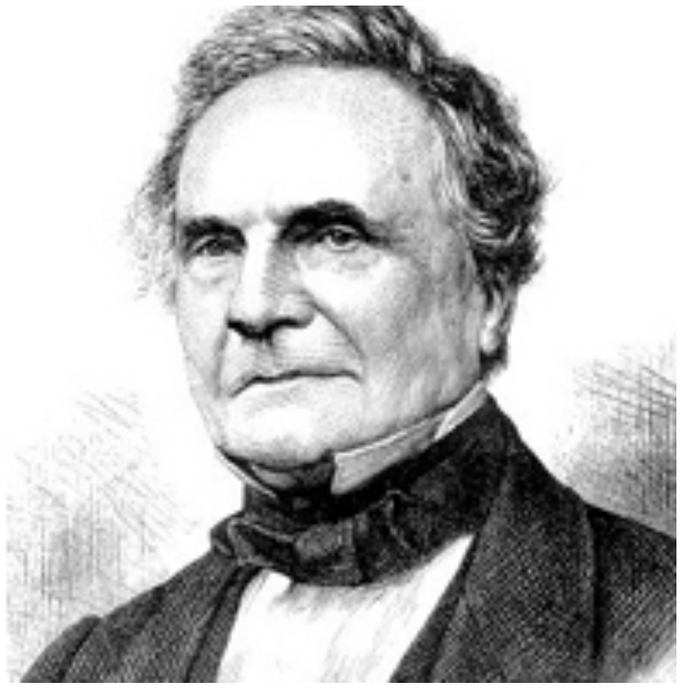
# Module # 5—Summing Up

## Visual Perception and the Brain

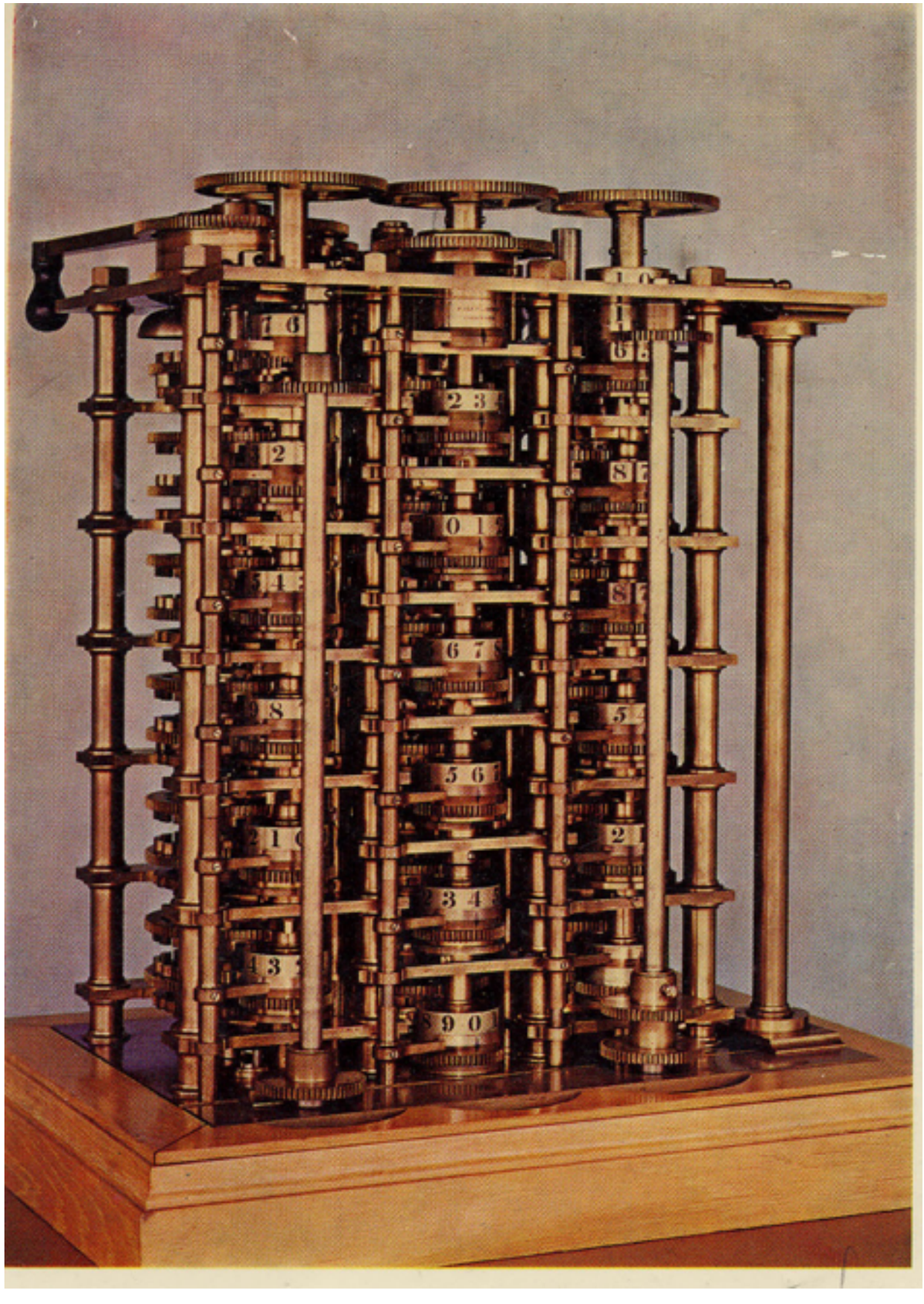
DUKE INSTITUTE *for* BRAIN SCIENCES

# Topic 2. What Vision Implies about How Brains Work

# Lesson 1. Does the Brain Work by Computation?



Charles Babbage
1791–1871



# Lesson 2. Or is It an Engine of Reflex Associations?

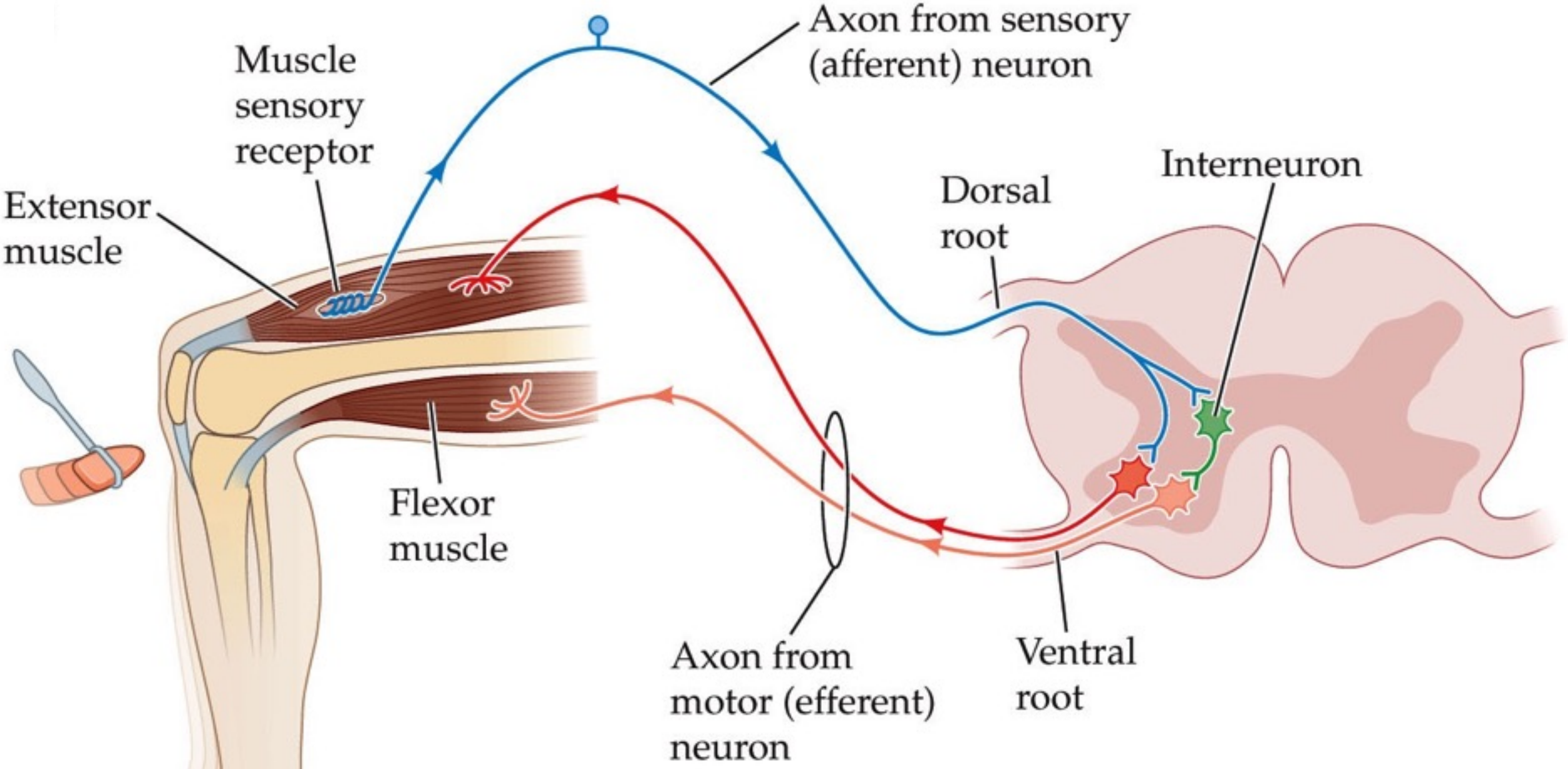
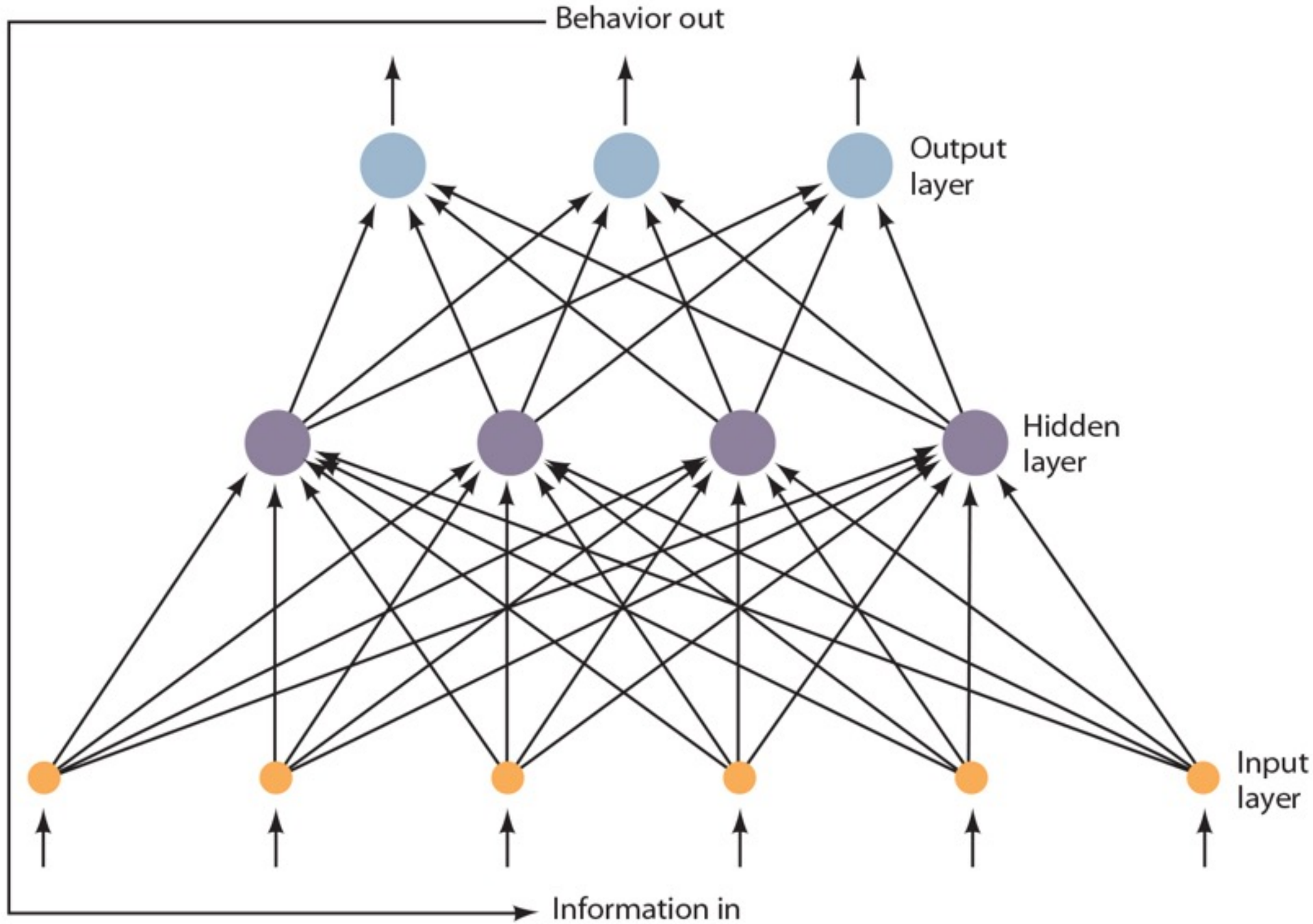
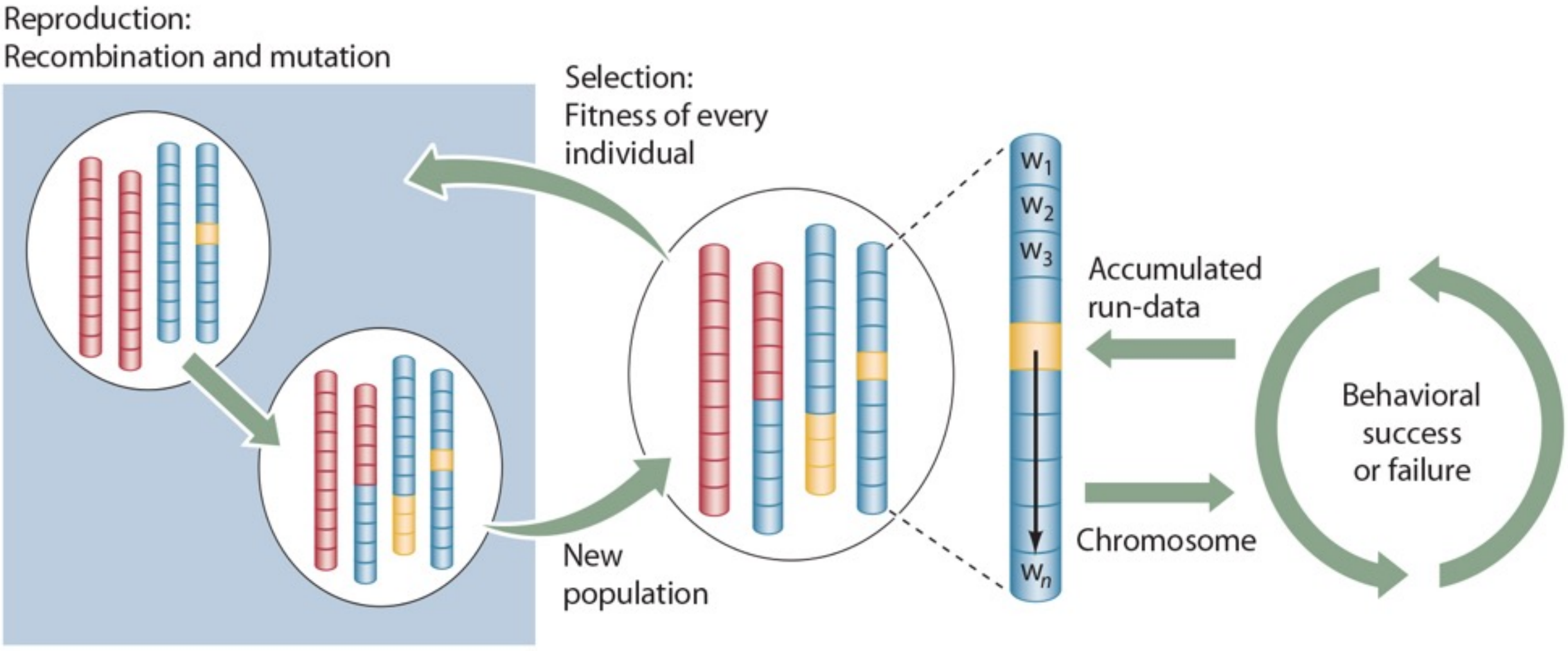



**Figure 7.6.** A Sherringtonian reflex. The elements of a mitotic reflex are shown in this diagram. Omitted, however, are ascending pathways that carry information from the spinal cord to the brainstem and cerebrum and the descending pathways that modulate the execution ofthis and other spinal reflexes.

(From Purves et al., 2008b)

# Artificial Neural Networks





# Lesson 3. Some Concluding Remarks

# Key Points Overall

- The fundamental challenge in vision is that the real-world sources of images can't be known
- The apparent solution is to generate percepts entirely on the basis of trial and error experience
- The evidence is that much of what we see in the different domains of vision can be explained on this basis
- If this interpretation is correct, then visual cortical circuitry and its goals will need to be understood in these terms

No one understands vision or brain operation generally, and we should therefore be open minded about what may seem strange ideas.

# Credits

- Babbage's difference engine, ©2008 Decatur City Schools
- Dale Purves, R. Beau Lotto. *Why We See What We Do Redux*, Sinauer Associates Inc. 2011
- Sherringtonian reflex, pg. 193
- Artificial neural network, pg. 196
- Evolution of neural networks, pg. 197