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## Basis of Biology: 150 Years Running

Lauren Ferrell  
*Lake Forest College*

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## Basis of Biology: 150 Years Running

### Lauren Ferrell

Department of Biology  
Lake Forest College  
Lake Forest, Illinois 60045

Despite publishing his most famous work 150 years ago, Charles Darwin's theories are still used in today's scientific world (Historic Figures). Sure, Albert Einstein developed one of the most widely recognized physics equations today, but not many people look out their windows in the morning to see how  $E=mc^2$  affects their lives. Darwin's theory of evolution through natural selection, however, can be easily observed in any natural setting. Since Darwin published his book, "On the Origin of Species by Means of Natural Selection" in 1859, renowned scientists have tested and retested his theories. Darwin's curiosity about his surroundings and his knowledge of multiple disciplines allowed him to make one of the most famous biological observations in history. That observation is now a central theory in biology, taught in natural science classrooms throughout the Western world – including Lake Forest College.

It is well known that Darwin made the majority of his observations and specimen collections during his voyage aboard the *H.M.S. Beagle*. During this five-year journey beginning in 1831, Darwin noted the enormous variety of animals on the planet and read contemporary authors such as Charles Lyell (Historic Figures). Lyell's book, "Principles of Geology," was one of the first to suggest that fossils are from organisms that lived well before the time of humans (Historic Figures). Having seen so many foreign species in places such as Australia, Africa, and – most influentially – the Galápagos Islands and having read Lyell's theories, Darwin began entertaining ideas about natural selection and evolution (Historic Figures). Once his feet were back on solid ground, Darwin began experiments to test his newly formed theories. Then, twenty-eight years after his voyages to the Galápagos and beyond, Darwin finally produced his well-known book, "On the Origin of Species by Means of Natural Selection."

When Darwin first proposed his ideas on natural selection and evolution in 1859, he was not well received (Historic Figures). During this time, most Western scientists still believed that God created all of earth's organisms in seven days. Theologians and scientists such as Thomas Huxley and Samuel Wilberforce debated whether a deity created the world we know or whether this new natural selection theory was a possibility (Darwin). Their debate continues today. The majority of the scientific world, however, seems to agree that Darwin was right; since earth formed, all of its organisms have been subject to natural selection and have evolved to the forms we see today.

Staying true to the scientific method, this conclusion was not reached without thorough experimentation. Many different scientists have observed evolution in action. The most famous perhaps are Peter and Rosemary Grant. The Grants, along with a team of researchers, were able to conduct nearly 30 years of field research on the very same finches Darwin himself had observed and collected in the Galápagos, *Geospiza fortis* and *Geospiza scandens* (Grant & Grant). Throughout their study, the Grants saw how birds with different phenotypes survived – and therefore reproduced – under certain conditions while others did not (Finch Beak). The specific phenotypes of certain birds – beak size and weight for example – were what allowed those birds to survive.

Therefore, the conditions in nature were 'selecting' which birds would survive and reproduce to pass on their traits.

Thanks to the efforts of the Grants and other evolutionary biologists like them, evolution is accepted as a sound scientific theory in most Western nations. In the U.S., however, the debate between creationism and evolution still burns on. The famed Kansas School Board is an easy example. In spite of the debate, many colleges and universities such as University of California, Brown University, and our very own Lake Forest College are siding with the scientists of Europe and are teaching evolution in their classrooms (University; Casper). On our own campus, sophomore biology students were encouraged to take Ecology and Evolution with Professor Gates and this past year's biology senior seminar with Professor Houde entitled "Sex and Evolution."

Darwin never saw his theories corroborated by other scientists and may not have believed that evolution would be a keystone of modern biology, but years of follow-up research have overwhelmingly substantiated his work. Research such as that done by the Grants and Professor Houde's lab here in Lake Forest is validating the theory of evolution on a daily basis. Darwin's 150 year old theory may have yet to infiltrate the beliefs of the devoutly religious, but the most progressive of biological discoveries could not be made without it.

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b. Run a different search of the following sequence  
4. Choose a suitable year for the Published in the Last box, such as 5 years.  
5. Select Title/Abstract in the pull-down menu for Tag Terms. The default here is All Fields.  
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Chapter 1: - Biology: Study of Life - Animals ~ Cells ~ Nucleus - Chemicals o Make up Everything i, § Build: Chemicals: Take Apart - Bacteria o Simple Cell Structure o One internal Membrane o It has a cell wall which is why it is hard to break down. - Archaea o Looks and is similar to bacteria, discovered in 1980s o It has a cell wall around it. o He then discovered a cell wall which after 200 years became the units of eukaryotic cells. For Medical Students: Excellent book for the start of second year pathology. However, it is a tremendous amount of information and not everything is high yield for step 1. What is super important about this book is that the illustrations, graphs, and tables are actually extremely HIGH YIELD. The book's graphic team did an amazing job of conveying the information needed to understand pathology. basis. In the Flint River, Michigan, hydropsychid caddisfly and chironomid larvae. dominated diets during the day, chironomid pupae during the evening and heptacyclic phosphorous cycling (Bunnell et al., 2005). On the basis of these findings, *N. melanostomus* probably results in increased heavy metal (Hg) recycling compared to historical levels, but recycling and trophic-level bioaccumulation of PCBs.