Darwin Day Sermon

Darwin Sunday Sermon, February 09, 2020

OPENING WORDS: Today we commemorate the birthday on Wednesday, February 12, of one of the most famous Unitarians in history, **Charles Robert Darwin**. Darwin may have been the 2nd or maybe 3rd most influential scientific thinker of all time. He revolutionized the organization of the study of Biology at its most basic level. His revolution still influences how we think about the natural world today. As you can see from the hangings our walls here in this sanctuary, we celebrate the "search for truth and meaning", "the interdependent web of all existence", and heeding "the guidance of reason and the results of science."

CHILDREN'S STORY: "The God Brings Fire to Man: Prometheus the Creator" (pg 133) -- one of the stories from the book In the Beginning, as told by Virginia Hamilton.

THE FIRST READING:
Charles Robert Darwin was an English naturalist, geologist and biologist, best known for his contributions to the science of evolution. He was born on February 12, 1809 (211 years ago this coming Wednesday) and he died on April 19, 1882. He was a son of a wealthy society doctor and financier Robert Darwin. His family was largely Unitarian, and Darwin's father was quietly a freethinker. However, he had baby Charles baptized in the Anglican Church, but Charles and his siblings attended the Unitarian chapel with their mother.
When Darwin was young, he already had a taste for natural history and collecting specimens when he attended the local day school.
In Darwin's second year at the university he joined a student natural-history group featuring lively debates in which radical democratic students with materialistic views challenged orthodox religious concepts of science.
Darwin's neglect of medical studies annoyed his father, who then sent him to study for a Bachelor of Arts degree as the first step towards becoming an Anglican country parson. His cousin introduced him to the popular craze for beetle collecting; Darwin pursued this zealously. He became a close friend and follower of the famous botany professor John Stevens Henslow and met other leading parson-naturalists who saw scientific work as "religious natural theology", and becoming known as "the man who walks with Henslow".
Darwin stayed at Cambridge until 1831. He studied "Natural Theology" or arguments for the existence and attributes of the Deity, which made an argument for divine design in nature, explaining adaptation as God acting through laws of nature.
Inspired with "a burning zeal" to contribute to scientific knowledge, Darwin planned to undertake travels to the tropics to study natural history after his graduation from university.
In 1831, he received an invitation to be a suitable (if not quite qualified) self-funded assistant naturalist on the *HMS Beagle* with Captain Robert FitzRoy, an expedition to chart the coastline of South America. Darwin did take care to remain in a private

capacity in order to retain control over his collection, intending it for a major scientific institution.

The voyage lasted almost five years. Darwin spent most of that time on land in various locations, investigating geology and making natural history collections. He kept careful and copious notes of his observations and theoretical speculations, and at intervals during the voyage his specimens were sent to Cambridge together with letters, including a copy of his journal for his family. He had some expertise in geology, beetle collecting and dissecting marine invertebrates, but in all other areas he was a novice, but ably collected specimens for expert appraisal. Most of his zoology notes are about marine invertebrates, starting with plankton and barnacles.

By his return, he had become critical of the Bible as history, and wondered why all religions should not be equally valid. In the next few years, while intensively speculating on geology and the transmutation of species, he gave much thought to religion and openly discussed this with his wife Emma, whose beliefs also came from intensive study and questioning.

Darwin's views on social and political issues reflected his time and social position. He grew up in a family of reformers who supported electoral reform and the emancipation of slaves. Darwin was passionately opposed to slavery, while seeing no problems with the working conditions of English factory workers or servants. He had taxidermy lessons in 1826 from the freed slave John Edmonstone, who he long recalled as "a very pleasant and intelligent man", reinforcing his belief that black people shared the same feelings and could be as intelligent as people of other races.

He took much the same attitude toward native people he met on the *Beagle* voyage. These attitudes were not unusual in Britain in the 1820s, much as it shocked visiting Americans. British society became more racist in mid-century, but Darwin remained strongly against slavery, against "ranking the so-called races of man as distinct species", and against ill-treatment of indigenous peoples.

Darwin's interaction with the peoples of Tierra del Fuego had a profound impact on his view of "primitive" peoples. By studying these indigenous peoples, Darwin concluded that basic emotions by different human groups were the same and that mental capabilities were roughly the same as for **"civilized Europeans."** Although interested in their culture, Darwin failed to appreciate their deep ecological knowledge and elaborate cosmology until the 1850s when he inspected a dictionary of their language, detailing 32-thousand words. He recognized that European colonization often led to the extinction of native civilizations.

In 1882 he was diagnosed with what was called "angina pectoris" which then meant coronary thrombosis and disease of the heart. At the time of his death, the physicians diagnosed "angina attacks", and "heart-failure".

He died on April 19, 1882. He had expected to be buried in the local churchyard, but at the request of Darwin's colleagues, after public and parliamentary petitioning, the President of the Royal Society arranged for Darwin to be honored by burial in Westminster Abbey, close to John Herschel and Isaac Newton. The funeral was held on Wednesday April 26, 1882 and was attended by thousands of people, including family, friends, scientists, philosophers and dignitaries.

THE SECOND READING:
How many of you own a dog or a cat?
Does your dog look like a wolf or a fox or a coyote? Does your cat look like a lynx or an ocelot or lion or a tiger? Why not?
Do the tomatoes or the ears of corn we harvest in the summer look like the tomatoes and corn found in the western hemisphere at the time of the European invasion in the 1500s? Why not?
I would recommend to all of you that you read Charles Darwin's Origin of Species. It is a little challenging to read, like other great literature of the 1800s, but Darwin was a very good and very clear writer. Most of the highly technical aspects of the study of biology had not yet been developed when he wrote and published the book. For example, the first chapter of the book is about breeding pigeons. He asks: Why don't some of the domestic breeds look like the wild varieties? Where do these strange looking pigeons come from?
Offspring almost always look somewhat different from their parents because of a mixing of genetic traits from the two parents. For example, for almost all of us, we look a little bit like each of our parent, maybe even our grandparents or great-grandparents. And, on a few occasions, someone looks a lot like one of their parents. And, sometimes completely new traits appear in offspring that neither sides of the ancestry possess. (Note: These are random variations at the genetic level, are called mutations. Darwin did not know anything about genetics or mutations. More about this later.) These are where variations from one generation to the next come from.
In the more natural world, these variations due to genetic mixing and/or mutations might benefit the offspring in its competition for survival in order to propagate offspring, or might be of no particular benefit or hindrance, and sometimes they are a definite hindrance (especially the mutations). When the variation turns out to be beneficial, then these variations will be passed on to the descendants and to all the subsequent generations. As beneficial variations succeed in the propagation of descendents, and as beneficial variations accumulate, a new variety, or a new sub-species can arise, and eventually a new species altogether. This all started as the process of Nature, from the very first self-replicating molecules. And it all happens by completely random and chance combinations of traits and by mutations.
Remember, the universe will take care of itself, and it has an awfully long time to do it in.

SERMON:
Among the books and authors I read in preparing for this "sermon", I especially was informed by reading Ever Since Darwin (1979) by Stephen Jay Gould. This is a book I can highly recommend to you all. He was one of the principle recent proponents and defenders of Darwin's Theory of Evolution (as it has come to be called).

Darwin was well aware that the concept of the evolution of biological species over time was not a new or frightening idea. If had been circulating around in the writings

of various biologists and geologists for quite awhile. Darwin made remarkable progress in his own thinking about transmutation of species, taking every opportunity to question expert naturalists and, unconventionally, people with practical experience in selective breeding such as farmers and pigeon fanciers. Over time, his research drew on information from his relatives and children, the family butler, neighbors, colonists and former shipmates. He included mankind, both as contributors and subjects, in his speculations from the outset.

In his book The Origin of Species, he introduced a new none-directed concept in evolution, namely, **variation of offspring with natural selection** in subsequent generations. This undirected evolution eliminated the role of some "higher being" or "higher power" in guiding biological change toward humans as a blessed favored species on the planet. And it most certainly violated a literal understanding of the Christian scriptures, with all current species created as we see them now, in a world at most only 10,000 years old.

From Prof. Gould, ". . . the basis of natural selection is simplicity itself – three undeniable facts and an inescapable conclusion: (1) organisms vary, and these variations are inherited (at least in part) by their offspring; (2) organisms produce more offspring than can possibly survive; [and] (3) on average, offspring that vary most strongly in directions favored by the environment will survive and propagate. Favorable variation will therefore accumulate in populations by natural selection."

The key discovery of "Darwin's theory lies in his contention that natural selection is the creative force of evolution. . . ." Therefore, we can further extend the first fact above: "variation must be random, or at least not preferentially inclined toward adaptation." . . . "Evolution is a mixture of chance and necessity – chance at the level of variation, necessity in the working of selection." The second extension is that "variation must be small relative to the extent of evolutionary change in the foundation of new species." Both of these extensions are backed up by our subsequent discoveries in the study of genetics.

What makes Darwin's theory so challenging to accept is not any scientific difficulty, "but rather in the radical philosophical content of Darwin's message – . . . that evolution has no purpose. Individuals struggle to increase their representation in future generations . . ., and that is all." "[E]volution has no direction, it does not lead inevitably to higher things." "Organisms become better adapted to their local environments, and that is all." And thirdly, "Darwin applied a consistent philosophy of materialism to his interpretation of nature. Matter is the ground of all existence . . ." (ESD pg 11 - 13)

Christian fundamentalists, believing in the literal truth of the Book of Genesis, where God created the world in six days and six nights, around 4000 BCE, and saw no way to reconcile a theory that mankind has slowly evolved over millions of years. It is a wonder that this particular heated argument between science and religion did not break out much earlier. After all, the first treatise of paleontology on the antiquity of fossils had been written as early as 1669. The first scientific computation of the age of the Earth had been published in 1778; and a theory of the origin of the universe as an expanded cloud of gas had been in circulation since 1796. The current scientific

calculation of the age of the universe is about 14 billion years, and the age of our planet is about 4 billion years.

What makes some people anti-evolution, creationist or intelligent-design advocates is the concept of philosophical materialism -- the postulate that matter is the stuff of all existence and that all mental and spiritual phenomena are merely its byproducts. No notion could be more upsetting to the deepest traditions of Western thought than the statement that mind — however complex and powerful — is simply a product of [the] brain. A fundamental feature Darwin's Theory of Evolution is its "uncompromising philosophical materialism. . . . Darwin spoke only of random variation and natural selection." (ESD pg 24 - 25) Darwin's awareness of his probable persecution for this paradigm shattering explanation for how the biological universe works made him delay publication for over 20 years after his revolutionary realization. Other scientists prior to Darwin had suffered professional suppression when they tried espousing similar views of the universe.

The term "evolution" is almost a misnomer for Darwin's description of what is going on. He instead preferred to use the phrase "descent with modification" instead of "evolution."

"Darwin developed an evolutionary theory based on chance variation and natural selection imposed by the external environment: a rigidly materialistic (and basically atheistic) version of evolution." (ESD pg 33) This is not the same as saying that Darwin was an atheist or a non-theist. About this I do not know and maybe he was a theist. The scientific method does not care about belief. Belief in a deity and constructing a paradigm using the scientific method are independent of each other. He considered it "absurd to doubt that a man might be an ardent theist and an evolutionist" and, though reticent about his religious views, in 1879 he wrote that "I have never been an atheist in the sense of denying the existence of a God. — I think that generally . . . an agnostic would be the most correct description of my state of mind". In his writings from the time of his reading of Thomas Malthus, *An Essay on the Principal of Population*, through his work on geology and sea animals, Darwin's continued his opposition to acts of creation in the emergence of new species.

One of the principle critics of the theory of descent with modification at the time of its publication was the Anglican Bishop Samuel Wilberforce. He proclaimed that Darwin was guilty of "a tendency to limit God's glory in creation"; that "the principle of natural selection is absolutely incompatible with the word of God"; that it "contradicts the revealed relations of creation to its creator"; that it is "inconsistent with the fullness of his glory"; that it is "a dishonoring view of Nature"; and that there is "a simpler explanation of the presence of the strange forms among the works of God": that explanation being – "the fall of Adam." . . .

Many other theologians had similar things to say about the Origin of Species , and the theological and philosophical implications of Darwin's Theory of Evolution. In short (as I read all these out cries of outrage), they all come down to the realization that Darwin's Theory of Evolution and a literal reading of the Christian Bible cannot both be true at the same time, at least as an explanation for the history of biological beings on our planet. Within less than a generation of its publication, the theory of descent with

modification, it became the organizing principle of the science of biology. Since then, almost all scientists studying life take this as the guiding and central paradigm of biological understanding.

Science progresses creatively, not by just collecting a catalog of facts and then trying to come up with a unifying explanation for why they may be true. The "scientific method" incorporates intuition and insights, tempered by judgment and ingenuity, into devising an explanation with predictive power for future observations.

Experimentation and falsifiability of the theoretical explanation are key aspects of the "scientific method" (which we can discuss later if you wish). Science proceeds by un-falsified overarching explanations, theories or paradigms: like Newton's Theory of Gravity, Einstein's Theory of Relativity and Darwin's Theory of Evolution. When these theories persist long enough in their explanatory power, they eventually are called "Laws."

Darwin avoided explicit discussion of human origins in the Origin of Species, but implied the significance of his work with the sentence; "Light will be thrown on the origin of man and his history." His theory is simply stated in the introduction:

> "As many more individuals of each species are born than can possibly survive; and as, consequently, there is a frequently recurring struggle for existence, it follows that any being, if it vary however slightly in any manner profitable to itself, under the complex and sometimes varying conditions of life, will have a better chance of surviving, and thus be naturally selected. From the strong principle of inheritance, any selected variety will tend to propagate its new and modified form."

At the end of the book he concluded that:

> "There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved."

The last word was the only variant of the word "evolved" in the first five editions of the book.

In the past, and sometimes still today, there was a common view that science and religion must stand in an antagonistic conflict with each other, with science taking over the explanatory domain assumed by religion. However, the true antagonist to science is irrationalism. The 19th century embryologist Karl Earst von Baer, once commented that when a new theory supplants an older theory, "that every triumphant theory passes through three stages: first it is dismissed as untrue; then, it is rejected as contrary to religion; finally, it is accepted as dogma and each scientist claims that he had long appreciated its truth."

There is still some theological rejection of Theory of Evolution in the present time. A recent example is the advocacy of the teaching of "creationism" or "intelligent design" in some school districts. A famous recent case was *Kitzmiller v. Dover Area School District* from 2002.

The **creation vs. evolution debate** involves an ongoing, recurring cultural, political, and theological dispute about the origins of the Earth, of humanity, and of all other life. Species were once widely believed to be fixed products of divine creation in

accordance with creationism, but since the mid-19th century evolution by natural selection has been established as an empirical scientific fact.
The debate is religious, not scientific: in the scientific community, evolution is accepted as fact and efforts to sustain the traditional view are almost universally regarded as pseudoscience. While the controversy has a long history, today it has retreated to be mainly over what constitutes good science education, with the politics of creationism primarily focusing on the teaching of creationism in public education. Among majority-Christian countries, this debate is most prominent in the United States, where it may be portrayed as part of the culture wars. Parallel controversies also exist in some other religious communities, such as the more fundamentalist branches of Judaism and Islam. In Europe and elsewhere, creationism is less widespread (notably, the Catholic Church and Anglican Communion both accept evolution), and there is much less pressure to teach creationism as fact.
Christian fundamentalists repudiate the evidence of common descent of humans and other animals as demonstrated in modern paleontology, genetics, histology and the classification of biological species by their common characteristics and those other sub-disciplines which are based upon the conclusions of modern evolutionary biology, geology, cosmology, and other related fields. They argue for the Abrahamic accounts of creation, and, in order to attempt to gain a place alongside evolutionary biology in the science classroom, have developed a rhetorical framework of "creation science". In the landmark court case *Kitzmiller v. Dover*, the purported basis of scientific creationism was exposed as a wholly religious construct without formal scientific merit.
Evolution in nature is not inconsistent with the notion of divinely guided creation, because evolution requires the creation of beings that evolve. The debate is sometimes portrayed as being between science and religion, and the United States National Academy of Sciences states:

> Today, many religious denominations accept that biological evolution has produced the diversity of living things over billions of years of Earth's history. Many have issued statements observing that evolution and the tenets of their faiths are compatible. Scientists and theologians have written eloquently about their awe and wonder at the history of the universe and of life on this planet, explaining that they see no conflict between their faith in God and the evidence for evolution. Religious denominations that do not accept the occurrence of evolution tend to be those that believe in strictly literal interpretations of religious texts.

According to a 2014 Gallup survey, "More than four in 10 Americans continue to believe that God created humans in their present form less than 10,000 years ago, a view that has changed little over the past three decades. Half of Americans believe humans evolved, with the majority of these saying God guided the evolutionary process. However, the percentage who say God was not involved is rising." A 2015 Pew Research Center survey found "that while 37% of those older than 65 thought that God created humans in their present form within the last 10,000 years, only 21% of respondents between the ages of 18 and 29 agreed."

On November 19, 2004, the Dover Area School District issued a press release stating that, commencing in January 2005, teachers would be required to read the following statement to students in the ninth-grade biology class at Dover High School:

> The Pennsylvania Academic Standards require students to learn about Darwin's theory of evolution and eventually to take a standardized test of which evolution is a part.
>
> Because Darwin's Theory is a theory, it is still being tested as new evidence is discovered. The Theory is not a fact. Gaps in the Theory exist for which there is no evidence. A theory is defined as a well-tested explanation that unifies a broad range of observations.
>
> Intelligent design is an explanation of the origin of life that differs from Darwin's view. The reference book *Of Pandas and People*, is available for students to see if they would like to explore this view in an effort to gain an understanding of what intelligent design actually involves.
>
> As is true with any theory, students are encouraged to keep an open mind. The school leaves the discussion of the origins of life to individual students and their families. As a standards-driven district, class instruction focuses upon preparing students to achieve proficiency on standards-based assessments.

The three school board members who voted against it resigned in protest, and science teachers in the district refused to read the statement to their ninth-grade students, citing the Pennsylvania state code 235.10(2), which requires that "The professional educator may not . . . Knowingly and intentionally misrepresent subject matter or curriculum." Instead, the statement was read to students by a school administrator.

The school board's statement asserting that there are "gaps" in evolution and that it specifically is a theory and "not a fact" singled out evolution, implying it is just a hunch, even though this is not the actual meaning of the term "scientific theory".

The legal title of the case is ***Kitzmiller v. Dover Area School District***, and was the first direct challenge brought in the United States federal courts testing a public school district policy that required the teaching of intelligent design. The prominence of the textbook Of Pandas and People during the trial was such that the case is sometimes referred to as the **Dover Panda Trial**, a name which recalls the popular name of the Scopes Monkey Trial in Tennessee, 80 years earlier. (The Scopes Trial was dramatized into the play and movie(s) Inherit the Wind, which I highly recommend to you to watch, or rewatch.) The plaintiffs successfully argued that intelligent design is a form of creationism, and that the school board policy violated the Establishment Clause of the First Amendment to the United States Constitution. The judge's decision sparked considerable response from both supporters and critics.

Eleven parents of students in the school district sued the Dover Area School District over the school board requirement that a statement presenting intelligent design as "an explanation of the origin of life that differs from Darwin's view" was to be read aloud in ninth-grade science classes when evolution was taught. The suit was brought in the U.S. District Court, in front of Judge John E. Jones III, a Republican judge appointed in 2002 by George W. Bush.

On December 20, 2005, Jones issued his 139-page findings of fact and decision ruling that the Dover mandate requiring the statement to be read in class was unconstitutional. The ruling concluded that Intelligent Design is not science, and permanently barred the board from "maintaining the Intelligent Design Policy in any school within the Dover Area School District, from requiring teachers to denigrate or disparage the scientific theory of evolution, and from requiring teachers to refer to a religious, alternative theory known as Intelligent Design.
Many mainstream moderate Christians read the Bible figuratively rather than literally, and they see God as the maker of natural laws, from the Big Bang to natural selection. They are comfortable with modern science, and for them God is not a micromanager of nature, nor an intruder on the free-will affairs of the human species.
Scientists observe the carnage of natural selection and see it as the engine of adaptation and speciation. Creationists observe the same carnage and explain it as divine punishment, with no evolutionary significance.
I will finish with this note from an article in the Chronicle of Higher Education, May 18, 2007 by Stephen Asma on the Creation Museum :

> The Creation Museum [in Petersburg, Kentucky near Cincinnati] exhibits the world as an "enchanted garden". It may be defiled temporarily by the sins of man, but this world is a magical place wherein God cares about human beings and codes nature with secrets and signs of his power and purpose. The evolutionist, on the other hand, lives in a much larger, older, and more mechanical version of nature. The late Stephen Jay Gould once described his metaphysical world view as "the 'cold bath' theory that nature can be truly 'cruel' and 'indifferent' . . . because nature was not constructed as our eventual abode, didn't know we were coming (we are, after all, interlopers of the latest geological microsecond), and doesn't give a hoot about us". And Gould writes, "I regard such a position as liberating, not depressing".

If we had more time, I would have liked to speak briefly about another one of my heroes, a contemporary of Darwin's, the Austrian monk Gregor Mendel. His work was unknown to Darwin and basically ignored until about 1900. He was to become known as the "father of genetics", and began the understanding of the functional mechanism of random variation and natural selection.
Neo-Darwinism is generally used to describe any integration of Darwin's theory of evolution by natural selection with Gregor Mendel's theory of genetics. The term Neo-Darwinism marks the combination of natural selection and genetics as it has been variously modified since it was first proposed.

CLOSING WORDS: A quote by Jacques L. Monod, who won the Nobel Prize in 1965 for Physiology or Medicine for his work on molecular genetics, recorded in the book The Eighth Day of Creation: The Makers of the Revolution in Biology by Horace Judson: he has said
". . . I want to stress, while all thoughtful, hardheaded biologists believed in the Neo-Darwinian theory of evolution, and although it was clear that that was the only one

that gave a rational description of how evolution could have happened, yet it was *still* true that that theory was profoundly incomplete so long as one did not also have a physical theory of heredity. Since the whole Darwinian concept is based on change through the inheritance of new traits, on selection pressing on a somewhat varied population, so long as you could not say exactly how the inheritance occurred, physically, and what the generator of variety was, chemically, Darwinism was still up in the air.

"So what molecular biology has done, you see, is to prove beyond any doubt but in a totally new way the complete independence of the genetic information from events occurring outside or even inside the cell -- to prove by the very structure of the genetic code and the way it is transcribed that no information from outside, of any kind, can ever penetrate the inheritable genetic message. . . .

"With that, and the understanding of the random physical basis of mutation that molecular biology has also provided, the mechanism of Darwinism is at last securely founded.

"And man has to understand that he is a mere accident. Not only is man not the center of creation; he is not even the heir to a sort of predetermined evolution that would have produced either man or something very like him in any case. It is not true that evolution is a law; it is just a phenomenon, which is quite different."

Darwin Day Sermon

Suplementary Reading:

From 2002, members of the **Dover Area School District** **Board of Education**, in York County Pennsylvania, who were **young earth creationists**, had made various statements supporting teaching **creationism** alongside **evolution**. At a board meeting on June 7, 2004, mentions were made about creationism and objections were raised to the proposed use of a textbook biology textbook, which was described as "laced with Darwinism" and saying it was "inexcusable to have a book that says man descended from apes with nothing to counterbalance it."
This story made the York newspapers, and a board member was telephoned by a staff attorney for the Discovery Institute, whose tasks included "communicating with legislators, school board members, teachers, parents and students" to "address the topic of [intelligent design] in a scientifically and educationally responsible way" in public schools. He later stated that he made the call to "steer the Dover Board away from trying to include intelligent design in the classroom or from trying to insert creationism into its cirriculum [*sic*]", an account which has been disputed. The board members were sent the book and DVD of *Icons of Evolution*, who required the Dover High School science teachers to watch the DVD. They did not take up the opportunity to use it in their classes.
Soon afterwards, another group, the Thomas More Law Center, agreed to represent the Dover Board, and recommended the book *Of Pandas and People*. The Thomas More Law Center is a conservative Christian not-for-profit law center that uses litigation to promote "the religious freedom of Christians and time-honored family values". Its stated purpose is " . . . to be the sword and shield for people of faith".
On October 18, 2004, the school board voted 6–3 resolving that there were to be lectures on the subject, with *Pandas* as a reference book, and that the following statement was to be added to their biology curriculum: "Students will be made aware of the gaps/problems in Darwin's theory and of other theories of evolution including, but not limited to, intelligent design. Note: Origins of life is not taught."
. . .
The reference to *Of Pandas and People* and presentation of intelligent design as an alternative "explanation of the origins of life" presented it as though it were a scientific explanation, in contrast to the way that evolution was described. Encouraging students to "keep an open mind" about alternatives, without offering an alternative scientific explanation, implied an invitation to meditate on, and endorsing, a religious view, endorsing found to be unconstitutional in a prior court case. The school board claimed the statement does not teach intelligent design and simply makes students aware of its existence as an alternative to evolution, but no such statements were made about other subjects. As part of the presentation, the administrators stated that "there will be no other discussion of the issue and your teachers will not answer questions on the issue", giving intelligent design a position not applied to scientific topics. The board denied that intelligent design was "religion in disguise," despite being represented in court by the Thomas More Law Center,

The American Civil Liberties Union filed suit on December 14, 2004, on behalf of eleven parents from the Dover school district, and sought a law firm willing to take on the case at the risk of not being paid if the case was lost. A member of the National Center for Science Education legal advisory council, was quick to agree to take the case on such a contingency basis.

The Discovery Institute's spokesperson said the case displayed the ACLU's "Orwellian" effort to stifle scientific discourse and objected to the issue being decided in court. "It's a disturbing prospect that the outcome of this lawsuit could be that the court will try to tell scientists what is legitimate scientific inquiry and what is not. That is a flagrant assault on free speech." Opponents, represented by the American Association for the Advancement of Science and the National Association of Biology Teachers, contended that his statement is not just ironic, but hypocritical, as the Discovery Institute **opposes** methodological naturalism, the basic principle that limits science to natural phenomena and natural causes without assuming the existence or non-existence of the supernatural, which by definition is beyond natural explanation. Despite its earlier involvement, the Discovery Institute was concerned that this would be a test case and that the defendants had earlier displayed their religious motivations.

In May 2005, the publisher of *Of Pandas and People*, filed a motion seeking to intervene in the case. This publisher argued that a ruling that intelligent design was religious would have severe financial consequences, citing possible losses of approximately half a million dollars. By intervening, they would have become a co-defendant with the Dover Area School Board, and able to bring its own lawyers and expert witnesses to the case. In the judge's decision on the motion, he ruled that they were not entitled to intervene in the case because its motion to intervene was not timely, describing their reasons for not trying to become involved earlier as "both unavailing and disingenuous". The judge also held that they had failed to demonstrate that it has "a significantly protectable interest in the litigation warranting intervention as a party" and that its interests would not be adequately represented by the defendants.

. . .

In his **Conclusion**, he wrote:

> The proper application . . . to the facts of this case makes it abundantly clear that the Board's Intelligent Design Policy violates the Establishment Clause. In making this determination, we have addressed the seminal question of whether Intelligent Design is science. We have concluded that it is not, and moreover that Intelligent Design cannot uncouple itself from its creationist, and thus religious, antecedents. [. . .]
>
> The citizens of the Dover area were poorly served by the members of the Board who voted for the Intelligent Design Policy. It is ironic that several of these individuals, who so staunchly and proudly touted their religious convictions in public, would time and again lie to cover their tracks and disguise the real purpose behind the Intelligent Design Policy. With that said, we do not question that many of the leading advocates of Intelligent Design have *bona fide* and deeply held

beliefs which drive their scholarly endeavors. Nor do we controvert that Intelligent Design should continue to be studied, debated, and discussed. As stated, our conclusion today is that it is unconstitutional to teach Intelligent Design as an alternative to evolution in a public school science classroom.

All eight of the Dover school board members who were up for re-election on November 8, 2005, were defeated by a set of challengers who opposed the teaching of intelligent design in a science class. (The ninth member was not up for re-election.) The new school board president subsequently stated that the board did not intend to appeal the ruling.

Neo-Darwinism

From Wikipedia, the free encyclopedia

Neo-Darwinism is generally used to describe any integration of Darwin's theory of evolution by natural selection with Gregor Mendel's theory of genetics. The term Neo-Darwinism marks the combination of natural selection and genetics as it has been variously modified since it was first proposed.

Although this is Darwin Sunday, I really cannot close this discussion of Darwin and the theory of random variation and natural selection without saying something about one of his contemporaries who went pretty much unrecognized in his own time. This is the Austrian monk Gregor Mendel.

For several years the abbot had been observing the peas in the monastery garden. By careful cross pollination and by concentrating on just a few specific characteristics such as height and color he was able to demonstrate definite patterns of inheritance in successive plant generations. He established the existence of dominant and recessive characteristics whose recurrence in hybrids he could empirically predict. His results were totally ignored.

Mendel worked for several years in the monastery garden with common peas. By working with a few observable traits, like color of peas, color of flowers and heights of the plants, careful cross pollination and by the simple process of counting, he was able to discover one of the most fundamental rules of the inheritance process, that traits in offspring are transmitted from "cell elements" that occur in pairs, which we later called "genes". In careful cross-pollination, he could predict the hybrids produced.

The contributed parental "cell elements" are either "dominant" or "recessive" and that the combinations of genes produce the apparent traits observed in the offspring. These combinations are governed by randomness and chance, but do follow observable mathematical regularity, in the same way we can discuss the math of playing dice and playing cards. This eventually became known as Mendel's Laws. (If

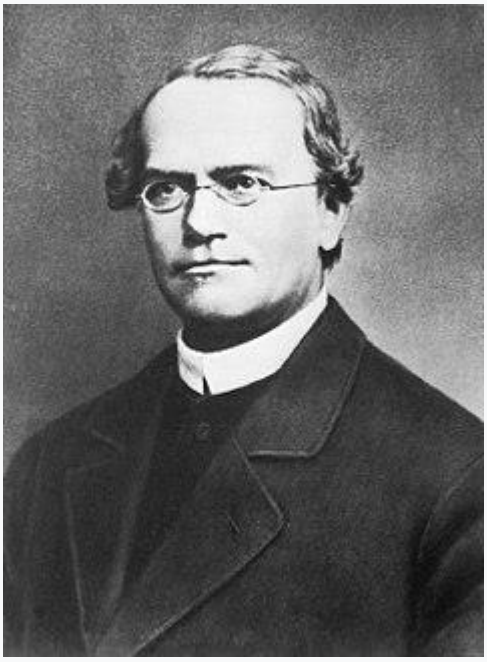
you would be interested in this, I can show you how it works down in the dining room after the service.) He published his results in a short 40 – 50 page booklet in 1866. Mendel's discoveries were all but ignored for about 40 years. His work was discovered around the year 1900, after the observation of chromosomes and genetic units were discovered. As the historian of science Curt Stern described it, "Gregor Mandel's short treatise "Experiments on Plant Hybrids" is one of the triumphs of the human mind. It does not simply announce the discovery of important laws of nature by new methods of observation and experiment. Rather, in an act of highest creativity, it presents these facts in a conceptual scheme which gives them general meeting. Mendel's paper is not solely a historical document. It remains alive as a supreme example of scientific experimentation and profound penetration of data. It can give pleasure and provide insight to each new reader -- and strengthen the exhilaration of being in the company of a great mind at every subsequent study."

Mendalism remained in the experimental stage for many decades. His paper was criticized at the time, but is now considered a seminal work. Notably, Charles Darwin was not aware of Mendel's paper, and it is envisaged that if he had been aware of it, genetics as it exists now might have taken hold much earlier. Mendel's scientific biography thus provides an example of the failure of obscure, highly original innovators to receive the attention they deserve.

Although the presence of chromosomes in living cells was established early in the twentieth century, the mechanics of the genes, or 'unit-characters', as Mendel had called them, long defied the researchers. the early 20th century that the importance of Mendel's ideas was realized.

By 1900, research aimed at finding a successful theory of discontinuous inheritance rather than blending inheritance led to independent duplication of his work In 1909, his "cell elements" were given the name of "genes" by a Danish scientist. Work with the breeding of fruit flies in the 1920s, Mendel's Laws were verified again. (I replicated this experiment a number times in college.) The significance of deoxyribonucleic acid (DNA) was not realized until 1944, and the double helical spiral structure of the DNA molecule not demonstrated until 1953 by Watson and Crick.

Gregor Mendel



Born Johann Mendel

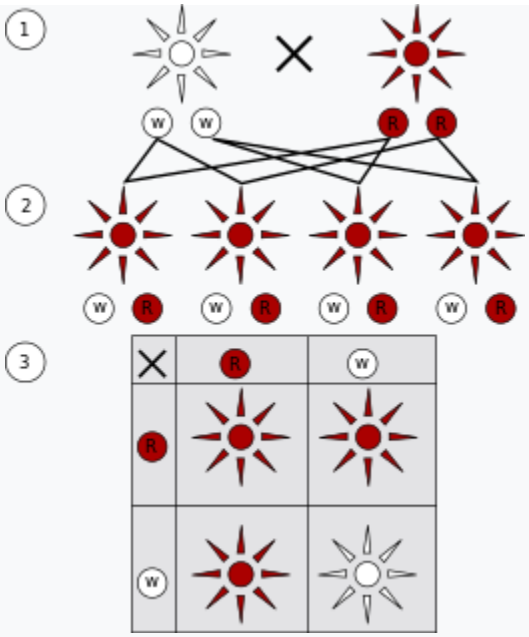
20 July 1822
Heinzendorf bei
Odrau, Silesia, Austrian
Empire (now Hynčice, Czech
Republic)

Gregor Johann Mendel (20 July 1822 – 6 January 1884)
was a scientist, Augustinian friar and abbot of St. Thomas' Abbey in Brno, Moravia. Mendel gained posthumous recognition as the founder of the modern science of genetics. Though farmers had known for millennia that crossbreeding of animals and plants could favor certain desirable traits, Mendel's pea plant experiments conducted between 1856 and 1863 established many of the rules of heredity, now referred to as the laws of Mendelian inheritance. Mendel worked with seven characteristics of pea plants: plant height, pod shape and color, seed shape and color, and flower position and color. Taking seed color as an example, Mendel showed that when a true-breeding yellow pea and a true-breeding green pea were cross-bred their offspring always produced yellow seeds. However, in the next generation, the green peas reappeared at a ratio of 1 green to 3 yellow. To explain this phenomenon, Mendel coined the terms "recessive" and "dominant" in reference to certain traits. (In the preceding example, the green trait, which seems to have vanished in the first filial generation, is recessive and the yellow is dominant.) He published his work in 1866, demonstrating the actions of invisible "factors" — now called genes — in predictably determining the traits of an organism.

The profound significance of Mendel's work was not recognized until the turn of the 20th century (more than three decades later) with the rediscovery of his laws. Other scientists independently verified several of Mendel's experimental findings, ushering in the modern age of genetics.

Contributions

Experiments on plant hybridization



Dominant and recessive phenotypes. (1) Parental generation. (2) F1 generation. (3) F2 generation.

After initial experiments with pea plants, Mendel settled on studying seven traits that seemed to be inherited independently of other traits: seed shape, flower color, seed coat tint, pod shape, unripe pod color, flower location, and plant height. He first focused on seed shape, which was either angular or round. Between 1856 and 1863 Mendel cultivated and tested some 28,000 plants, the majority of which were pea plants (*Pisum sativum*). This study showed that, when true-breeding different varieties were crossed to each other (e.g., tall plants fertilized by short plants), in the second generation, one in four pea plants had purebred recessive traits, two out of four were hybrids, and one out of four were purebred dominant. His experiments led him to make two generalizations, the Law of Segregation and the Law of Independent Assortment, which later came to be known as Mendel's Laws of Inheritance.

Initial reception of Mendel's work

Mendel presented his paper, "*Versuche über Pflanzenhybriden*" ("Experiments on Plant Hybridization"), at two meetings of the Natural History Society of Brno in Moravia on 8 February and 8 March 1865. It generated a few favorable reports in local newspapers, but was ignored by the scientific community. When Mendel's paper was

published in 1866 in *Verhandlungen des naturforschenden Vereines in Brünn*, it was seen as essentially about hybridization rather than inheritance, had little impact, and was only cited about three times over the next thirty-five years. His paper was criticized at the time, but is now considered a seminal work. Notably, Charles Darwin was not aware of Mendel's paper, and it is envisaged that if he had been aware of it, genetics as it exists now might have taken hold much earlier. Mendel's scientific biography thus provides an example of the failure of obscure, highly original innovators to receive the attention they deserve.

Mendel's results were quickly replicated, and genetic linkage quickly worked out. Biologists flocked to the theory; even though it was not yet applicable to many phenomena, it sought to give a genotypic understanding of heredity which they felt was lacking in previous studies of heredity, which had focused on phenotypic approaches. Most prominent of these previous approaches was the biometric school of Karl Pearson and W. F. R. Weldon, which was based heavily on statistical studies of phenotype variation. The strongest opposition to this school came from William Bateson, who perhaps did the most in the early days of publicising the benefits of Mendel's theory (the word "genetics", and much of the discipline's other terminology, originated with Bateson). This debate between the biometricians and the Mendelians was extremely vigorous in the first two decades of the 20th century, with the biometricians claiming statistical and mathematical rigor, whereas the Mendelians claimed a better understanding of biology. (Modern genetics shows that Mendelian heredity is in fact an inherently biological process, though not all genes of Mendel's experiments are yet understood.)
In the end, the two approaches were combined, especially by work conducted by R. A. Fisher as early as 1918. The combination, in the 1930s and 1940s, of Mendelian genetics with Darwin's theory of natural selection resulted in the modern synthesis of evolutionary biology.

The Mendelian Paradox

In 1936, R.A. Fisher, a prominent statistician and population geneticist, reconstructed Mendel's experiments, analyzed results from the F2 (second filial) generation and found the ratio of dominant to recessive phenotypes (e.g. green versus yellow peas; round versus wrinkled peas) to be implausibly and consistently too close to the expected ratio of 3 to 1. Fisher asserted that "the data of most, if not all, of the experiments have been falsified so as to agree closely with Mendel's expectations," Mendel's alleged observations, according to Fisher, were "abominable", "shocking", and "cooked".
Other scholars agree with Fisher that Mendel's various observations come uncomfortably close to Mendel's expectations. Anthony W.F. Edwards, for instance, remarks: "One can applaud the lucky gambler; but when he is lucky again tomorrow, and the next day, and the following day, one is entitled to become a little suspicious".

Three other lines of evidence likewise lend support to the assertion that Mendel's results are indeed too good to be true.

Fisher's analysis gave rise to the Mendelian Paradox, a paradox that remains unsolved to this very day. Thus, on the one hand, Mendel's reported data are, statistically speaking, too good to be true; on the other, "everything we know about Mendel suggests that he was unlikely to engage in either deliberate fraud or in unconscious adjustment of his observations." A number of writers have attempted to resolve this paradox.

One attempted explanation invokes confirmation bias. Fisher accused Mendel's experiments as "biased strongly in the direction of agreement with expectation . . . to give the theory the benefit of doubt". This might arise if he detected an approximate 3 to 1 ratio early in his experiments with a small sample size, and, in cases where the ratio appeared to deviate slightly from this, continued collecting more data until the results conformed more nearly to an exact ratio.

In his 2004 article, J.W. Porteous concluded that Mendel's observations were indeed implausible. However, reproduction of the experiments has demonstrated that there is no real bias towards Mendel's data.

Another attempt to resolve the Mendelian Paradox notes that a conflict may sometimes arise between the moral imperative of a bias-free recounting of one's factual observations and the even more important imperative of advancing scientific knowledge. Mendel might have felt compelled "to simplify his data in order to meet real, or feared, editorial objections." Such an action could be justified on moral grounds (and hence provide a resolution to the Mendelian Paradox), since the alternative — refusing to comply — might have retarded the growth of scientific knowledge. Similarly, like so many other obscure innovators of science, Mendel, a little known innovator of working-class background, had to "break through the cognitive paradigms and social prejudices of his audience. If such a breakthrough "could be best achieved by deliberately omitting some observations from his report and adjusting others to make them more palatable to his audience, such actions could be justified on moral grounds."

Daniel L. Hartl and Daniel J. Fairbanks reject outright Fisher's statistical argument, suggesting that Fisher incorrectly interpreted Mendel's experiments. They find it likely that Mendel scored more than 10 progeny, and that the results matched the expectation. They conclude: "Fisher's allegation of deliberate falsification can finally be put to rest, because on closer analysis it has proved to be unsupported by convincing evidence." In 2008 Hartl and Fairbanks (with Allan Franklin and AWF Edwards) wrote a comprehensive book in which they concluded that there were no reasons to assert Mendel fabricated his results, nor that Fisher deliberately tried to diminish Mendel's legacy. Reassessment of Fisher's statistical analysis, according to these authors, also disprove the notion of confirmation bias in Mendel's results.

Ronald Fisher, an English statistician, finally united Mendelian genetics with natural selection, in the period between 1918 and his 1930 book The Genetical Theory of

Natural Selection. He gave the theory a mathematical footing and brought broad scientific consensus that natural selection was the basic mechanism of evolution, thus founding the basis for population genetics and the modern evolutionary synthesis, which set the frame of reference for modern debates and refinements of the theory.

Many mainstream moderate Christians read the Bible figuratively rather than literally, and they see God as the maker of natural laws, from the Big Bang to natural selection. They are comfortable with modern science, and for them God is not a micromanager of nature, nor an intruder on the free-will affairs of the human species.

. . .

Scientists observe the carnage of natural selection and see it as the engine of adaptation and speciation. Creationists observe the same carnage and explain it as divine punishment, with no evolutionary significance.

(ESD pg 104)

. . . "'organs of extreme perfection' proclaim their value unambiguously; the difficulty lies in explaining how they developed. In Darwinian theory, complex adaptations do not arise in a single step, for natural selection would then be confined to the purely destructive task of eliminating the unfit whenever a better-adapted creature suddenly appeared. Natural selection has a constructive role in Darwin's system: it builds adaptation gradually, through a sequence of intermediate stages, by bring together in sequential fashion elements that seem to have meaning only as part a final product.

. . . .

(ESD pg 107)

"The general principle advanced by modern evolutionists to solve this dilemma calls upon a concept with the unfortunate name of 'preadaptation.' (I say unfortunate because the term implies that species adapt in advance to impending events in their evolutionary history, when exactly the opposite meaning is intended.) The success of a scientific hypothesis often involves an element of surprise. Solutions often arise from a subtle reformulation of the question, not from the diligent collection of new information in an old framework. With preadaptation, we cut through the dilemma of a function for incipient stages by accepting the standard objection and admitting that intermediate forms did not work in the same way as their perfected descendants. We avoid the excellent question, 'What good is 5% of an eye?' by arguing that the possessor of such an incipient structure did not use it for sight."

. . .

(ESD pg 109 - 110)

"Common sense is a very poor guide to scientific insight for it represents cultural prejudice more often than it reflects the native honesty of a boy before the naked emperor. Common sense dictated to Darwin's critics that a gradual change in form must indicate a progressive building of function. Since they could assign no adaptive value to early and imperfect stages of function, they assumed either that early stages have never existed (and that perfect form had been created all at once). Or that they had not arisen by natural selection. The principal of . . . functional change in structural continuity — can resolve this dilemma. Darwin ended his paragraph on the eye with this perceptive evaluation of 'common sense':`

> 'When it was first said that the sun stood still and the world turned around, the common sense of mankind declared that doctrine false; but the old saying of *Vox popul, vox Dei* [the voice of the people is the voice of God], as every philosopher knows, cannot be trusted in science.'"

(ESD pg 116)
"Reproduction propagates a species, ... The biological function of sex, . . ., is to promote variability by mixing the genes of two (or more) individuals. (Sex is usually combined with reproduction because it is expedient to the mixing in an offspring.)"

Major evolutionary change cannot occur unless organisms maintain a large store of genetic variability. The creative process of natural selection works by persevering favorable genetic variants form an extensive pool. Sex can provide variation on this scale , but efficient sexual reproduction requires the packaging of genetic material into discrete units (chromosomes)."

"In [the book] Civilization and Its Discontents, Sigmund Freud examined the agonizing dilemma of human social life. We are by nature selfish and aggressive, yet any successful civilization demands that we suppress our biological inclinations and act altruistically for common good deal of time and harmony. Freud argued further that as civilization complex and "modern", we must renounce more of our innate selves. This we do imperfectly, with guilt, pain and hardship; the price of civilization is individual suffering.
. . .
(pg 261 — 263) How, then, could anything but selfishness ever evolve as a biological traits of behavior? If altruism is the cement of stable societies, then human society must be fundamentally outside nature. There is one way around this dilemma. Can an apparently altruistic act be "selfish" in this Darwinian sense? Can an individual sacrifice ever lead to the perpetuation of his own genes? The answer to this seemingly contradictory opposition here is quality "yes." We owe the resolution of this paradox to the theory of "king selection" developed in the early 1960s.
According to the theory of kin selection, animals evolve behaviors that endanger or sacrifice themselves only if such altruistic acts increase their own genetic potential by

benefiting kin. Altruism and the society of kin must go hand in hand; the benefits of kin selection may even propel the evolution of social interaction.
. . .
(pg 265 — 267) Kin selection, operating on the peculiar [mechanics of]genetics . . . , seems to explain the T features of social behavior [in some social species]. The want what can it do for us? How can it help us understand the contradictory on the album of impulses for slavishness when altruism by form our own personalities. . . . . Follower selfishness and aggressive urges me at all by the Darwinian row of individual and acted, are altruistic tendencies need not represent a unique overlay in been called by the demands of civilization. These tendencies may have arisen by the same Darwinian route via kin selection. Basic human kindness maybe as "animal" as human nastiness.
. . .
. . . [We need to] stop short of any deterministic speculation that attributes *specific* behaviors to the possession of specific altruist or opportunist genes. Our genetic makeup permits a wide range of behaviors . . . . Upbringing, culture, class, status, and all the intangibles that we call "free will," determine how we restrict our behaviors from the whole wide spectrum — extreme altruism to extreme selfishness -- that our genes permit.
. . . [Kin selection] extends the realm of genetic potential even further by including the capacity for kindness, once viewed as intrinsically unique to human culture. Sigmund Freud argued that the history of our greatest scientific insights as reflected, ironically, a continuous retreat of our species from center stage in the cosmos. Before Copernicus and Newton, we thought we lived at the hub of the universe. Before Darwin, we thought that of a benevolent God had created us. Before Darwin, we thought ourselves as rational creatures (surely one of the least modest statements in intellectual history). It can selection marks another stage and this retreat, it will serve us well by nudging our thinking away from domination and toward a perception of respect and unity with other animals.

Conclusion

(ESD pg 268 — 271) Where is Darwinism going? What are the prospects for its second century (as of 1979)? . . . [A]n assessment of future direction must be kind to an understanding of what has been — particularly to the three essential ingredients of Darwin's own world view: his focus on individuals as primary evolutionary agents, his identification of natural selection as the mechanism all adaptation, and his belief in the gradual nature of evolutionary change.
Did Darwin hold that natural selection acts as an exclusive agent in evolutionary change? Being believed that all products of evolution are adaptive? . . . Darwin's view was pluralistic and accommodating — the only reasonable stance before such a complex world. He certainly granted overwhelming importance to natural selection, . . . but he did not reject an influence of other factors. . . .

. . . An individual is not decomposable into independent bits of genetic coding. The bits have no meaning outside the milieu of their own body, and they do not directly code for any bounded piece of morphology or any specific behavior. Morphology and behavior are not rigidly built by battling genes; they need not be adaptive in all cases.
. . .
. . . (In Darwin's formulation, the raw material of variation may be random, but evolutionary *change* is deterministic and directed by natural selection).

. . . Nature is so wondrously complex and varied that almost anything possible does happen. . . . A person who wants clean, definitive, global answers to the problems of life must search elsewhere, not in nature. . . . We can resolve small questions definitely (I know why the world will never see an ant 25 feet long). We do reasonably well with the middle-sized questions (I doubt that. . . [cutting the tails out of mice over many generations will eventually produce tailless mice]). Really big questions succumb to the richness of nature -- change can be directed or aimless, gradual or cataclysmic, selective or neutral.