

# Evolution: The Darwinian Revolutions

BIOEE 2070 / HIST 2870 / STS 2871

## Essay Assignment #2

The publication of Darwin's *Origin of Species* in 1859 sparked a revolution in the biological sciences, providing a comprehensive explanation for the origin of adaptation and diversity. Central to this revolution was Darwin's concept of "descent with modification," which Darwin massively documented with examples from around the world. So convincing was Darwin's theory of descent with modification that by the beginning of the 20<sup>th</sup> century, the overwhelming majority of naturalists accepted it.

By contrast, the mechanism Darwin proposed for this process – *natural selection* – was not nearly as acceptable to his contemporaries. Indeed, by 1909, the majority of scientists had rejected natural selection in favor of the newly described process of genetic mutation. Some had even gone so far as to declare Darwinism "dead."

However, by 1959 (the centennial of the publication of the *Origin of Species*), Darwin's mechanism of natural selection was once again at the pinnacle of popularity among scientists. Between 1909 and 1959, something (or rather, several things) had happened to rehabilitate natural selection in the eyes of biologists, so much so that historians of science could proclaim this period as the time of the "modern evolutionary synthesis."

### Your Essay Question:

In an essay of between four and eight pages, you must first explain why natural selection had fallen from favor among biologists, especially Mendelian geneticists. Then, you must explain what new ideas eventually led to the resurrection of natural selection as the core mechanism of biological evolution. In particular, what part did mathematics play in this process, and what kinds of compromises with Darwin's original theory did the authors of the "modern evolutionary synthesis" have to make to formulate the "neo-darwinian" theory of evolution?

You should refer to the work of specific people such as Hardy and Weinberg, R. A. Fisher, Sewell Wright, J. B. S. Haldane, Theodosius Dobzhansky, G. G. Simpson, and Ernst Mayr in particular (the readings from Provine and Mayr would be very useful for this), and explain why their ideas were so important to the "modern evolutionary synthesis."

### Hints:

- "Explain" means subjecting the arguments to careful analysis. An explanation is not simply a description of what happened, but also includes an evaluation of why particular observations and ideas were crucial to the theories presented.
- Support your arguments with evidence from lecture and the readings. Citation of lecture dates or page numbers is sufficient.
- Supply references for all material taken from elsewhere, including all web URLs.
- Divide your paper into sections and keep paragraphs to reasonable lengths.
- Write clearly and concisely – excess verbiage and needless digressions will be penalized.
- We strongly encourage the use of word processor spelling and grammar checkers.

**DATE DUE: Monday 23 July 2012**