

Honor 2103
Darwin Lecture 3

Origin

Origin of Species (1859)

- Evolution (change of species over time) vs. Mechanism of Evolution (Natural Selection); and account for adaptation
- Canon (Overview of Darwin’s Theory of Natural Selection)

Proposition	Description	Mechanism
Heritability	Off spring resemble their parents; traits are passed from parent to off spring	Not known to Darwin, but observable. (Mendel 1865/1900)
Variation	In each generation there are variations; offspring are not identical to parents, and individuals vary	Not known to Darwin, but observable. (Mendel 1865/1900)
Selection	Some of the variation gives advantages to individuals, increasing their chance of reproducing and passing on those advantageous traits; adapting the species (population) to its environment.	Natural Selection = struggle for existence, competition for scarce resources Observable via analogy with domestication (artificial selection)

- Chapters 1 & 2: Domestication and Variation
 - Pivotal Analogy with “artificial selection” in domesticated species
 - Consider the variety, from a common origin, by means of selective breeding
 - Assumes some heritability of traits, demonstrates variation, and effects of selection (adaptation to human ends)
- Chapter 3 & 4: Struggle for Existence and Natural Selection
 - Heritability and variation not enough: requires some means of natural selection: “struggle for existence” (108ff)
 - Also consider “sexual selection” (115-116)

- Consequences of natural selection
 - **Adaptation:** Species are well adapted to environment; only those with the traits best able to survive will survive.
 - **Evolution:** Accounts for the mutability of species, that they do indeed change over time
 - **Descent:** species come about by divergence from common ancestry, not special creation
 - Tree, not a ladder, of life
 - Accounts for similarities among near taxa (genus); not anatomical similarities between, say, human hand, dolphin flipper, bat wing, etc.
 - Divergence results from circumstances (isolation, environmental change, size of population, extinction, etc. – consider the observations of Galapagos Islands, biogeography)
 - Domestication provides observable support
- Explanatory Power?
 - “On these principles, I believe, the nature of the affinities of all organic beings may be explained.” (134)
 - “...must be judged of by the general tenour and balance of evidence given in the following chapters.” (134)
 - Accounts for... (134-135)
- Chapters 6 & 9: Troubles with Darwin’s account
 - Darwin identifies four problems that his account faces: transitional forms, mutability across species and complex traits, heritability of instincts, and hybridization of species.
 - Transitional Forms
 - “...why, if species have descended from other species by insensibly fine gradations, do we not everywhere see innumerable transitional forms? Why is not all nature in confusion instead of the species being, as we see them, well defined?” (p. 135)
 - Mutability Across Species
 - “...is it possible that an animal having, for instance, the structure and habits of a bat, could have been formed by the modification of some animal with wholly different habits? Can we believe that natural selection could produce... organs of such wonderful structure, as the eye, of which we hardly as yet fully understand the inimitable perfection?” (p. 136)

Note IBE and way in which Darwin argues....

Troubles with Darwin's Theory

Problem 1: Transitional Forms

"...why, if species have descended from other species by insensibly fine gradations, do we not everywhere see innumerable transitional forms? Why is not all nature in confusion instead of the species being, as we see them, well defined?" (p. 135)

Break into small groups; each group focuses on one of "difficulties" identified by Darwin; Answer the following questions:

1. In your own words what is the specific difficulty raised for Darwin's theory? Why is it a difficulty?
2. How does Darwin respond to this difficulty? What is Darwin's response?
3. Briefly explain why Darwin's response is or isn't effective in removing the difficulty?

Each group should have a sheet(s) of paper with names of each contributor.

Answer to questions should employ your own words *and* appeal to passages and/or examples from the text (Chapters 6, 9, and 14) –Don't write them down in their entirety, but make a brief citation or note of page and paragraph

Troubles with Darwin's Theory

Problem 2: Mutability

"...is it possible that an animal having, for instance, the structure and habits of a bat, could have been formed by the modification of some animal with wholly different habits? Can we believe that natural selection could produce... organs of such wonderful structure, as the eye, of which we hardly as yet fully understand the inimitable perfection?" (p. 136)

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