9.20
Classes #12-13: Notes on evolution; Development & Plasticity of Behavior

A. Notes on early evolution of behavior (class discussion; cf Lorenz)

1. What are the most basic multipurpose movement abilities of animals from protozoa to primate?

2. What are the three types of basic background support of behavior (the three "stabilities") Give examples of each for vertebrates.

3. Above these basic supports are the regulators of behavior – the basic controllers we call drives or motivational systems. List the most basic groups of drives/controllers, found in all vertebrates. (Most of these, if not all, are also found in invertebrates.) To do this, write an outline of an ethogram for a species.

B. Genes and behavior (Scott pp 57-66)

4. Variations in a single gene can result in variations in behavior. What kind of effect on the body must such a gene have?

5. What are "hygienic bees"? Why do bee colonies (hives) need them?

6. How is it possible for an individual who has no offspring to have greater "inclusive fitness" than an individual who has offspring? Answer by describing an example. (See the box on pp 64-65.) This is a major topic in sociobiology.

C. Learning (Scott pp 66-75)

7. Write definitions for "habituation" and "sensory adaptation". The textbook describes briefly only the former. You must find the rest elsewhere.

8. Give examples of habituation from your own experience. Can we habituate to complex stimuli as well as to simple stimuli? Answer with your examples.

9. Why have scientists often chosen to study learning in animals like sea slugs and snails and certain insects? Give more than one reason.

10. The author makes a mistake on p 71 in his description of classical conditioning. What is it?
11. In your own development, how have you shown learning by imitation and by mimicry? What is the difference between these two processes?

12. Imitation and/or mimicry have been observed in many non-human primates. Briefly describe an example of such learning in non-primate animals, not found in the Scott textbook. (It occurs, for example, in the development of cats.)

D. Navigation, pp 76-86.

13. Describe Niko Tinbergen's experiment on landmark orientation in the female digger wasp.

14. What causes the problem of "photo pollution" for hatchling sea turtles? What are two methods humans can use to improve the survival of the turtles faced with such photo pollution?

15. To return to a starting point, both humans and ants use "dead reckoning" (deduced reckoning) to judge positions, directions and distances. What is a likely difference in sensory cues used to make the necessary judgment?

16. What cues do homing pigeons use to direct their flight home from hundreds of miles away? First, how do they know the right direction? Second, when close to home, how can they find the exact position of the loft?

17. How does the Morris water maze provide evidence for a cognitive map in rats or mice? How could you test for the sensory cues these rodents are using to solve the problem in this maze?

18. With reference to Q16 and Q17, for what abilities is the hippocampal formation in the brain most needed? (Read the boxes on p 86 and p 87.)

E. Migration, pp 86-91.

19. Describe benefits and costs of long-distance migrations.

20. How do you think evidence has been obtained that the stars are used to guide long-distance migrations of birds? Describe a practical method.

21. What cues besides the stars are used by such birds?

22. How do we know that migration behavior is innate?

9.20 Animal Behavior

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