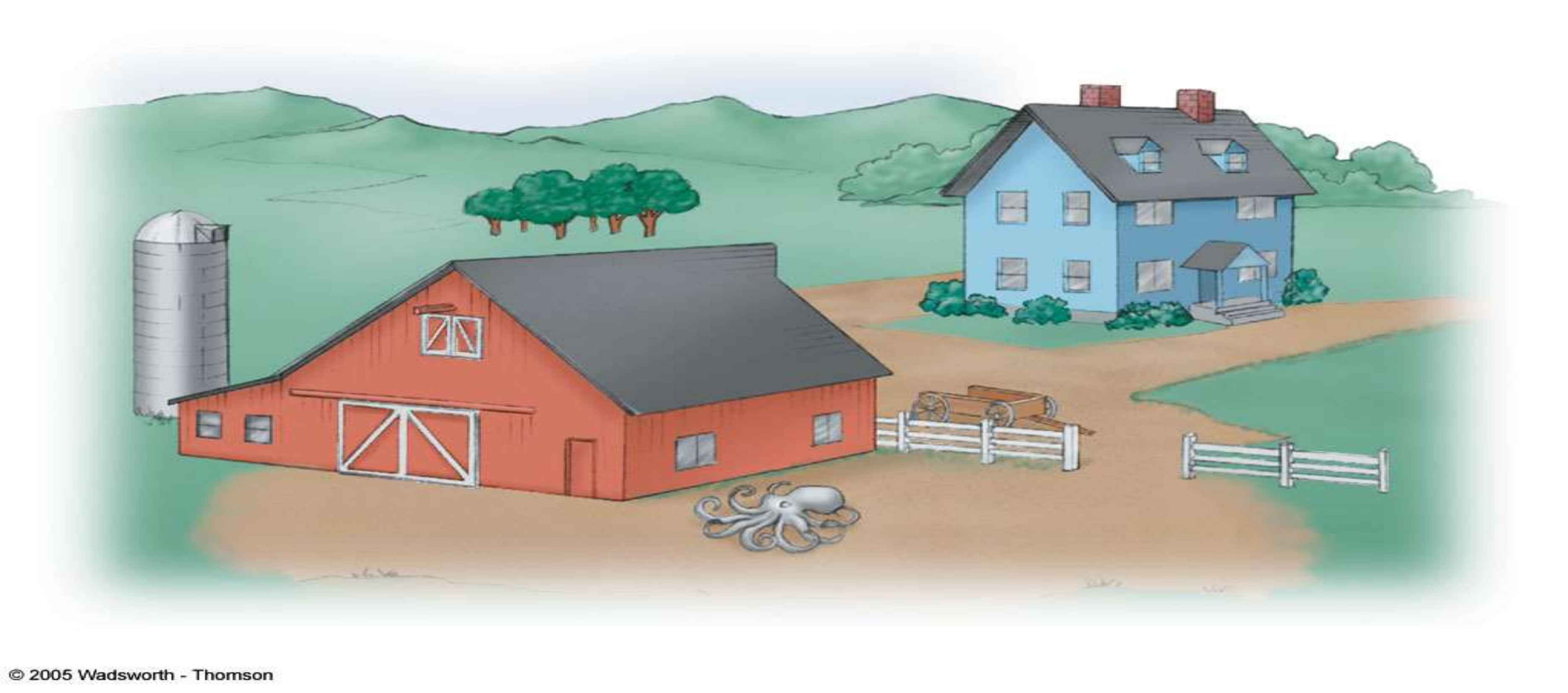

FIGURE 4.26 One of the drawings used by Mackworth and Loftus (1978) to investigate attention. Observers attend to unexpected objects longer than they do to expected objects. In this drawing, observers looked longer at the octopus than they did at a tractor placed in the same spot. What do you think would happen if a tractor were shown upside down or on the roof of the barn?

Gate control theory of pain

- Gate Control Theory: Pain messages from different nerve fibers pass through the same “neural” gate in the spinal cord.
  - If gate is closed by one pain message, other messages *may* not be able to pass through.
- Counterirritation: When messages from large, fast nerve fibers close spinal pain gate directly.
  - This prevents slower, “reminding system” pain from reaching the brain.
  - Acupuncture’s efficacy may be explained by this theory

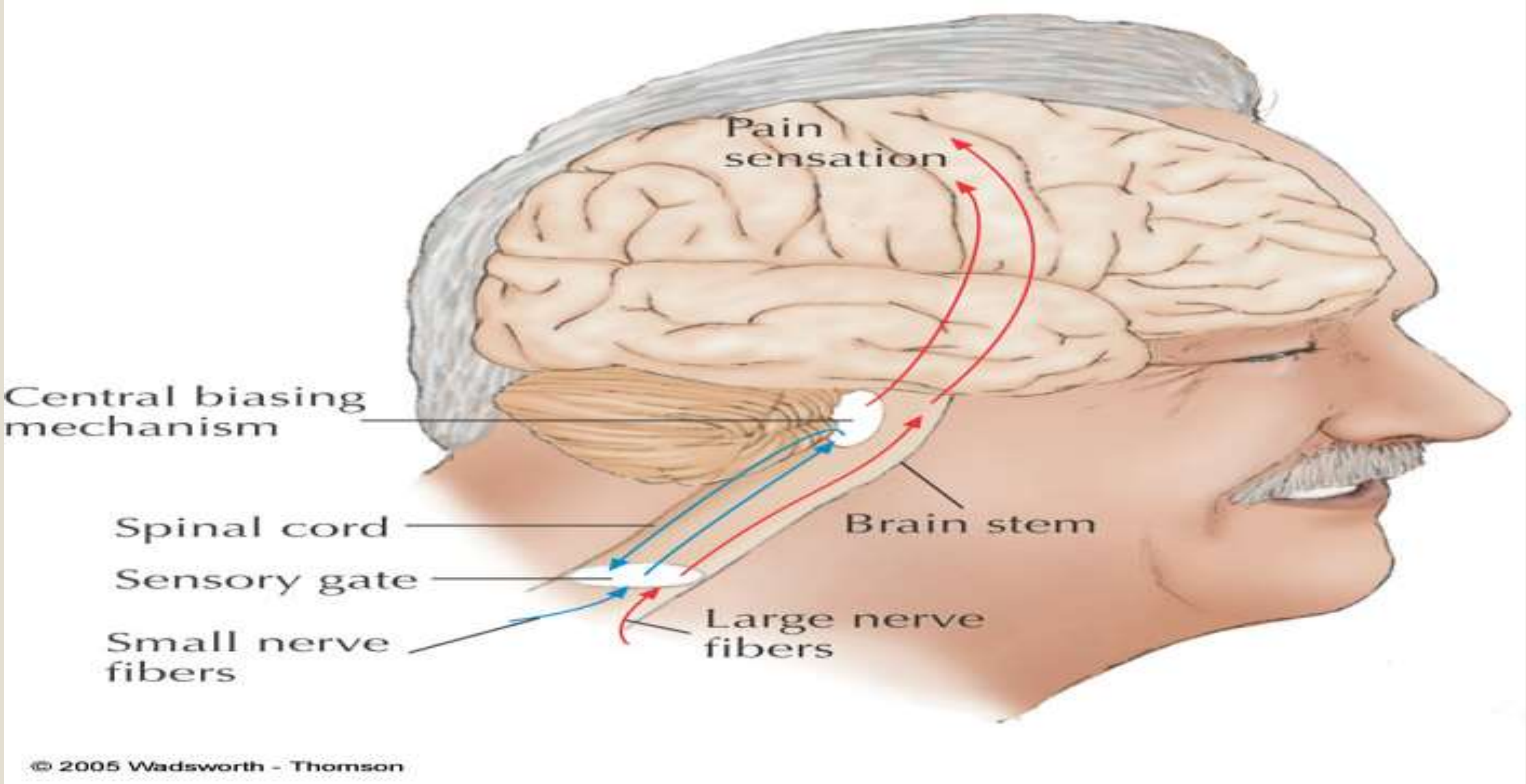

FIGURE 4.27 Diagram of a sensory gate for pain. A series of pain impulses going through the gate may prevent other pain messages from passing through. Or pain messages may relay through a “central biasing mechanism” that exerts control over the gate, closing it to other impulses.

Psychophysics

- Study of the relationship between the physical properties of stimuli and a person's experience of them (Fechner, 1860)
- Absolute threshold: minimum amount of energy we can detect (detection)
- Difference threshold: the smallest change in a stimulus we can detect (just noticeable difference) (discrimination)

Perception

- Size Constancy: Perceived size of an object remains the same, DESPITE changes in its retinal image
- Native Perception: A perceptual experience based on innate processes
- Empirical Perception: A perception based on prior experience
- Shape Constancy: The perceived shape of an object unaffected by changes in its retinal image
- Brightness Constancy: Apparent brightness of an object stays the same under changing lighting conditions

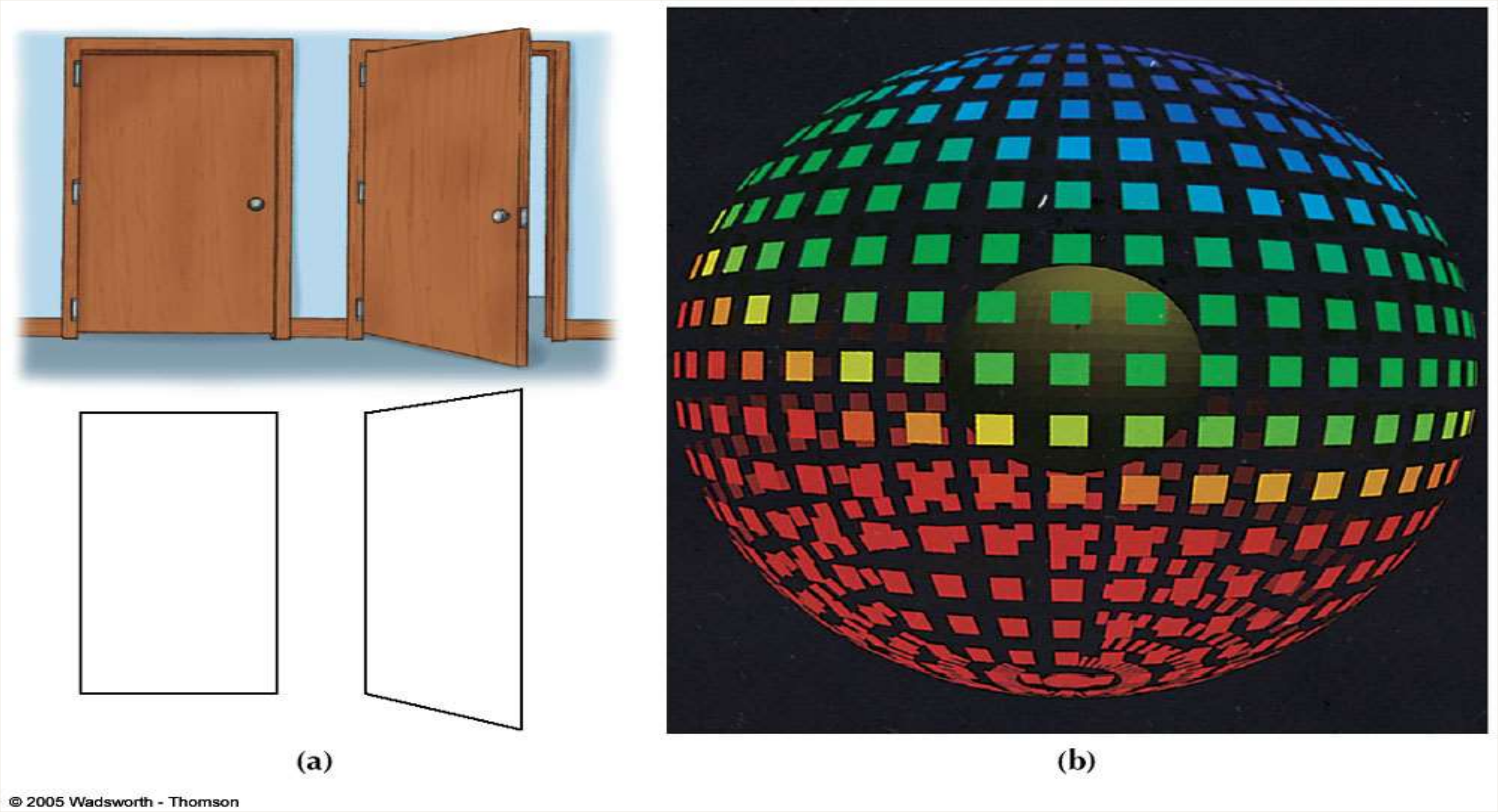

FIGURE 4.28 Shape constancy. (a) When a door is open, its image actually forms a trapezoid. Shape constancy is indicated by the fact that it is still perceived as a rectangle. (b)With great effort you may be able to see this design as a collection of flat shapes. However, if you maintain shape constancy, the distorted squares strongly suggest the surface of a sphere.

Visual perception

- How do we organize sensations into meaningful perceptions?

- **Perceptual constructions**—mental representations of external events—that **are actively created by your brain**

- Does your brain ever misconstruct (and thus misperceive) external stimuli?

Subliminal activity

James Vicary ignited a firestorm of controversy when he introduced subliminal advertising.

Feature-detector approach

- One explanation for how we analyze complex stimuli suggests that we break them down into component parts (low-level features, bottom-up processing)
  - We have **feature detectors**, specialized neurons that respond to the presence of certain simple features, such as angles and lines.
  - For example, one feature detector might be stimulated only by the presence of vertical lines, or 90° angles.
  - Feature detectors are essential for the first stages of analysis, but perception of complex stimuli requires other processes as well.

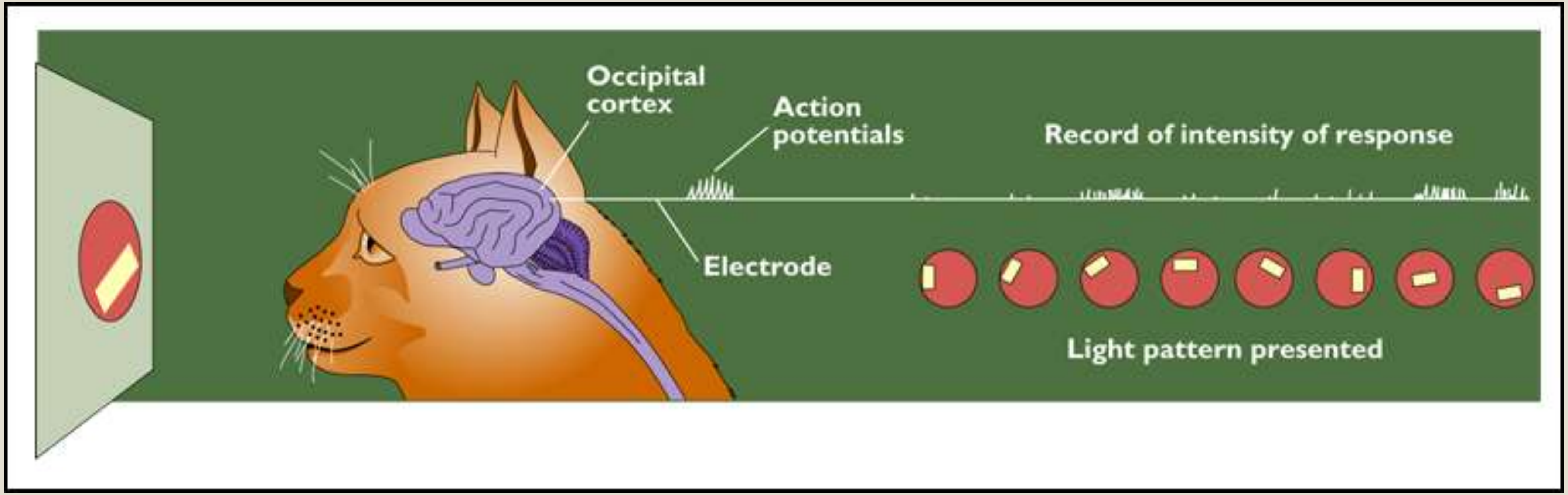

Fig. 4.44: Hubel and Wiesel (1981)—obtained important evidence for existence of feature detectors—won the Nobel Prize

Feature detectors have been discovered for: 1) orientation and 2) motion

Experiment; Hubel and Wiesel implanted electrodes to record the activity of neurons in the occipital cortex of a cat. Then they compared the responses evoked by various patterns of light and darkness on the retina.
In most cases a neuron responded vigorously when a portion of the retina saw a bar of light oriented at a particular angle. When the angle of the bar changed, that cell became silent but another cell responded. Different cells fired for response to movement in particular directions: eg. vertical, horizontal bars of light
.

- The **waterfall illusion** experienced by humans is evidence that humans do indeed have feature detectors.
- In this illusion, a person first stares at a waterfall for one minute or more.
- If the person then looks at cliffs immediately after staring at the waterfall, the cliffs will appear to “flow upward”.
- This suggests that the cells that detect downward motion have become fatigued from the act of staring at the waterfall.
- Another motion aftereffect

Imposing meaning

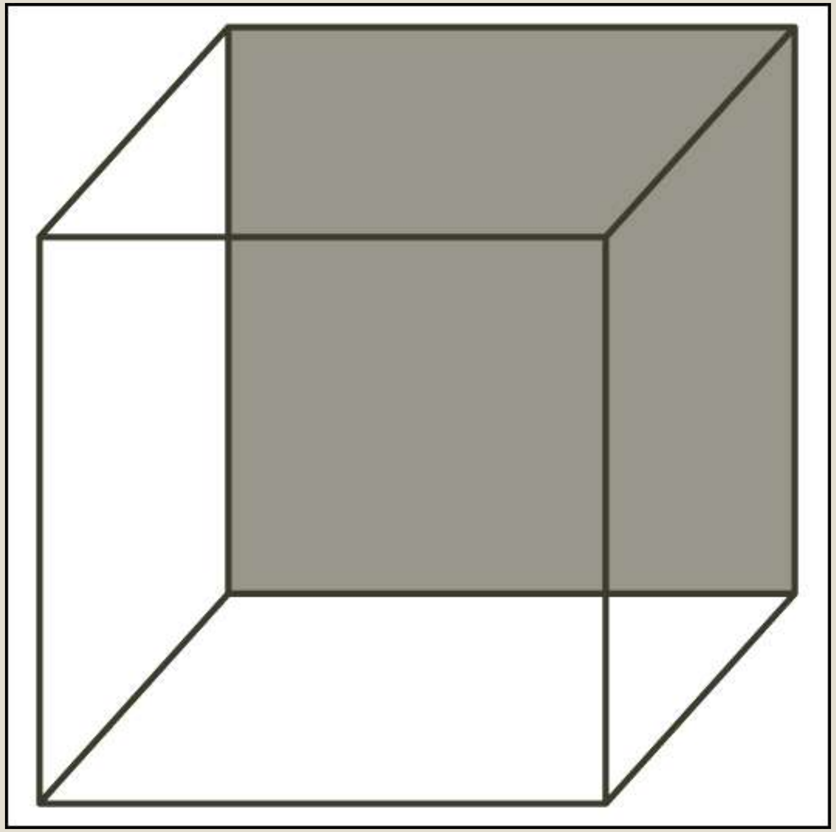

Fig. 4.23: Necker cube

- Gestalt psychology focuses on the human ability to perceive overall patterns.
  - The word **Gestalt** has no true English equivalent, but is close to synonymous with “pattern” or “configuration.”
  - According to Gestalt psychologists, visual perception is an active creation, not merely the adding up of lines and movement.

Perceptual grouping

- Figure-Ground Organization: Inborn part of a stimulus stands out as a figure (object) against a less prominent background (ground)
- Reversible Figure: When figure and ground that can be reversed

Figure vs ground ?

Order on an array vs addition of small features

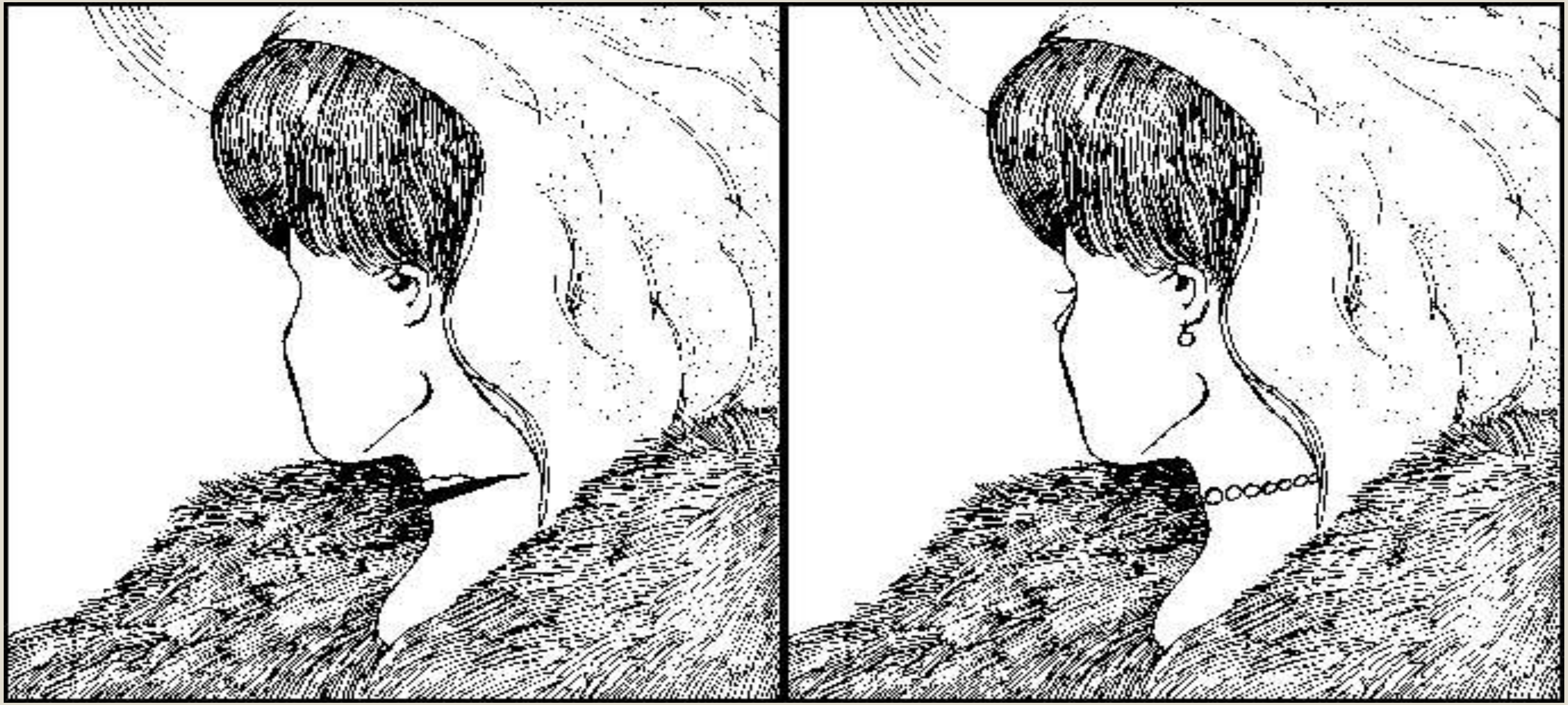

Figure 4.22
Unambiguous drawings of the young and old woman. These versions of the reversible figure in Figure 4.21 have been redrawn slightly to make the young woman more apparent on the right and the old woman more apparent on the left.

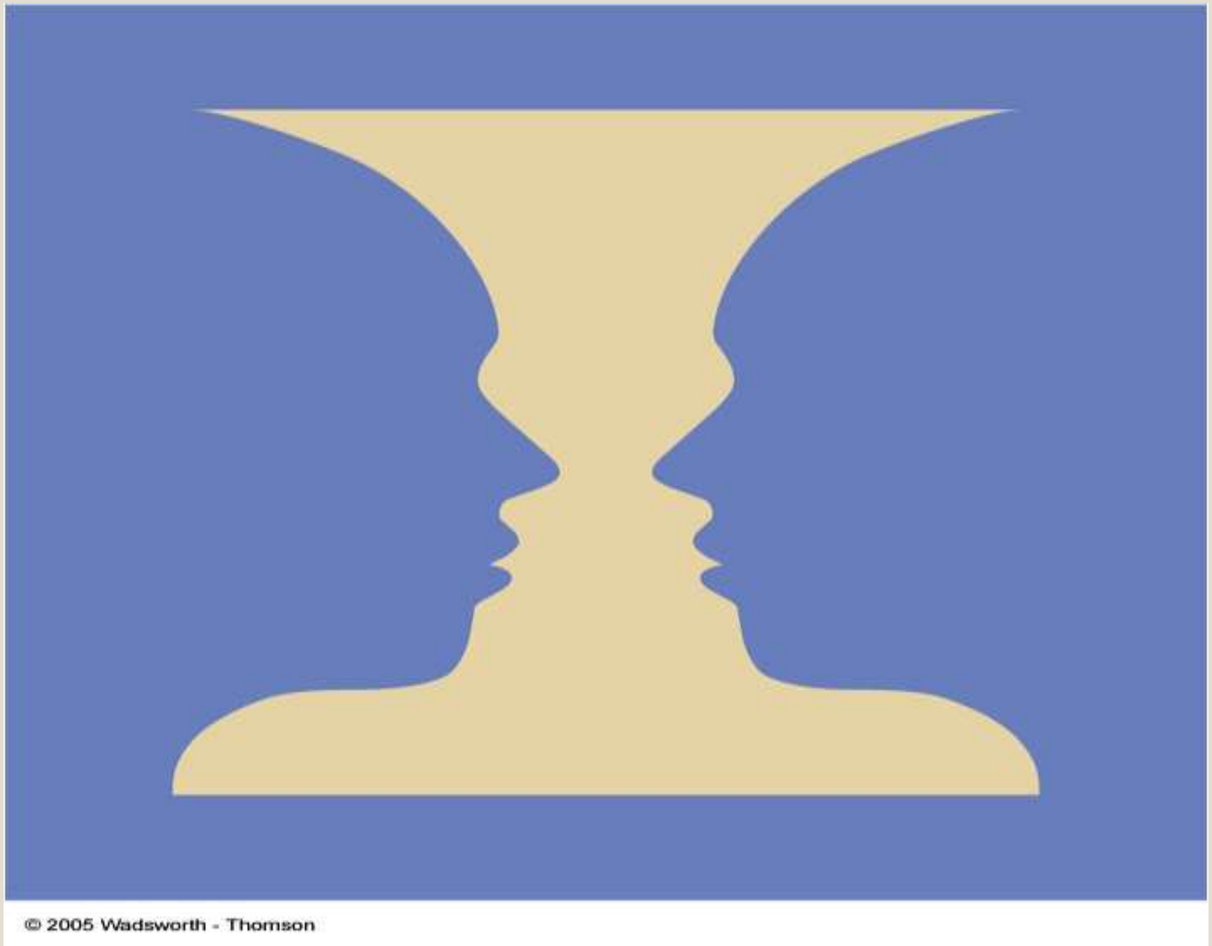

FIGURE 4.29 A reversible figure-ground design. Do you see two faces in profile or a wineglass?


GOOD


ILLUSION

Gestalt Principles of Organization

- Proximity (or Nearness): Stimuli that are near each other tend to be grouped together
- Similarity: Stimuli that are similar in size, shape, color, or form tend to be grouped together
- Closure: Tendency to complete a figure so that it has a consistent overall form
- Connectedness/Common Region: Stimuli that are found within a common area tend to be seen as a group

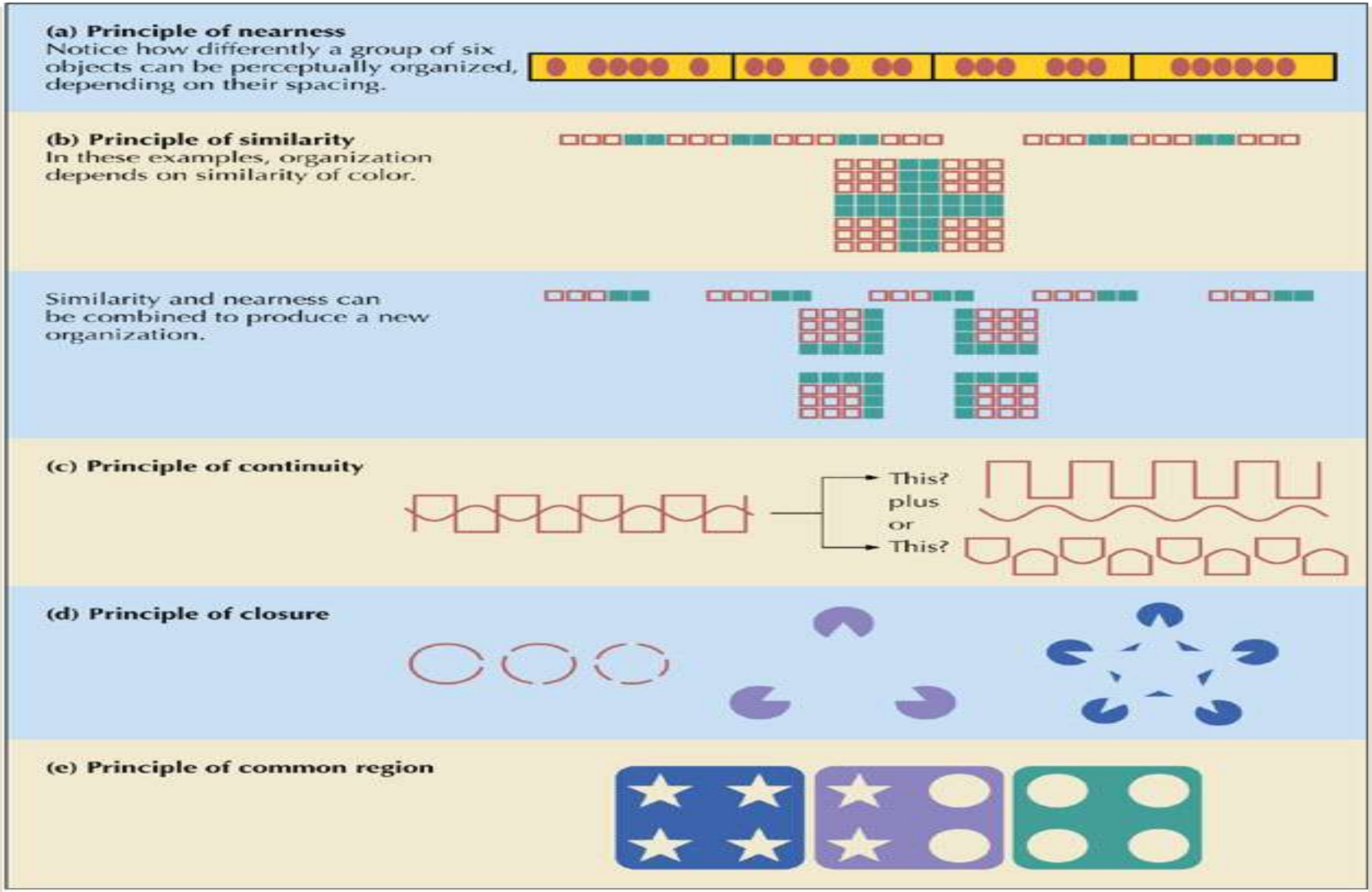

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FIGURE 4.30 How we organize perceptions.

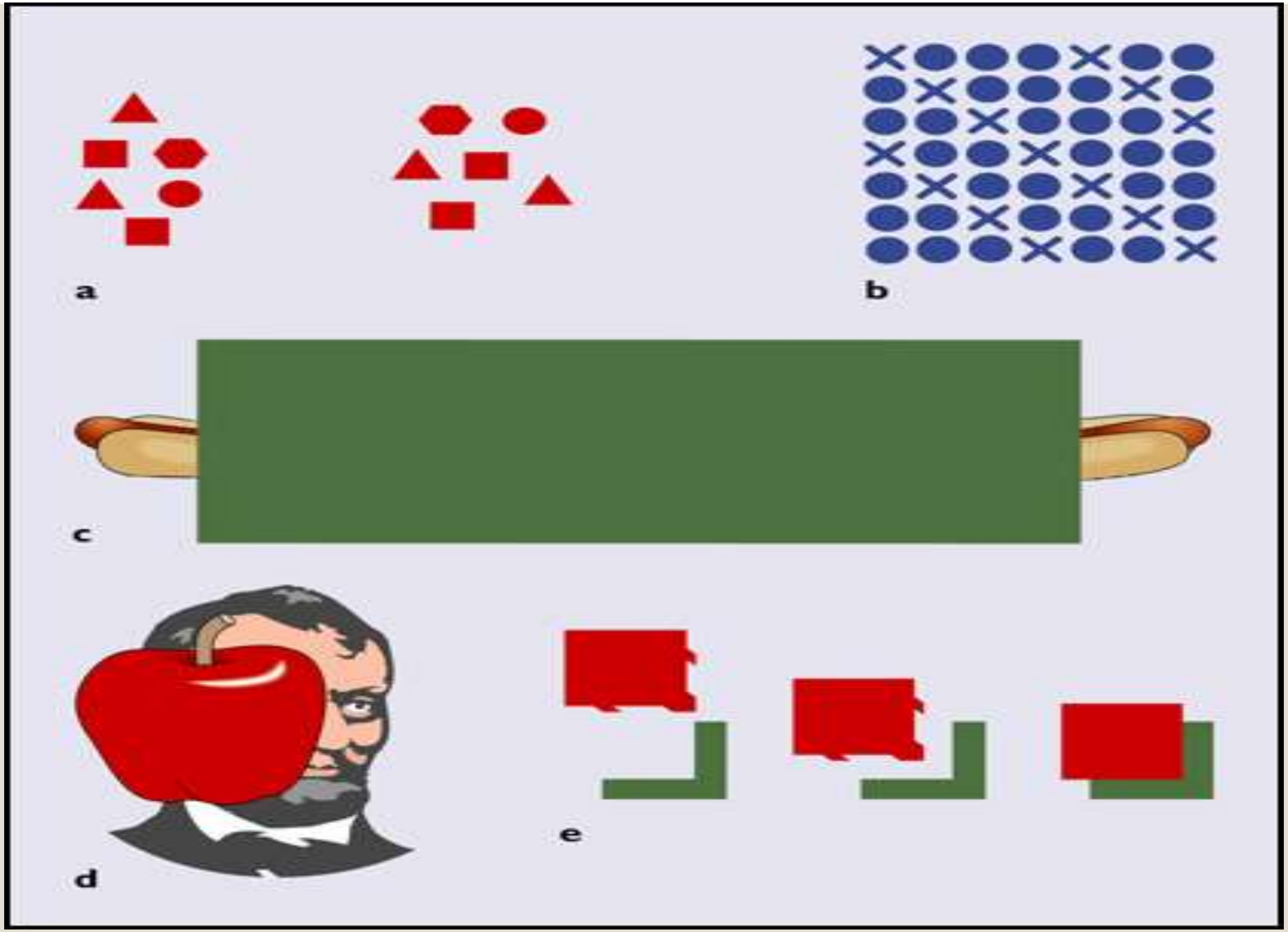


Figure 4.51

Gestalt principles of (a) proximity, (b) similarity, (c) continuation, (d) closure, and (e) good figure.

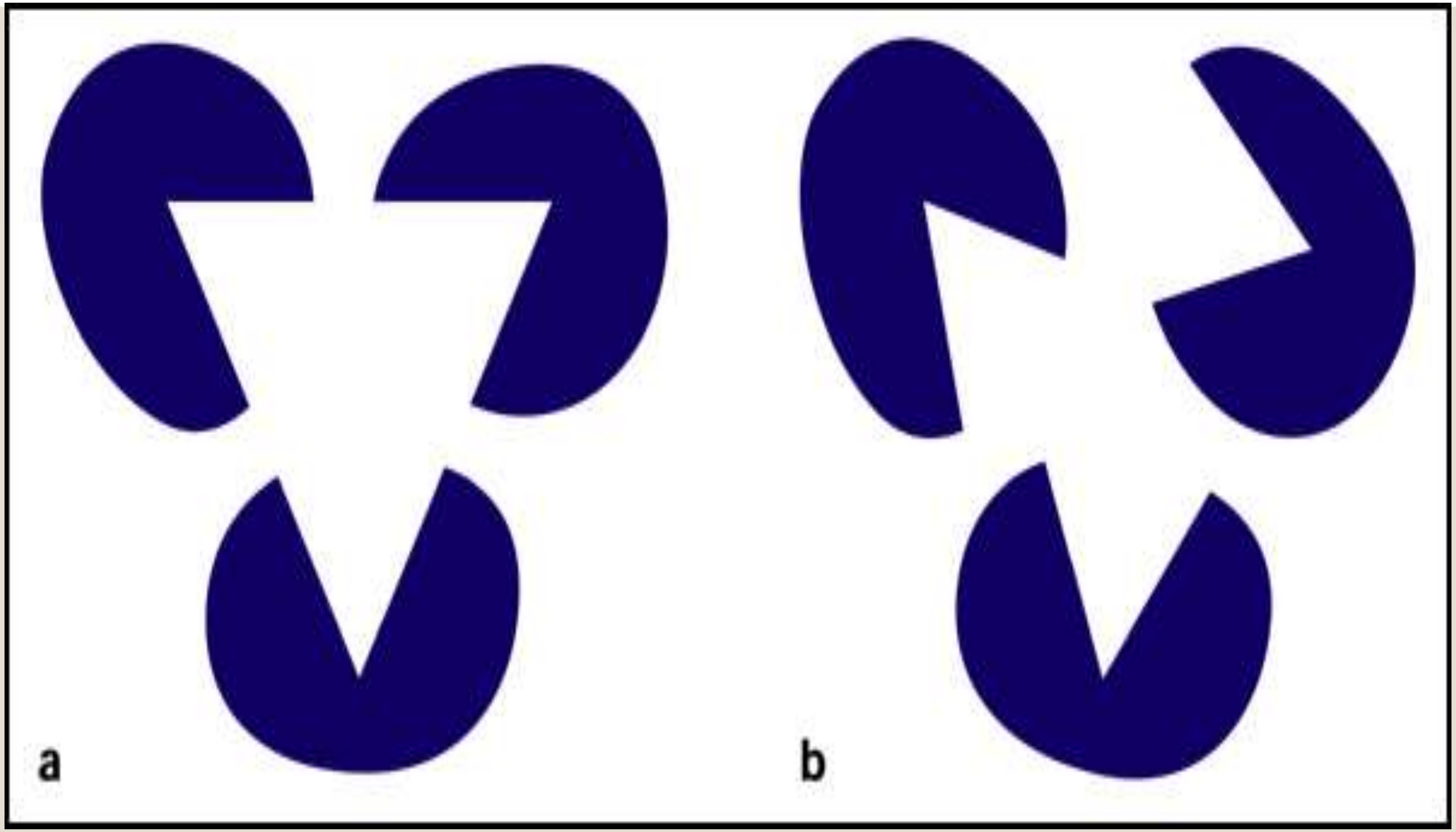


Figure 4.52

In (a) we see a triangle overlapping three irregular ovals. We see it because triangles are “good figures” and symmetrical. If we tilt the ovals, as in (b), they appear as irregular objects, not as objects with something on top of them. (From Singh, Hoffman, & Albert, 1999)

Perceptual expectancies (set)

- Bottom-Up Processing: Analyzing information starting at the bottom (small units) and going upward to form a complete perception
- Top-Down Processing: Preexisting knowledge that is used to rapidly organize features into a meaningful whole
- Perceptual Set: Readiness to perceive in a particular manner, induced by small expectations

Perception of movement and depth

- *Visual constancy*

  - <u>Visual constancy</u> is our tendency to perceive objects as keeping their size, shape and color even though the image that strikes our retina changes from moment to moment.

  - So an automobile that is driving away looks like it is moving away, not merely shrinking, even though the image on our two retinas is growing smaller.

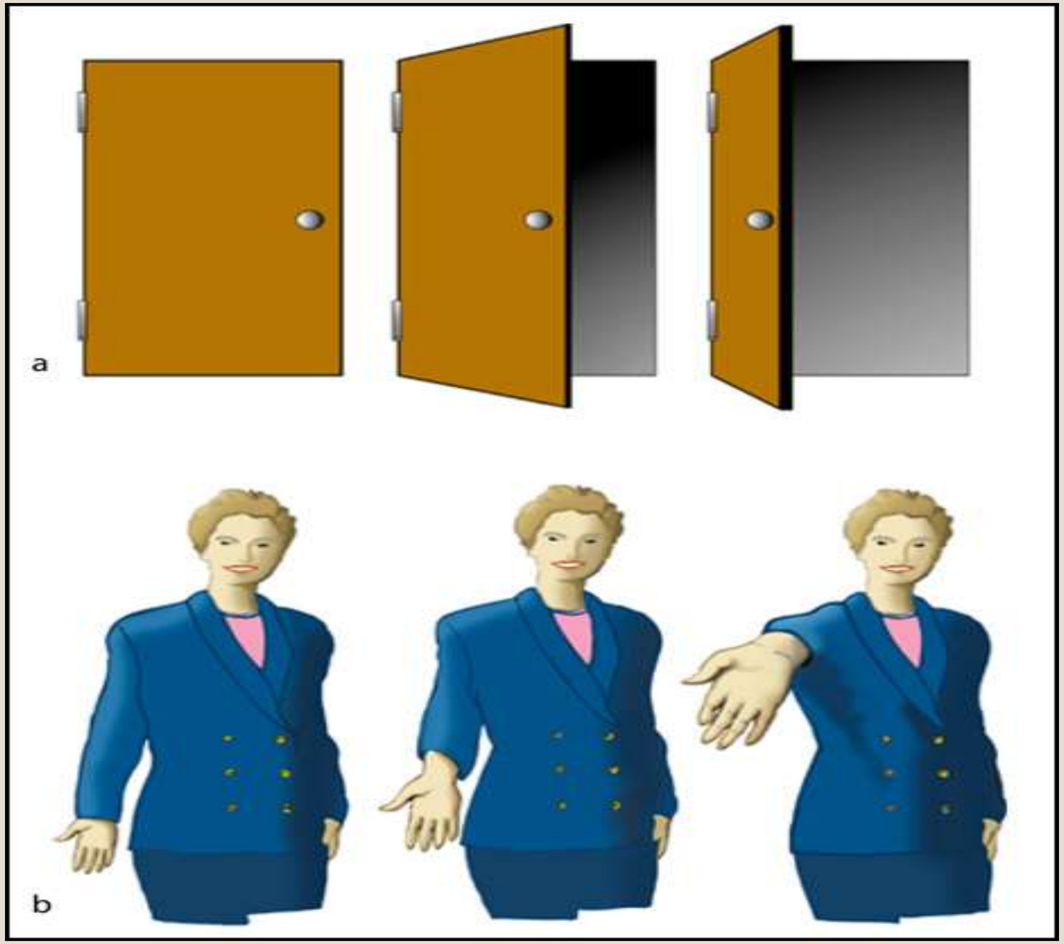


Figure 4.53

(a) Shape constancy: We perceive all three doors as rectangles.
(b) Size constancy: We perceive all three hands as equal in size.

Depth perception

- Our retinas are two-dimensional surfaces, but they give us very good depth perception – our ability to perceive distance.
  - There are several factors involved in creating our depth perception.
  - Some are **binocular cues** (depending on both eyes) and others are **monocular** (needing only one eye.)

- *Binocular cues*
  - One important contributor is **retinal disparity**, which is the difference in apparent position of an object seen by each retina.
  - This discrepancy allows us to gauge distance.
  - **Convergence** is the degree to which our eyes must turn in to allow us to focus on a very close object.

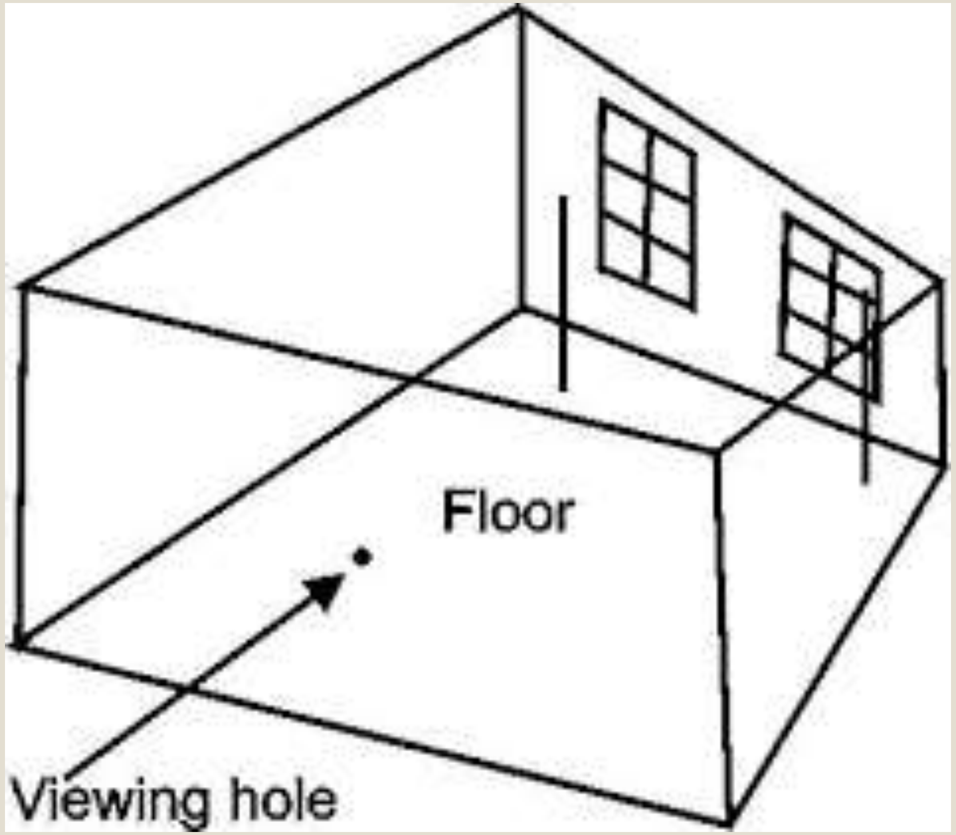
Figure 4.56
Convergence of the eyes as a cue to distance. The more this viewer must converge her eyes toward each other in order to focus on an object, the closer the object must be.

Depth perception

- **Monocular cues** allow a person to judge depth and distance accurately using only one eye.
  - **Object size** can be used if we already have an idea of the approximate size of the objects.
  - **Linear perspective**, as in the case of parallel lines that converge as they approach the horizon.
  - **Detail** – generally objects that are closer can be seen in greater detail than those that are farther away.

Optical illusions

- When we misjudge distance, we misjudge size as well.
- For example, the Ames room illusion causes us to misjudge the heights of people standing in it using a powerfully misleading set of background cues.



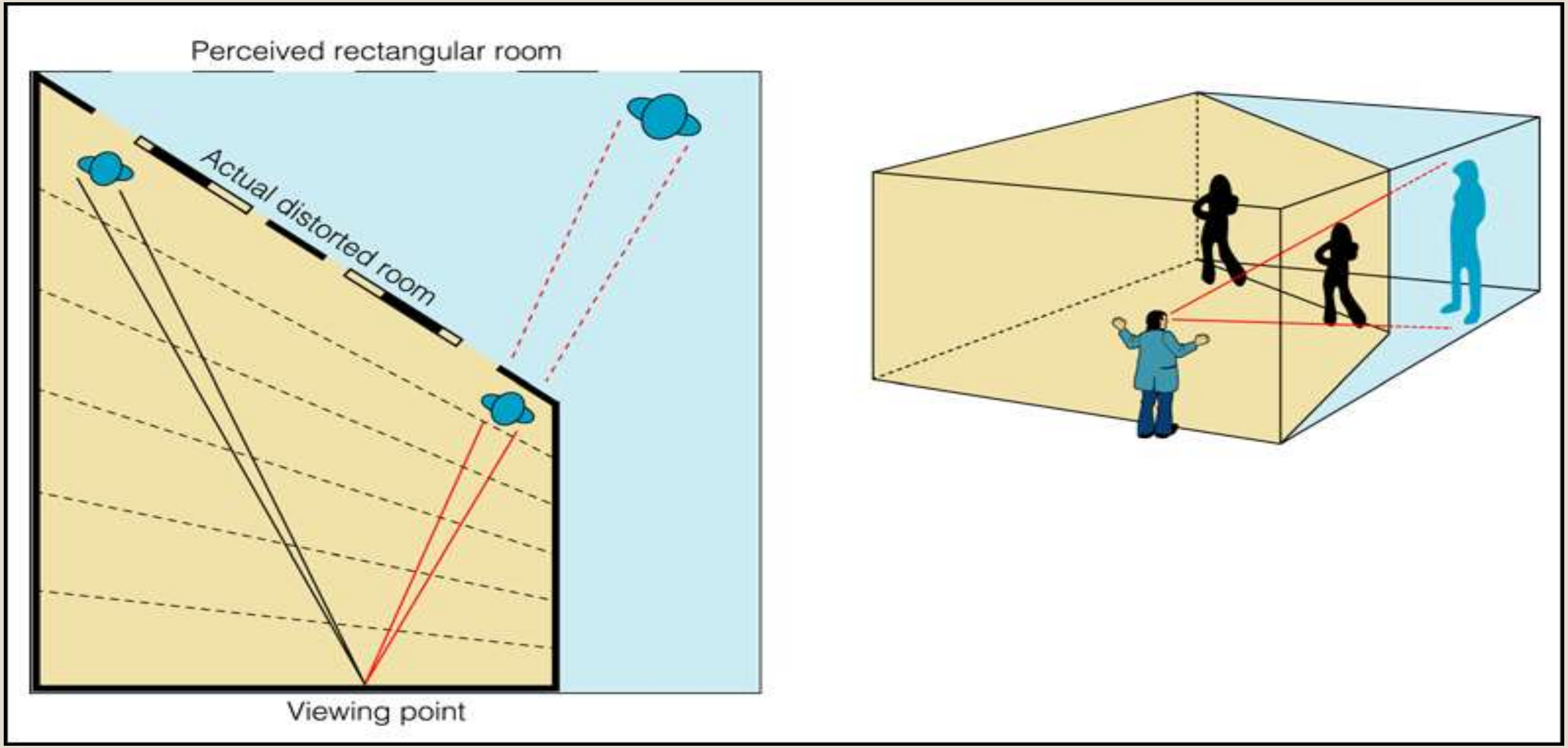


FIGURE 4.62b

The Ames room is a study in deceptive perception, designed to be viewed through a peephole with one eye. (b) This diagram shows the positions of the people in the Ames room and demonstrates how the illusion of distance is created. (Wilson et al., 1964)

Depth perception

- Definition: Ability to see three-dimensional space and to accurately judge distances
- Visual Cliff: Apparatus that looks like the edge of an elevated platform or cliff
- Depth Cues: Features of environment, and messages, that supply information about distance and space
- Monocular Depth Cue: Depth cue that can be sensed with one eye
- Binocular Depth Cue: Depth cue that can be sensed with two eyes

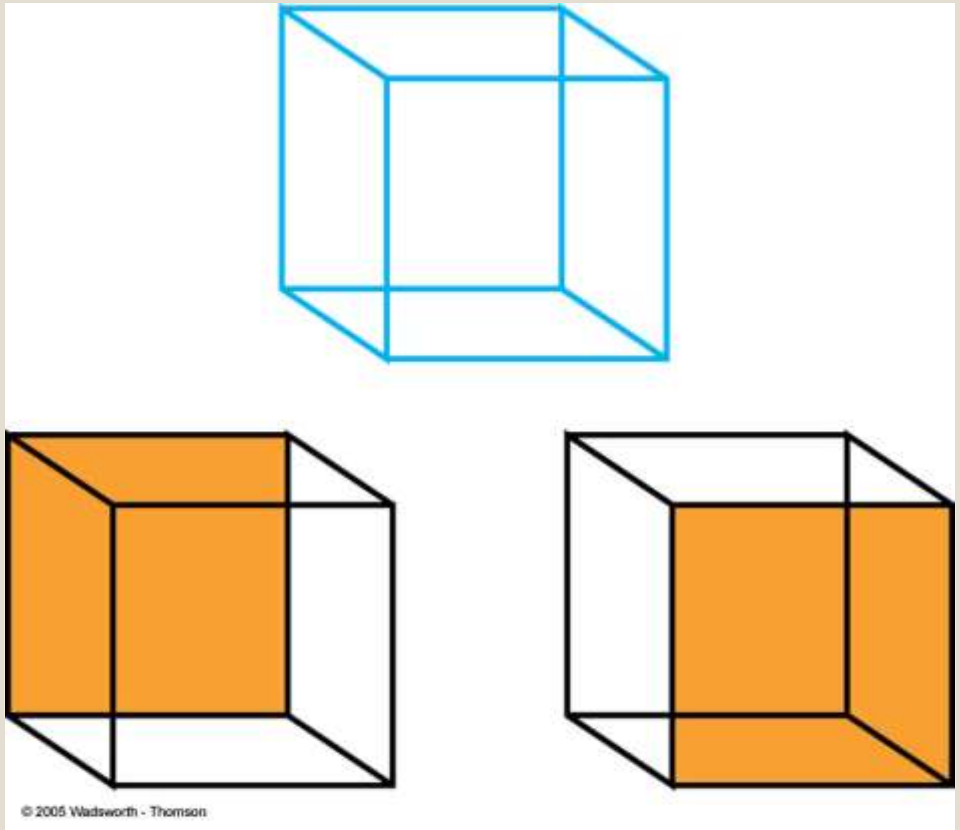


FIGURE 4.32 Necker's cube.

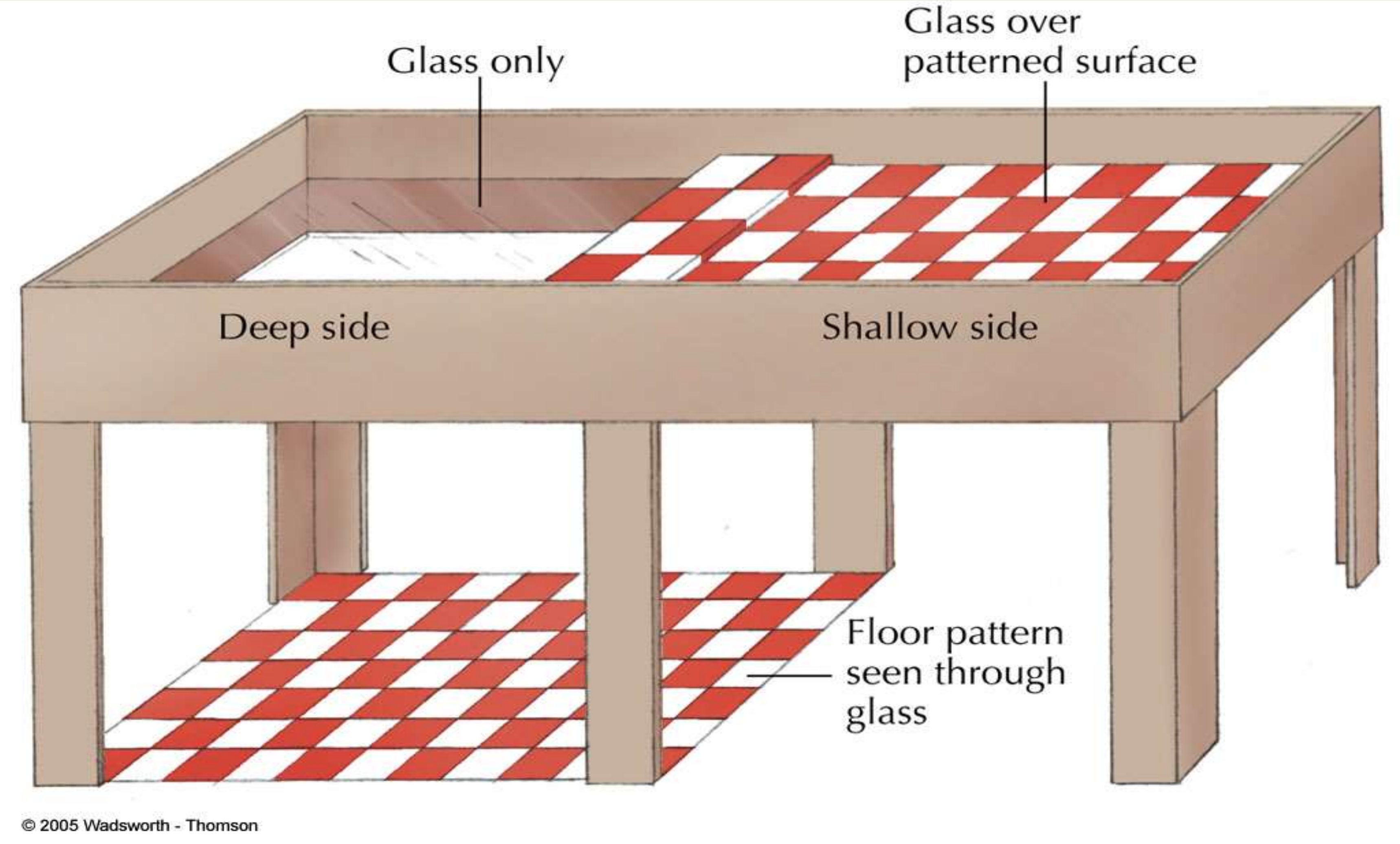


FIGURE4.34 Human infants and newborn animals refuse to go over the edge of the visual cliff.

Macular cues for depth perception

- Accommodation: Bending of the lens of the eye to focus on nearby objects
- Convergence: Binocular cue; when you look at something 50 feet or closer, your eyes must turn in (converge) to focus the object
- Retinal Disparity: Discrepancy in the images that reach the right and left eyes
- Stereotopic Vision: Three-dimensional sight

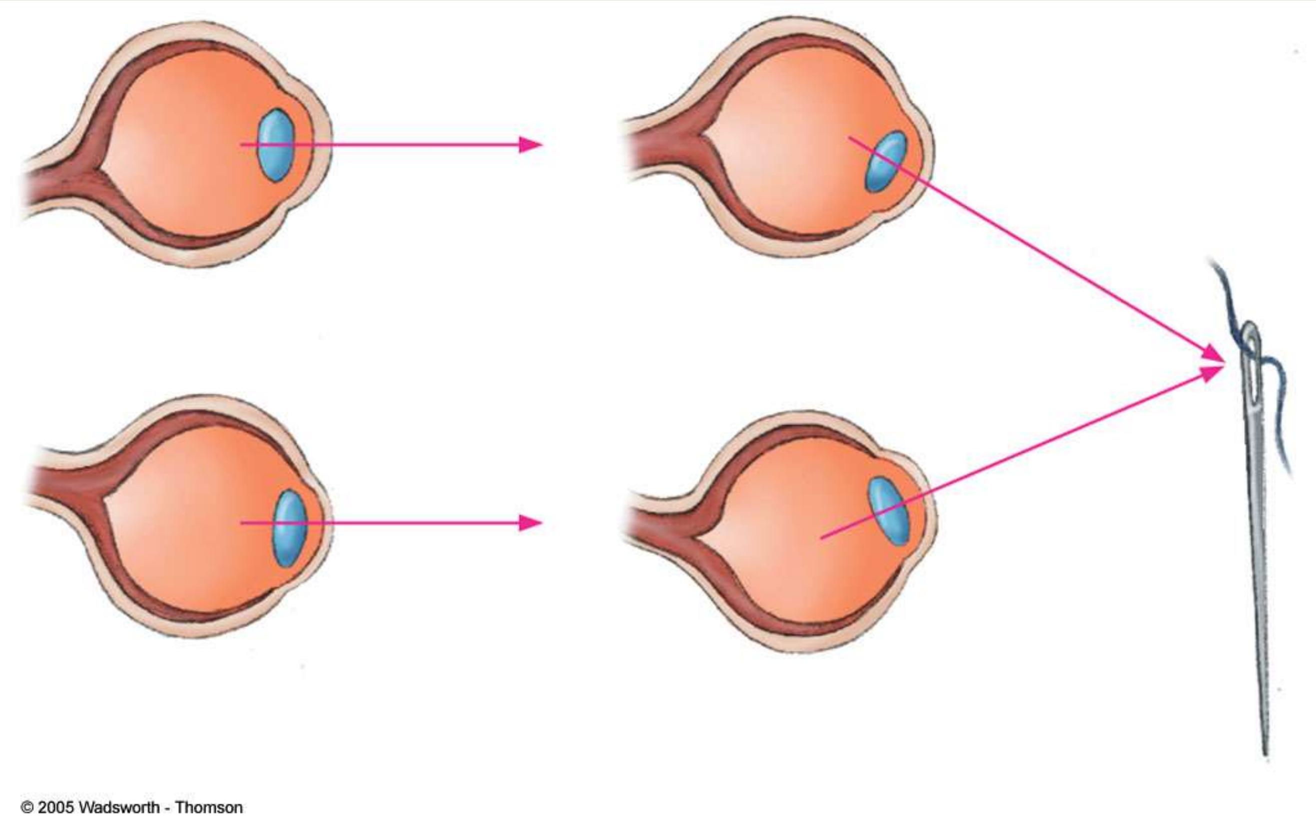


FIGURE 4.35 The eyes must converge, or turn in toward the nose, to focus on close objects.

Pictorial depth cues

- Features found in paintings, drawings and photographs that supply information about space, depth, and distance

  - Linear Perspective: Based on apparent convergence of parallel lines in environment
  - Overlap (Interposition): When one object partially blocks another
  - Texture Gradients: Texture changes can contribute to depth perception; coarse texture implies closeness, fine texture implies distance
  - Relative Motion (Motion Parallax): Nearby objects move a lot as your head moves; distant objects move slightly

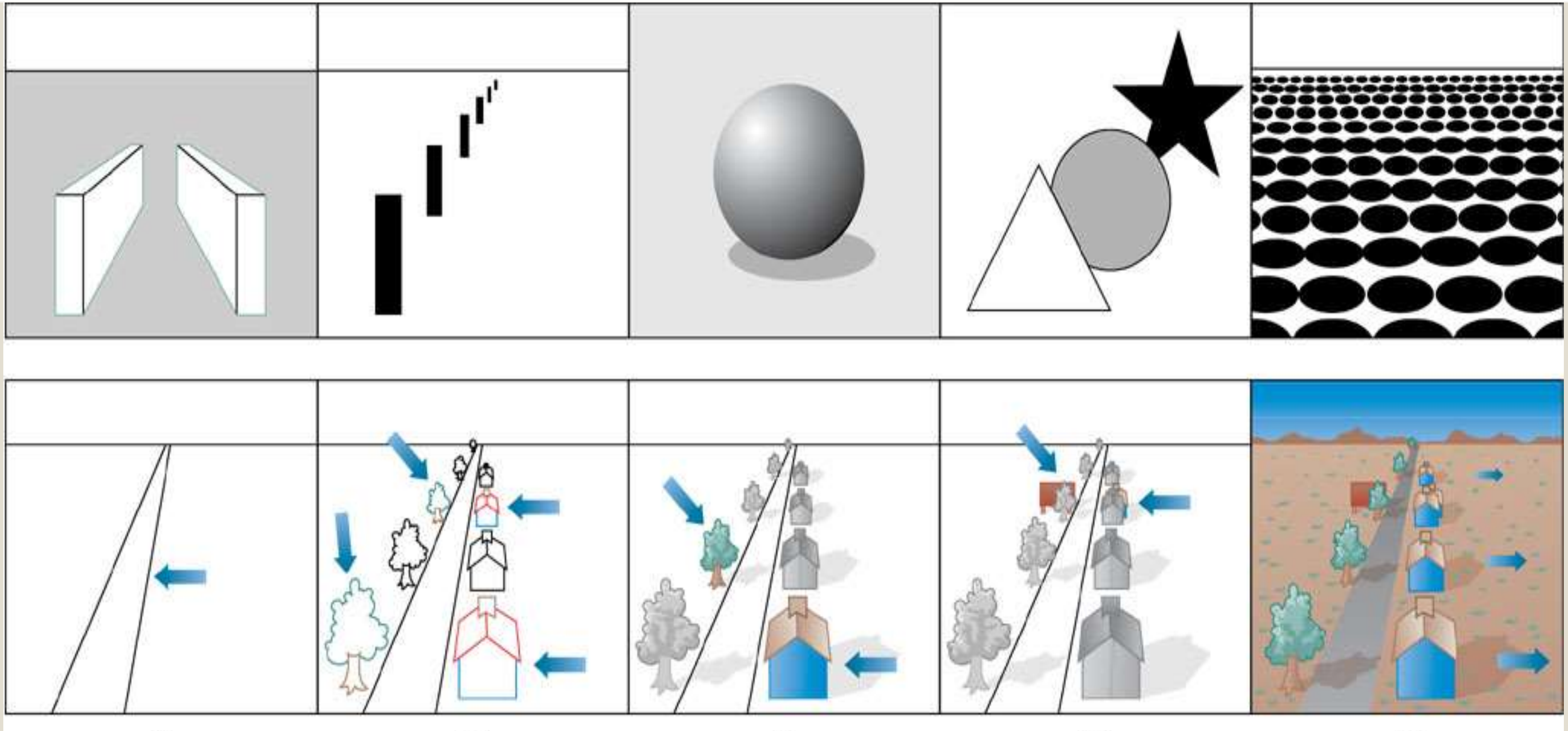


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FIGURE4.38 (a) Linear perspective. (b) Relative size. (c) Light and shadow. (d) Overlap. (e) Texture gradients. Drawings in the top row show fairly “pure” examples of each of the pictorial depth cues. In the bottom row, the pictorial depth cues are used to assemble a more realistic scene.

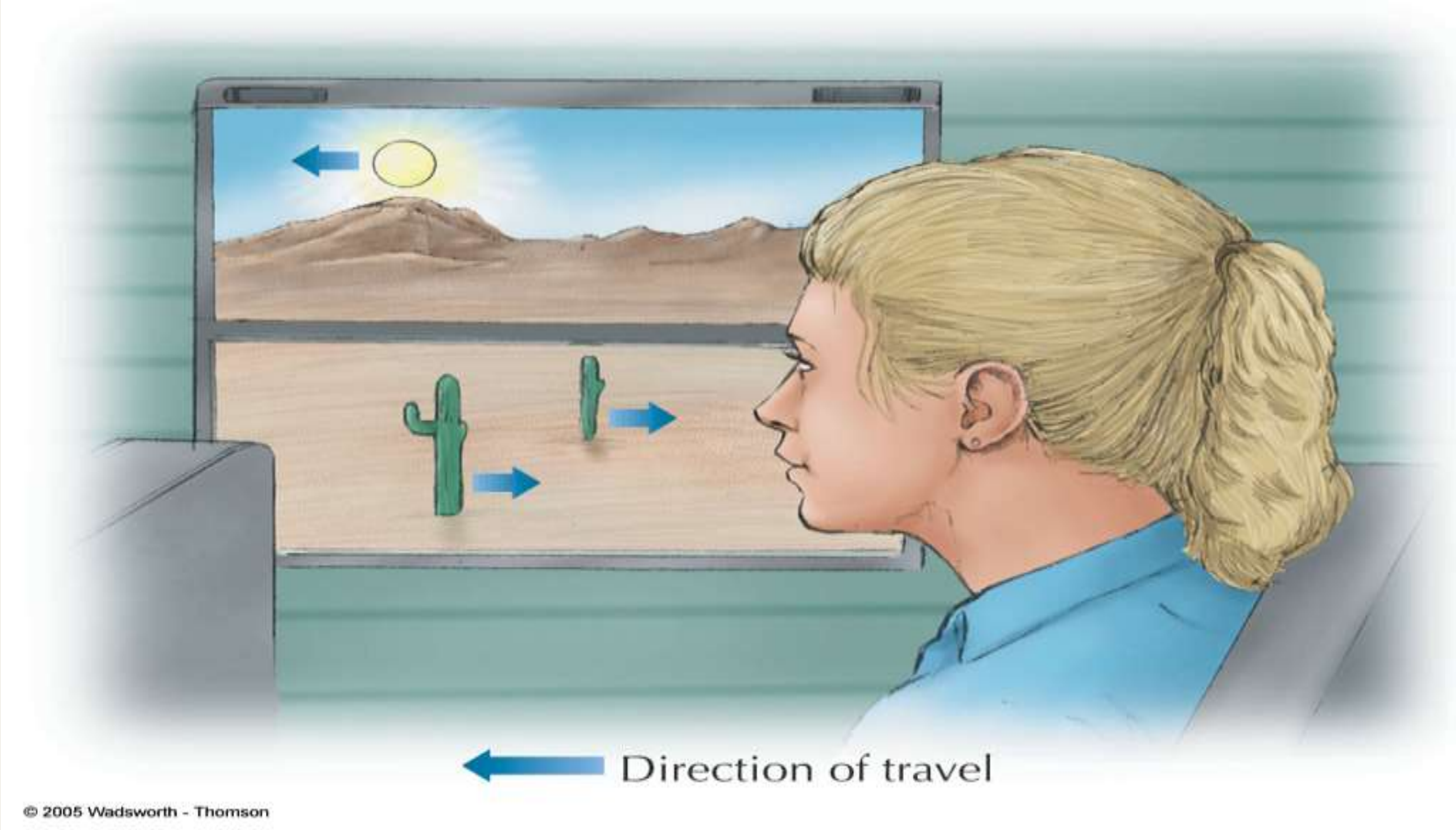

FIGURE 4.41 The apparent motion of objects viewed during travel depends on their distance from the observer. Apparent motion can also be influenced by an observer's point of fixation. At middle distances, objects closer than the point of fixation appear to move backward; those beyond the point of fixation appear to move forward. Objects at great distances, such as the sun or moon, always appear to move forward.

- Moon Illusion: Apparent change in size that occurs as the moon moves from the horizon (large moon) to overhead (small moon)

- Apparent-Distance Hypothesis: Horizon seems more distant than the night sky

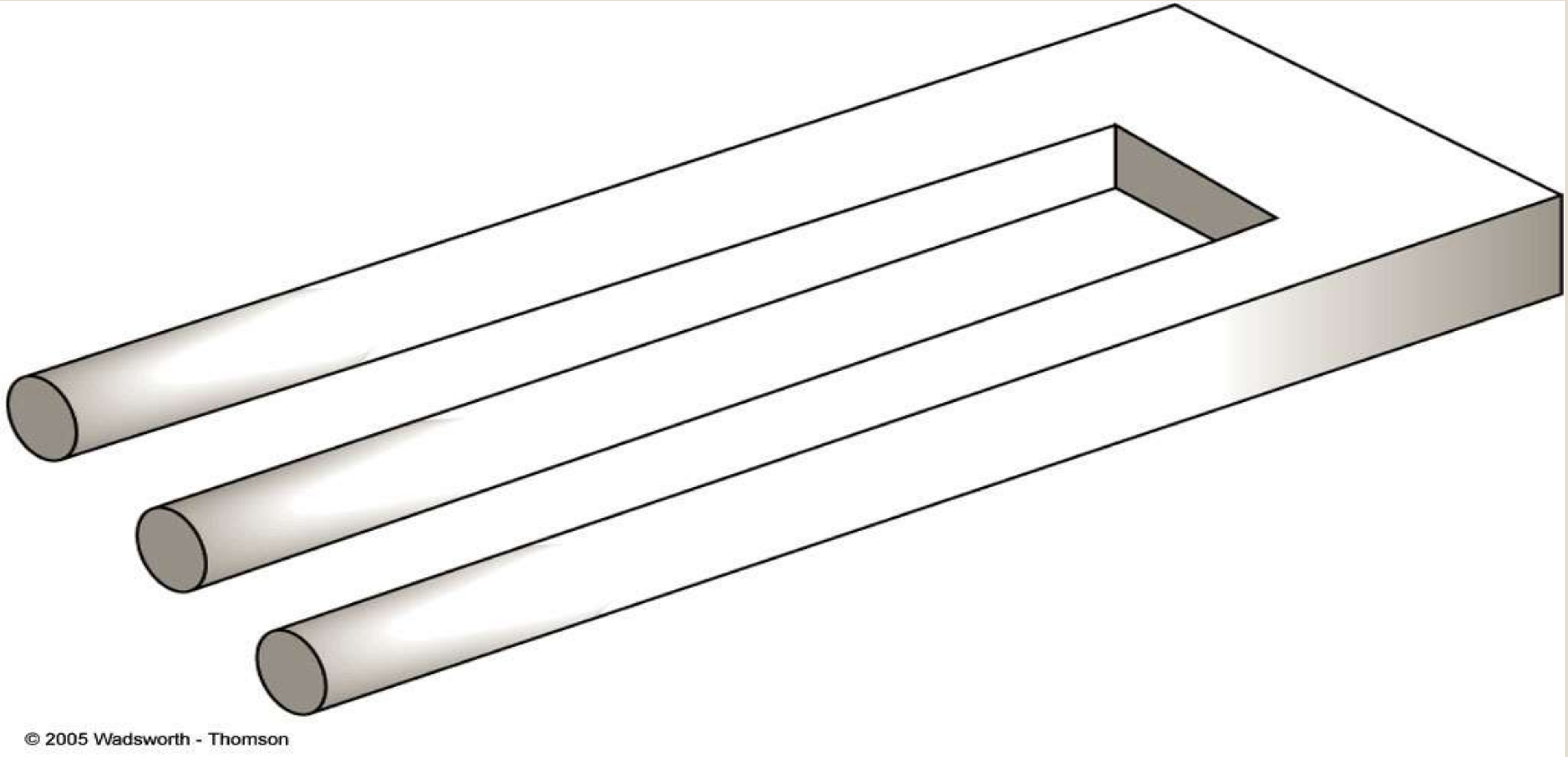

FIGURE 4.33 (Left) An impossible figure—the “three-pronged widget.” (Right) It might seem that including more information in a drawing would make perceptual conflicts impossible. However, Japanese artist Shigeo Fukuda has shown otherwise. (Disappearing Column, © Shigeo Fukuda, 1985.)

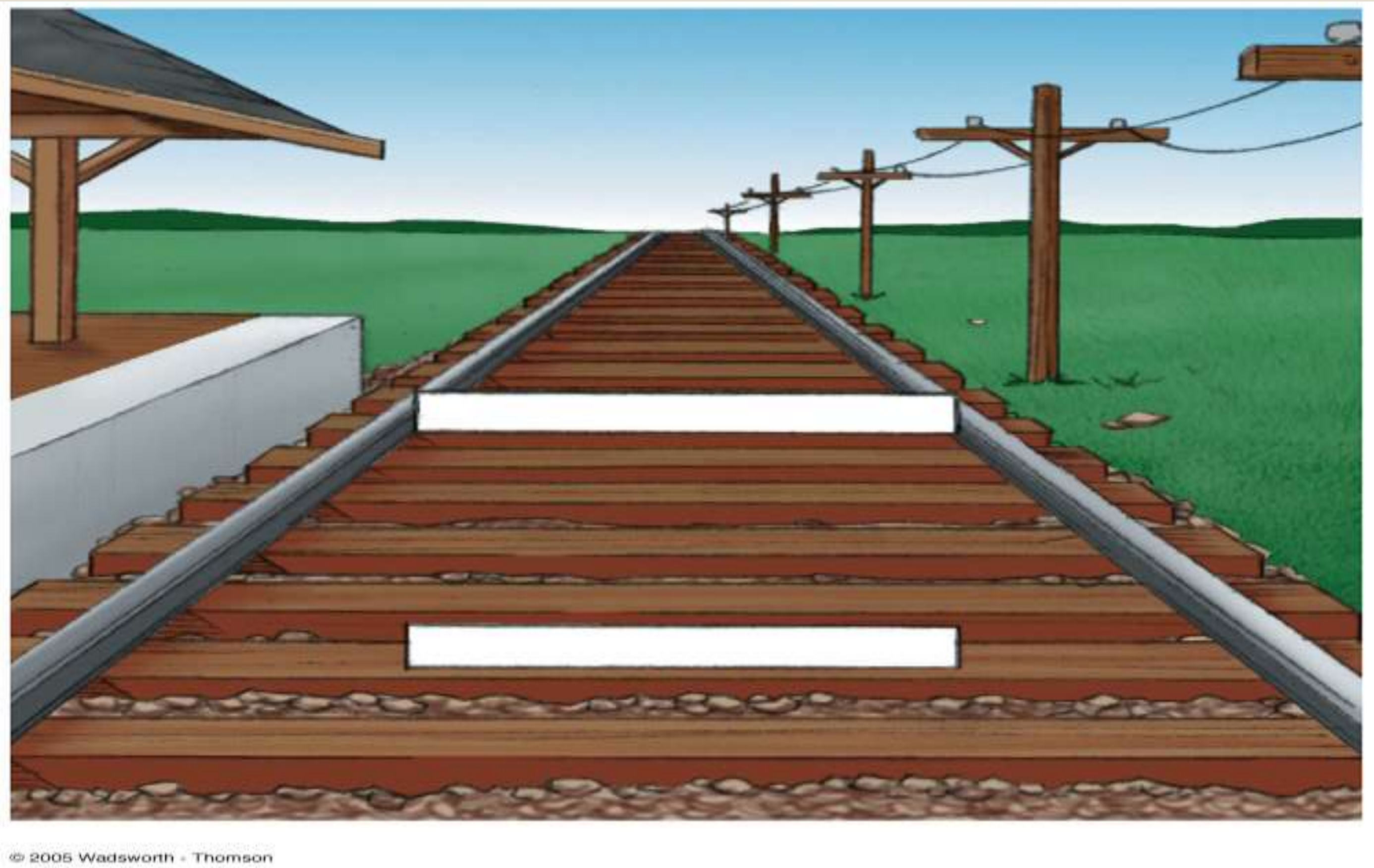

FIGURE 4.42 The Ponzo illusion may help you understand the moon illusion. Picture the two white bars as resting on the railroad tracks. In the drawing, the upper bar is the same length as the lower bar. However, because the upper bar appears to be farther away than the lower bar, we perceive it as longer. The same logic applies to the moon illusion.

Perceptual learning

- Change in the brain that alters how we process sensory information
- Perceptual Reconstructions: Mental models of external events
- Perceptual Habits: Ingrained patterns of organization and attention

Illusion

- Illusion: Misleading or distorted perceptions of stimuli that actually exist in the external world
- Hallucination: When people perceive objects or events that have no external basis in reality
- Muller-Lyer Illusion: Two equal-length lines topped with inward or outward pointing V's appear to be of different length; based on experience with edges and corners

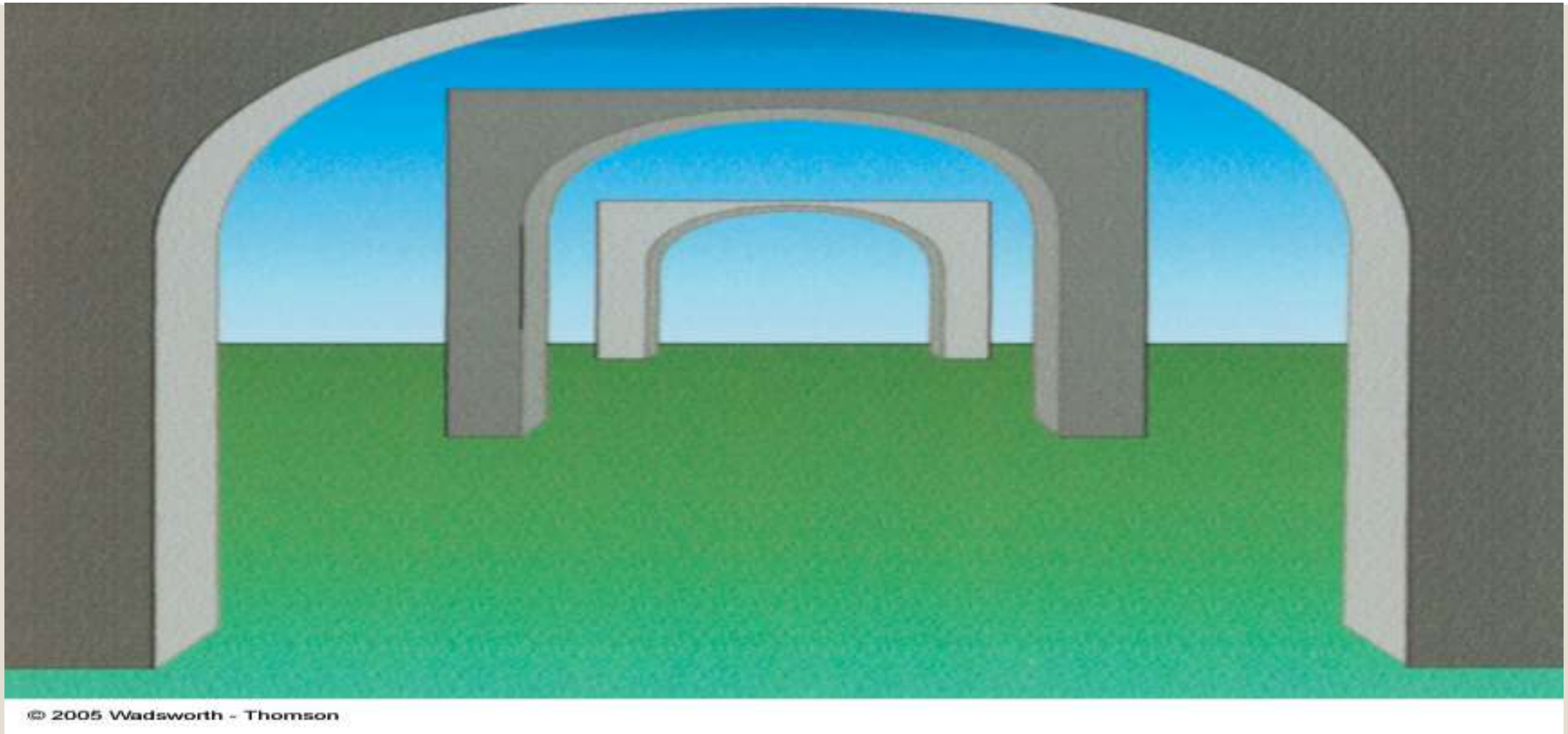

FIGURE 4.44 It is difficult to look at this simple drawing without perceiving depth. Yet, the drawing is nothing more than a collection of flat shapes. Turn this page counterclockwise 90 degrees, and you will see three C's, one within another. When the drawing is turned sideways, it seems nearly flat. However, if you turn the page upright again, a sense of depth will reappear. Clearly, you have used your knowledge and expectations to construct an illusion of depth. The drawing itself would only be a flat design if you didn't invest it with meaning.

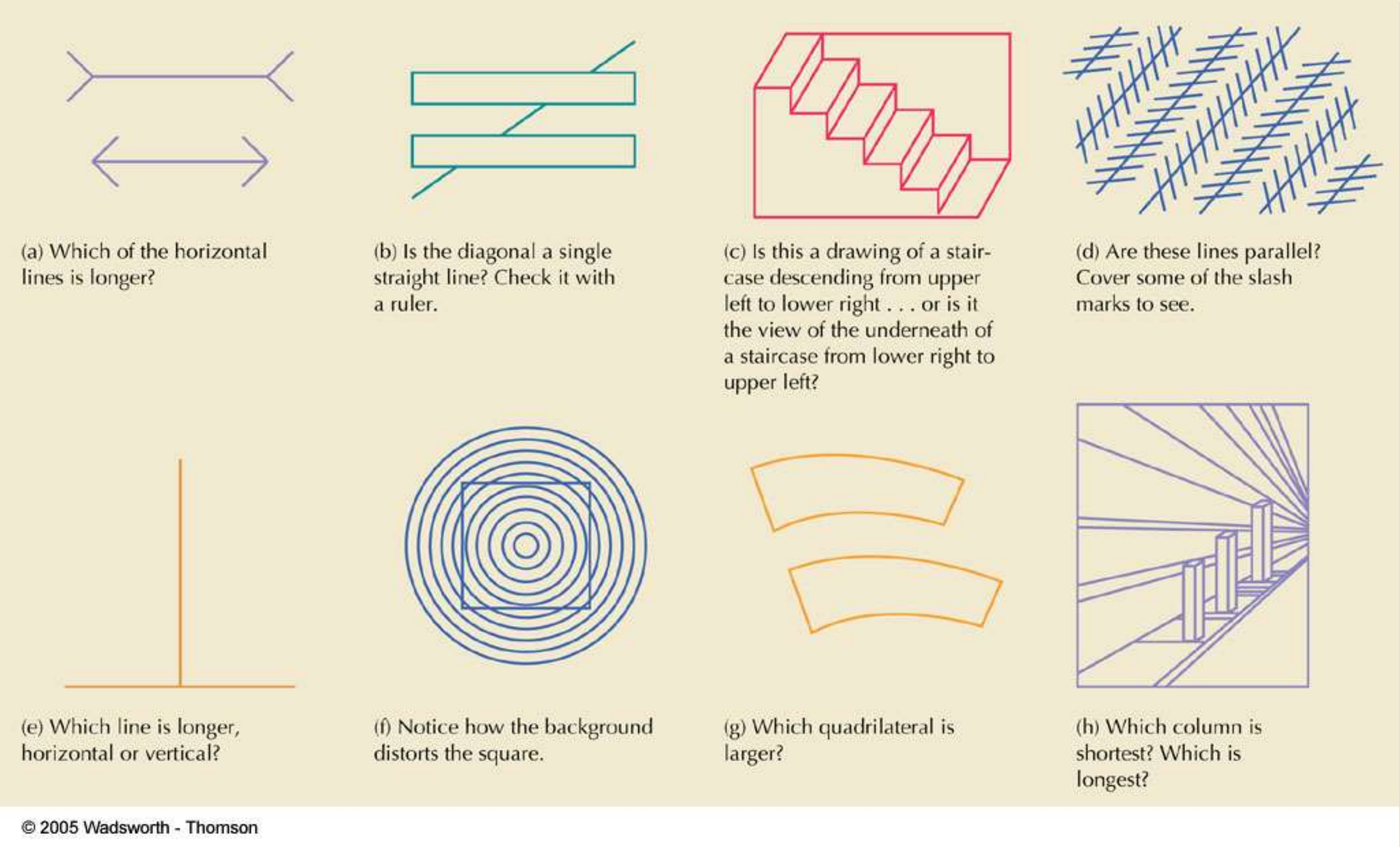

FIGURE 4.47 Some interesting perceptual illusions. Such illusions are a normal part of visual perception.

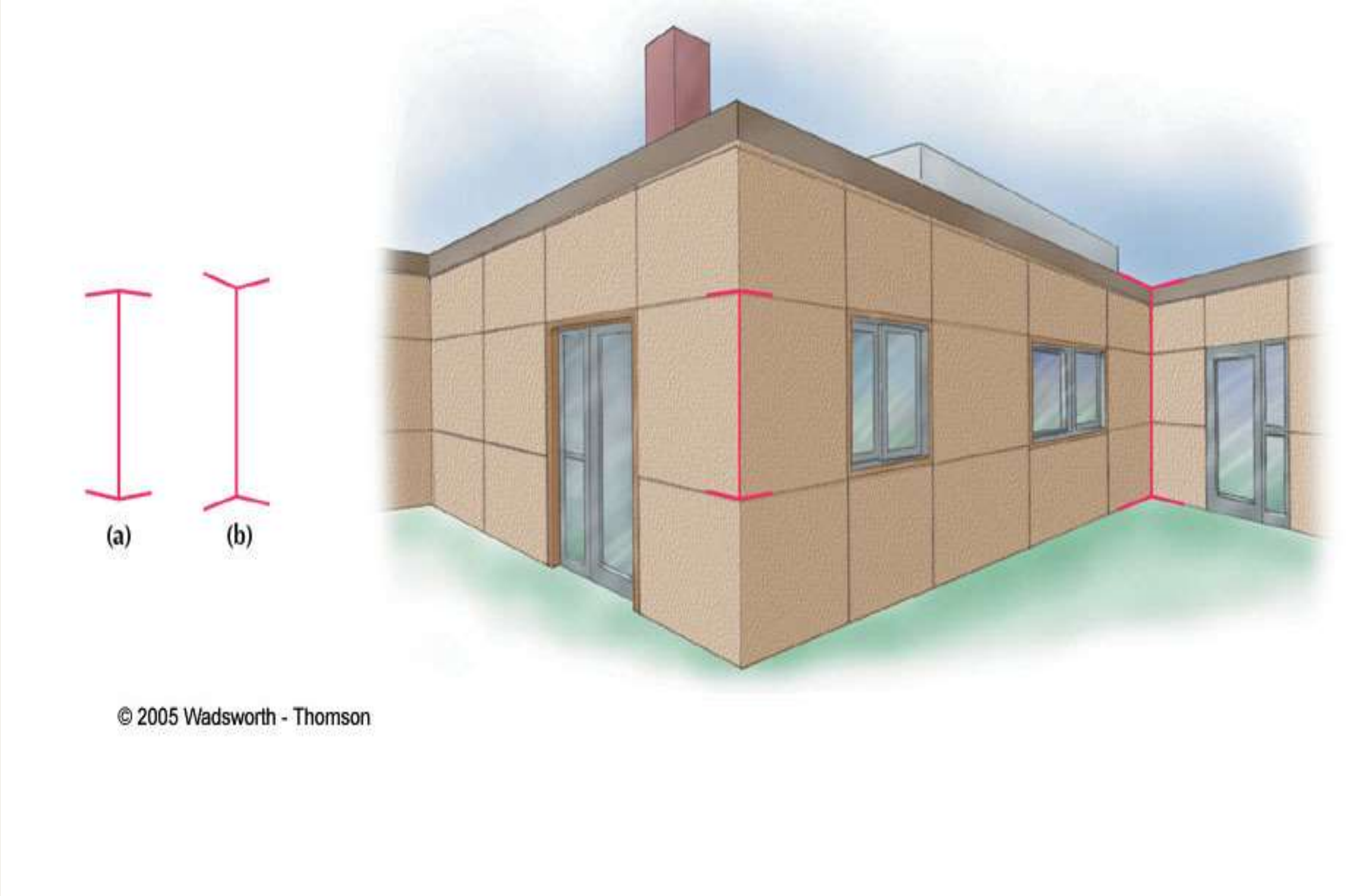

FIGURE 4.48 Why does line (b) in the Müller-Lyer illusion look longer than line (a)? Probably because it looks more like a distant corner than a nearer one. Because the vertical lines form images of the same length, the more "distant" line must be perceived as larger. As you can see in the drawing on the right, additional depth cues accentuate the Müller-Lyer illusion.

?Extrasensory perception

- Parapsychology: Study of ESP and other psi phenomena (events that seem to defy accepted scientific laws)
  - Clairvoyance: Purported ability to perceive events unaffected by distance or normal physical barriers
  - Telepathy: Purported ability to read someone else's mind
  - Precognition: Purported ability to accurately predict the future
  - Psychokinesis (Mind Over Matter): Purported ability to influence inanimate objects by willpower

- Zener Cards: Deck of 25 cards, each having one of five symbols
- Run of Luck: Statistically unusual outcome that could occur by chance alone (e.g., getting five heads in a row, two jackpots within six pulls of a slot machine)
- Stage ESP: Simulation of ESP for entertainment purposes
- Conclusion: Existence of ESP has NOT been scientifically demonstrated; positive results are usually inconclusive and easily criticized
  - In sum: Be skeptical! If it seems too good to be true, it probably is!

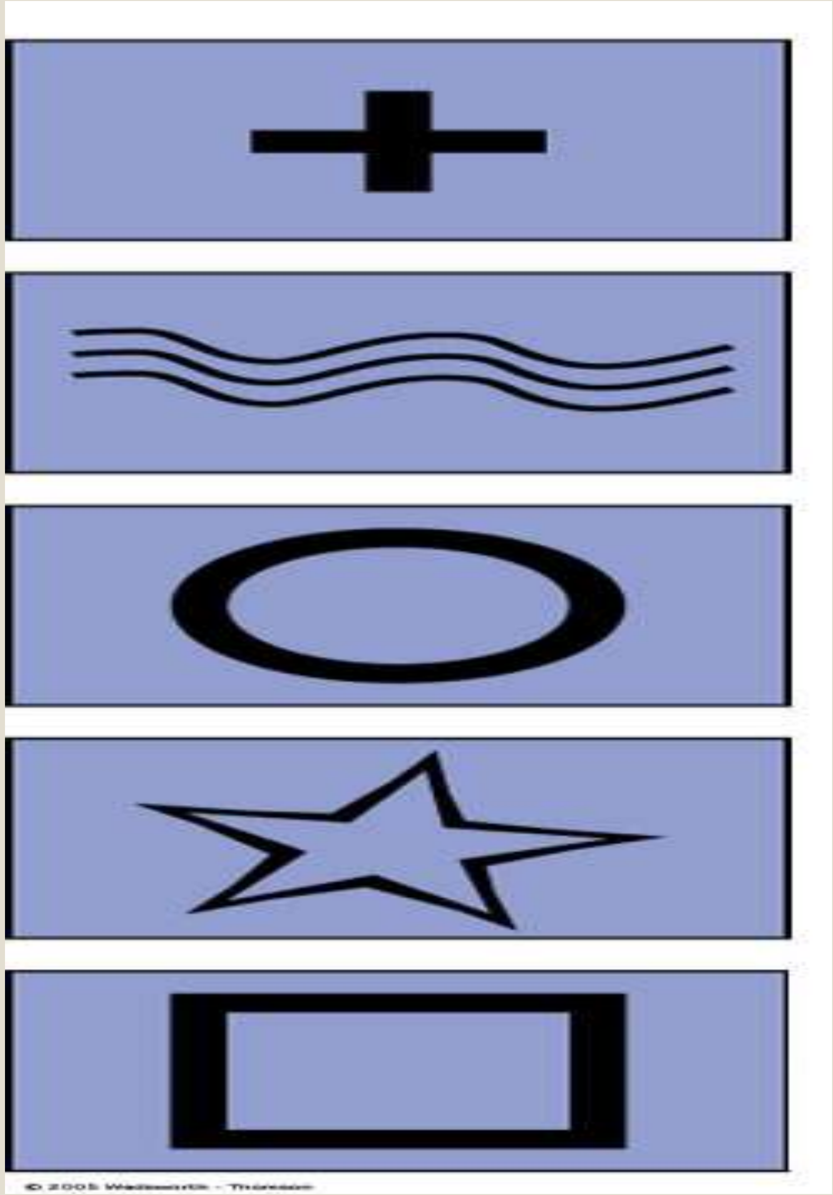

FIGURE 4.52 ESP cards used by J. B. Rhine, an early experimenter in parapsychology.

Factors Affecting the Accuracy of Eyewitness Perceptions

- Post-Event Information: Testimony reflects not only what was actually seen but also information obtained later on
- Attitudes and Expectations: May affect eyewitness's perception of events
- Cross-Racial Perceptions: Eyewitnesses are better at identifying members of their own race than of other races
- Weapon Focus: Presence of a weapon impairs eyewitness's accuracy
- Accuracy-Confidence: Confidence is not a good predictor of his/her accuracy

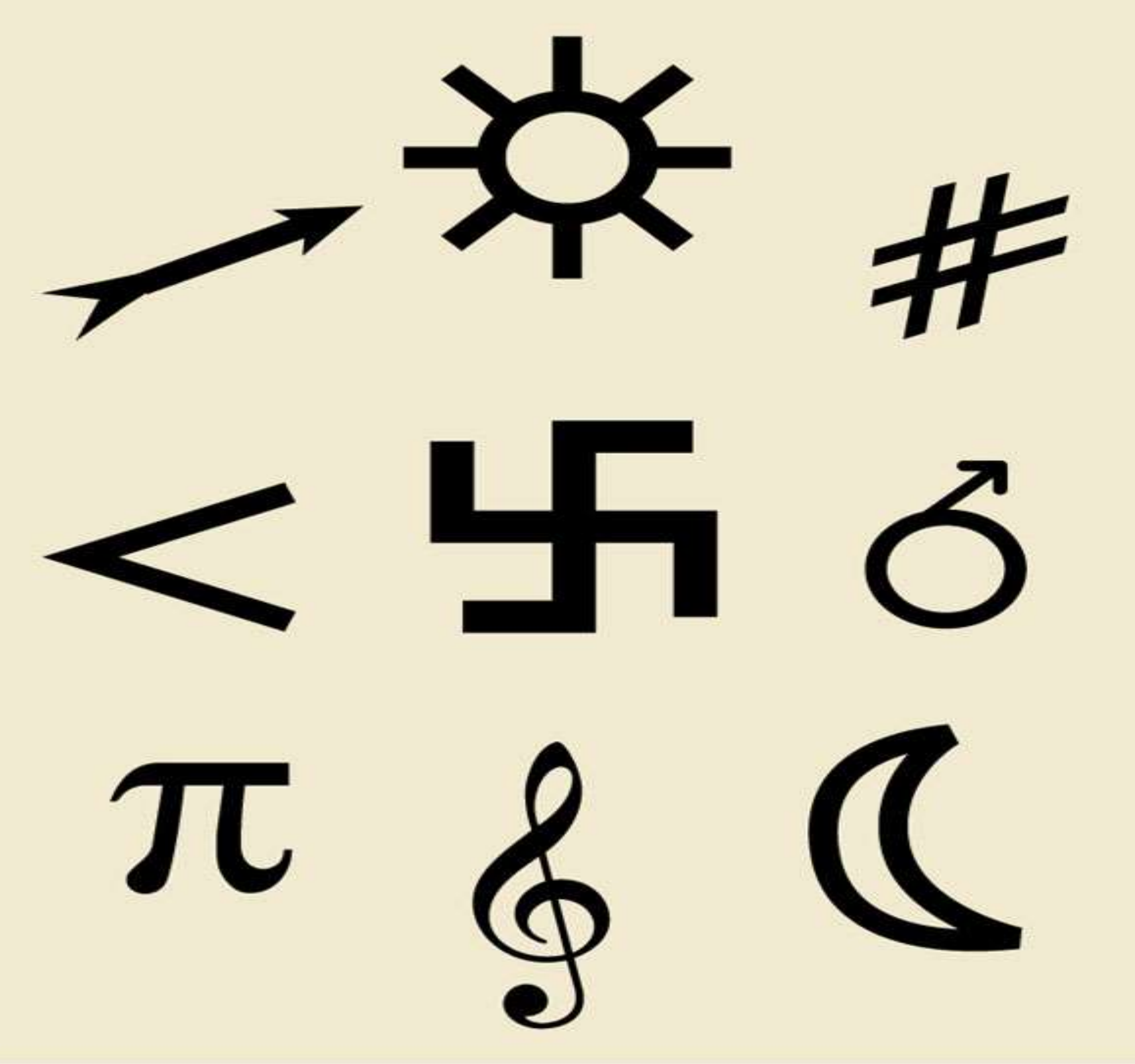
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FIGURE 4.49 Emotionally significant stimuli influence attention.

- Exposure Time: Less time an eyewitness has to observe an event, the less s/he will perceive and remember it
- Unconscious Transference: A culprit who is identified may have been seen in another situation or context
- Color Perception: Judgments of color made under monochromatic light are very unreliable
- Stress: High levels impair accuracy

Perceptual awareness

- Reality Testing: Obtaining additional information to check on accuracy of perceptions
- Habituation: Decrease in perceptual response to a given stimulus
- Dishabituation: A reversal of habituation

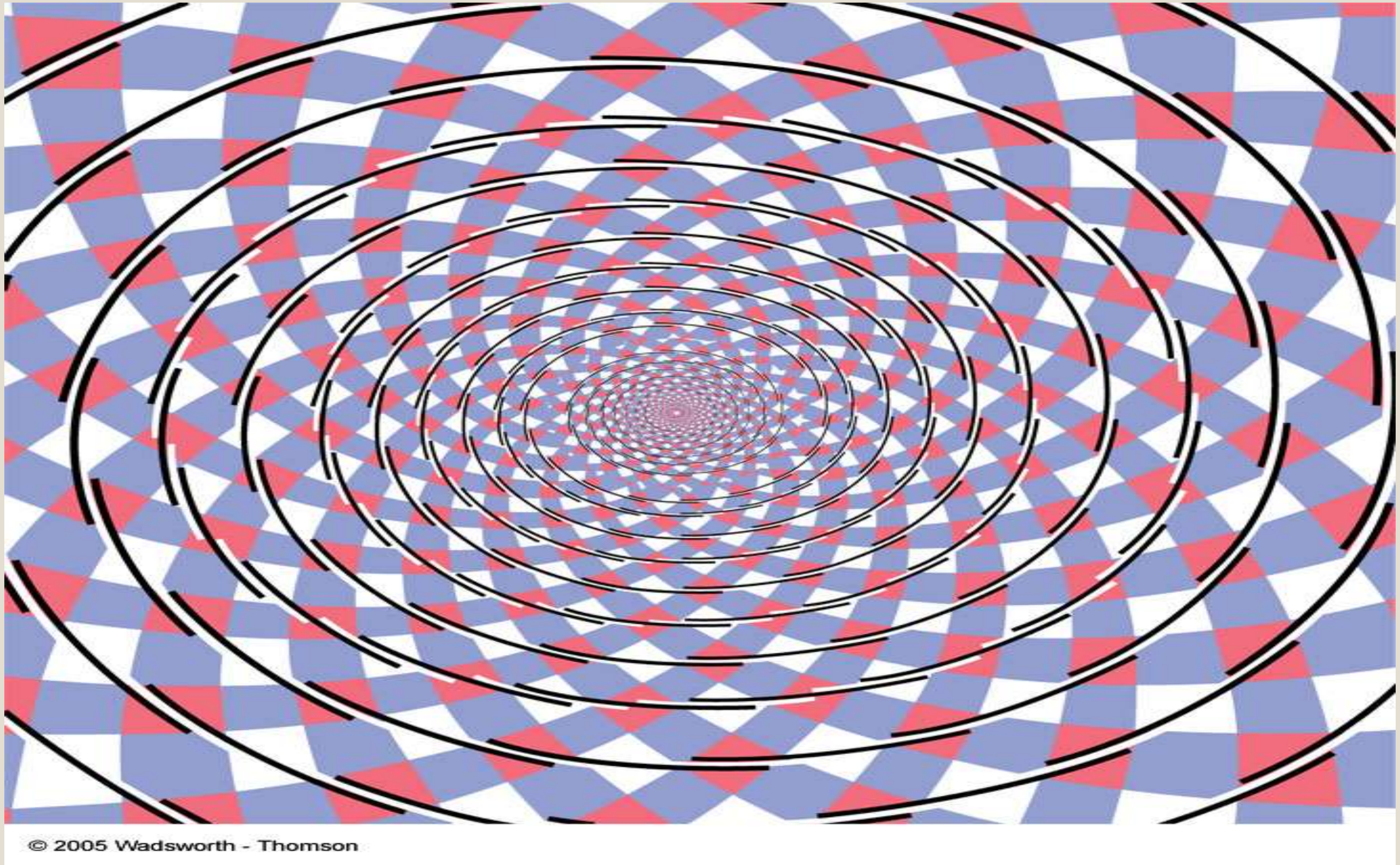

FIGURE 4.54 The limits of pure perception. Even simple designs are easily misperceived. Fraser's spiral is actually a series of concentric circles. The illusion is so powerful that people who try to trace one of the circles sometimes follow the illusory spiral and jump from one circle to the next.