PRESIDENTIAL DREAMCOURSE

HSCI 2213

"THE DARWINIAN REVOLUTION"

The "Darwinian Revolution" was a revolution in culture as well as biology. We will consider the history of the social, cultural, and theological issues associated with the development of evolutionary thought from the early-nineteenth century to the Modern synthesis of the 1930s and '40s, and present-day arguments about teaching evolution.

As a President’s Dreamcourse The Darwinian Revolution will feature a number of guest lectures by scholars whom are widely renowned for both their scholarship and their teaching in the history and philosophy of science.

COURSE TEXTS

Required:
Additional readings listed below will be placed on D2L or provided in class.

Time and location:
Tues & Thurs: 3:00-4:15
Price 2040

GTA: Mr Russel Hunter
Office hours: Tues & Thurs 4:30-5:30 & by appointment

Dreamcourse website:
http://faculty-staff.ou.edu/H/Piers.J.Hale-1/DarRevhome1.html
HSCI 2213: The Darwinian Revolution
Presidential Dreamcourse Evening Lecture Series:

Kerr Auditorium,
Sam Nobel Museum of Natural History

[All talks start at 6:00pm except for the Feb 12th event which will be at 7:00]

January 22nd

Ken Taylor.
Emeritus Professor, University of Oklahoma, Department of the History of Science
"Volcanology before Darwin: From Burning Mountains to Igneous Global Dynamics."

February 3rd

Paul White.
Darwin Correspondence Project; Affiliated Scholar, Department of History and Philosophy of Science, University of Cambridge
"Darwin’s Emotions"

February 12th

John Lynch.
Barratt Honors College,
Arizona State University
"Was there a Darwinian Revolution?"

February 26th

Michael Ruse.
Lucyle T. Werkmeister Professor, Department of Philosophy,
Florida State University
"Is Darwinism past its "sell by" date?"
March 12^{th}

John Beatty.
Department of Philosophy, University of British Columbia

April 9^{th}

John van Wyhe.
Founder & Director, Darwin Online Project; Bye-Fellow of Christ’s College, University of Cambridge.
“Darwin’s secret?
Was the theory of evolution really held back for 20 years?”

April 16^{th}

Garland Allen.
Department of Biology,
Washington University in St. Louis
“Darwin and Marx: Science as History and History as Science. Dialectical materialism and the dynamics of historical change”

April 21^{st}

Joe Cain.
Department of Science and Technology Studies,
University College London
“A Monkey’s Uncle: The 1925 Scopes Trial Wasn’t What You Think”

The Sam Noble Oklahoma Museum of Natural History has generously offered to host our guest speakers this semester. All talks will be in the Kerr Auditorium at the museum. Please do not be late! More information about our speakers, and links to their websites is available through the course website

“Dreamcourse Speakers” page:
ASSESSMENT

Assessment will be by two essays of approximately four-five type-written pages (each 15% of the course total); short written responses to selected readings (25% of the total), in class quizzes, (15%) and a final exam which will account for 15%. The remaining 15% will be awarded for a research poster.

More about assessment:
Short two-page write ups: You may submit a two-page essay that conveys your understanding of the readings for the week for those weeks indicated by an asterisk (*). This should not be just a short bullet-point summary, but a well-written, fully referenced and clearly thought out piece of writing – and it will be graded as such. Your essay should be submitted at the start of class on the following Monday. [No late submissions will be accepted] Your best five submissions will count, each accounting for 5% of your total grade.

In-class quizzes: There will be six unannounced in-class quizzes. Your best five will each count for 5% of the total grade for the course. These will be short-answer quizzes designed to test your general understanding of the topic at hand.

Essays: Essays should be sophisticated and informed, reflecting in-depth research. They should have a clear thesis and be appropriately referenced using a recognised citation style. Your professor or TA can give you advice and guidance. See the tips on writing style and the section on grading practises and standard appended to this syllabus. More will be said in preparation for these papers in class.

COURSE TEXTS

Required:
Additional readings listed below will be placed on D2L or provided in class.

Further Reading:
I shall refer to the work of Darwin scholars in lectures, as well as to other works by Darwin and his contemporaries, and will provide bibliographic references for these. These readings are not “required” as such, but would provide a good source of further information for your essays. You will be expected to do the leg-work for this extra research material yourself.
CLASS SCHEDULE

(PART I)
THE ORIGINS OF DARWINISM

Week One:
Tuesday January 20th:
Darwinism and “The Darwinian Revolution”
In this class we shall talk about the scientific and the social status of evolutionary biology. What it is that makes evolution contentious in the present, and exactly why it is not contentious amongst practicing scientists. This course will examine the history of Darwin’s ideas in the context of contemporary science and society. To begin this we shall consider William Paley’s “argument from design” which he outlined in his 1802 work “Natural Theology.” In this extract Paley describes how the order, complexity and apparent purposefulness in nature, compels the careful observer to conclude that the universe and everything in it was the creation of an omnipotent and loving designer. This was know as the “argument from design” or “argument from analogy.”
Reading:

Thursday January 22nd:
Dreamcourse Lecturer: Professor Kenneth Taylor
Geology, extinctions and catastrophism.
Geology has always played an important part in the evidence for (or against) evolutionary ideas. The distinguished comparative anatomist George Cuvier, (1769-1832), Professor of Vertebrate Zoology at Paris, was particularly significant in this regard. In this passage from The Theory of the Earth (1813), Cuvier discusses the significance of fossil remains for the argument that some species must have gone extinct – a radical idea at this time. He believed that these extinctions occurred as a result of radical changes or “revolutions” in the environment. However, despite his promotion of the idea of extinction, Cuvier was no evolutionist, rather he saw the fact of extinction as evidence of species inability to adapt or evolve.
Reading:

Week Two:
Tuesday January 27th:
Before the Origin: The Earth’s History and the History of Life on Earth: Charles Lyell and “Uniformitarianism”
William Whewell (1794-1866) a prominent geologist, minerologist, and longtime Master of Trinity College Cambridge, had named two theoretical explanations of the history of the Earth’s surface, “Catastrophism” and “Uniformitarianism”. The former allowed for significant occasional leaps in explaining the Earth’s natural history, a view associated with Cuvier’s “revolutions”.

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Uniformitarianism, however, entailed slow and gradual change. Cuvier's *Theory of the Earth* (1813) (along with William Buckland's *Geology and Minerology* (1836)) marked the field until the publication of Charles Lyell's controversial *Principles of Geology* (1830-1833). Lyell (1797-1875), a former student of Buckland, proposed a uniformitarian theory of earth's development suggesting that the earth was much older than previously assumed. Lyell argues that the fossil record is a "poor census taker".

Reading:

Thursday January 29th:
**Before the Origin: Evolution in France. Jean Baptiste Lamarck.**
Contrary to popular belief, the majority of the thinking public did not believe the Genesis story to be literally true prior to the publication of Darwin's *Origin of Species* in 1859. Jean Baptiste Lamarck (1744-1829) is widely credited with originating the first workable theory of evolution a full half-century before the *Origin*. A French botanist and Professor of Invertebrate Zoology at the National Museum in Paris, Lamarck argued in his *Zoological Philosophy* (1809), that organisms could change from generation to generation through the mechanism of the "inheritance of acquired characters": Abilities or traits that an organism developed during the course of its own lifetime could be passed on to its offspring. Significantly, Lamarck challenged the belief in the fixity of species - that the groups we call species are inherently fixed and unchanging.

Reading:

Week Three:
Tuesday February 3rd:
**Dreamcourse Lecturer: Dr. Paul White**
**Richard Owen, Thomas Huxley. British Comparative Anatomy and the making of Modern Science:**
Richard Owen (1804-1892) was from Lancaster in England, and had been at school with Whewell, with whom he remained close friends. Trained as a surgeon he was a brilliant dissectionist. He became involved with the Hunterian Collection of specimens at the Royal College of Surgeons in London, and soon became the most distinguished British comparative anatomist of his day. In 1830 he became acquainted with Cuvier. In 1856 he became superintendent of the natural history department of the British Museum. Significantly Owen saw evidence of design in the organisms he dissected, and he wrote a number of important works demonstrating exactly this, in this one, *On the Nature of Limbs*, Owen outlines homology as evidence for design. An important figure in science, Owen was later to come into conflict with those who advocated Darwinism, Thomas Huxley in particular.

Reading:
Thursday February 5th:
In the nineteenth-century England was indeed “the workshop of the world”. Amazing developments in science and technology drove the industrial revolution and the expansion of Empire. Herbert Spencer (1820-1903), a Radical journalist and philosopher advocated laissez-faire and “the Survival of the Fittest” – (a phrase that he coined, not Darwin) – not only with the aim of gaining for England the economic benefits of competition, but also of gaining the best evolutionary advantage for the English nation over their competitors. Although we don’t today hear much about Spencer, in his time he was immensely influential – both in England and on this side of the Atlantic. Also significant was Thomas Robert Malthus. In his Essay On the Principles of Population, which although published in 1798 reached the height of its popularity in this period, Malthus had portrayed a life of struggle amidst scarcity. This essay not only appeared to endorse nineteenth-century laissez-faire economics, but was also later to provide food for thought for Darwin.
Reading:
Extracts from Herbert Spencer, Principles of Biology (Vols.1 & 2); Principles of Ethics, and “On the Proper Sphere of Government.”

Week Four:
Tuesday February 10th:
Dreamcourse Lecturer: John M. Lynch
The professionalisation of Victorian Science: The Vestiges of the Natural History of Creation and “Scriptural Geology”
The Vestiges of the Natural History of Creation was published anonymously in 1844, by the Scottish publisher Robert Chambers (1802-1871). Chambers presented an argument that in society, as in nature, progress was both natural and inevitable. His book was met with considerable discussion and controversy. It was, in the words of one historian of science, a Victorian Sensation. Geologists, and natural scientists attacked the book however. They believed that Chambers’ goal was not an accurate explanation of nature, but was rather an attempt to use nature to justify a particular political position.
Reading:

Thursday February 12th: *[NB: Professor Lynch’s evening lecture is this evening.]*
Before the Origin: Scientific Proof
In this class we consider the philosophy of science, and, in particular, the nature of scientific proof and what made for good science. Debate on this question in England at this time centred on what it meant to be a good Newtonian. Arguably the most important writer in this debate was the Cambridge mathematician William Whewell (1794-1866). It is no exaggeration to call Whewell one of the most influential figures in the history of modern science. The son of a Carpenter, Whewell was recognised as a superb mathematician by a local parish priest, and
arrangements were made for his education. Through hard work and scholarships he attended Cambridge University and eventually became Professor of Mineralogy and Professor of Moral Philosophy. He was close to many of the prominent men of science of his day – including Lyell, John Stevens Henslow, Adam Sedgwick and with Darwin during his own student days at Cambridge. In this section from The Philosophy of the Inductive Sciences (1840), Whewell explained how scientists could best use the inductive method to extrapolate knowledge from collections of observations. Whewell’s interpretation of induction, which included the imaginative application and testing of hypotheses, was vital to Darwin’s evidences and argument for evolution through natural selection. [Think back to this passage of Whewell’s when we come to read the Origin]

**Reading:**

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**PART II**

**DARWIN AND DARWINISM**

**Week Five:**
**Tuesday February 17th:**
**Charles Darwin and the Voyage of the Beagle.**
Between the end of 1831 and the October of 1836, Charles Robert Darwin (1809-1882), sailed aboard the H.M.S. Beagle, a Royal Naval survey vessel, as the captain’s companion. His voyage took him from Plymouth, England, around South America, through New Zealand and Australia, across the Indian Ocean and around the Southern tip of Africa. When he left he was twenty-two with a general university education, five years later he returned to England as a minor celebrity as a result of the many plant animal and geological specimens he had collected during his voyage. His voyage, and not just his visit to the Galapagos Islands, were very important for his later views on speciation and his theory of Natural Selection. Significantly, so too was his timely reading of Thomas Malthus’s famous essay on population.

**Reading:**

**Thursday February 19th:**
**Darwin’s Voyage on the Beagle (continued).**
It was not only Darwin’s celebrated visit to the Galapagos Islands that led him to his evolutionary conclusions, but he was also led to think long and hard about the divergence and variety of individuals within a species by his encounter with the natives of Tierra del Fuego. Darwin was led to consider both the role of the environment and the role of personal effort as explanatory of the differences between races.

**Reading:**
Charles Darwin, Journal of Researches into the Natural History and Geology of the Countries Visited by H.M.S. Beagle (1839), Chapter 10, pp.180-203.
Week Six:
Tuesday February 24th:
*On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life* (1859).
Darwin had formulated the basic outline of his theory of natural selection as early as 1838, but he waited for over two decades to publish it. Anxieties about the accuracy of his conclusions, concerns about both public and scientific reaction, and the uproar over the Vestiges in 1844 combined to keep Darwin silent. By the 1850's, convinced he was correct and both financially and professionally secure, Darwin began discussing his ideas with a close circle of colleagues – among them Charles Lyell and Joseph Dalton Hooker. In these chapters, Darwin sets out the argument that the natural world is dominated by an incessant struggle for scarce resources. In light of the fact that far more organisms of any species are born than can possibly survive, only the best fitted to their environment would survive to reproduce, passing on their beneficial traits to the next generation. The unfit would, he concluded, be dispassionately exterminated by this same mechanism.

Reading:

Thursday February 26th:
Dreamcourse Lecturer: Michael Ruse

*On the Origin of Species by Means of Natural Selection*
Having laid out the mechanism of his theory of the Struggle for Existence and of the Natural Selection that must therefore ensue, Darwin turned to the objections that he anticipated might be raised against his theory. In chapter six Darwin deals explicitly with the absence of intermediate forms. He also addresses the seeming unlikelihood that complex organisms and complex organs – such as the eye – could possibly have evolved by such a slow and gradual process as Natural Selection. In the last chapter, Darwin summarises his argument, in the process giving attention to a number of other difficulties that might be raised against his theory.

Reading:

Week Seven:
Tuesday March 3rd:

*The Descent of Man and Sexual Selection.*
In the *Origin* Darwin had carefully skirted the issue of human evolution, however, it was the obvious question that his readers asked, and which many other authors ventured into in light of Darwin’s theory. By 1872 Darwin finally decided to put pen to paper himself in *The Descent of Man* (1872). In this book Darwin not only speculated about the origins of modern humanity, but also took the opportunity to more fully expound his theory of “sexual selection” a natural force that he saw working sometimes in tandem, and sometimes in opposition to natural selection.

Readings:
(PART III)
THE RECEPTION OF DARWINISM

Thursday March 5th:
The 1860 British Association meeting in Oxford.
The 1860 meeting of the British Association for the Advancement of Science that met in Oxford is notorious among Darwin scholars, and not without good reason. It was here that the forces of religious dogmatism represented by the Bishop of Oxford, Samuel Wilberforce (1805-1873) were slain by the hand of the eminent zoologist and “Darwin’s Bulldog” Thomas Henry Huxley. – Or so the story goes, at least. There are a number of reasons why historians have come to question this interpretation of the course of events and their meaning – Let’s have a look at the evidence...
Bishop Samuel Wilberforce was an excellent mathematician, dedicated liberal and skilled debater, he chose a career in the Anglican Church where he reorganised and reinvigorated his diocese. Wilberforce is often unfairly caricatured as a hard-line biblical-literalist. Nonetheless, he did reject evolution on philosophical as well as theological grounds, believing that it was an interesting, but inaccurate depiction of nature. Huxley, on the other hand, saw in evolution a political tool that advanced his own class and professional interests, but was actually ambivalent about natural selection.

Reading:

Week Eight:
Tuesday March 10th:
A Post-Darwinian Natural Theology in England: Charles Kingsley and Water Babies
In England, the Broad-Church Anglican Priest Charles Kingsley similarly received Darwin’s work as consistent with Natural Theology. As well as a popular author, with a controversial background in political Radicalism, Kingsley had become tutor to the Prince of Wales and Chaplain to the Queen. – he was thus not without influence! He wrote, spoke, and sermonised (!) extensively on evolution and its religious orthodoxy, but nowhere did he do this more deeply (or more charmingly) than in the fairy tale he wrote in 1862-3, Water Babies.

Reading:
Letter: Charles Kingsley to Charles Darwin, 18 November 1859.
Thursday March 12th:
Dreamcourse Lecturer: John Beatty
A Post-Darwinian Natural Theology in America: Asa Gray and Darwin’s Orchids
Reading:
Asa Gray (1810-1888) was a botanist at Harvard who, following the publication of the Origin, commenced an enthusiastic and a lifelong correspondence with Darwin. Whereas many people thought that Darwin’s theory refuted Paley’s argument from design, Asa Gray believed that natural selection was the mechanism through which God brought new species into the world. He was influential in ensuring that the Origin had a ready reception in the United States, and defended the work against the charge of atheism.

Week Nine:
March 14th – March 22nd
😊 Spring Break 😊

Week Ten:
Tuesday March 24th:
“Difficulties on Theory…”Questions over the sufficiency of Natural Selection
There were other objections to Darwin’s theory. Perhaps most notably those made by the Scottish Engineer Henry Charles Fleeming Jenkin (1833-1885), the English Catholic St. George Jackson Mivart (1827-1900), and the Irish physicist William Thompson 9124-1907) (who later became Lord Kelvin). Fleeming Jenkin pointed out that if those organisms with unusually fit traits bred with the less fit of their population, the result would tend to be an averaging out of that trait, rather than its exaggeration to the point of forming new species. Mivart, in his book The Genesis of Species (1871) also made problems for Darwin. Mivart argued that although natural selection might account for the success of well-established adaptations, it couldn’t possibly explain the initial stages of their development – he gave the problematic example of the migration of the flatfish’s eye. William Thompson also questioned Darwin’s theory. His calculations of the earth’s age, based upon deductions about the temperature of the Earth’s core suggested that the Earth was nowhere near old enough for sophisticated organisms to have evolved through the slow uniformitarian processes favoured by Darwin. Darwin took great pains to refute or accommodate these objections in the second and subsequent editions of the Origin. Significantly, Darwin fell back on the Lamarckian mechanism of speciation: the inheritance of acquired characters. This brought Darwin to a theoretical position referred to as “neo-Lamarckism”.
Reading:
Mivart in the *North British*???

**Thursday March 26th:** “Difficulties on Theory…” Darwin responds to his critics.
Darwin anticipated many of the objections that were raised against his theory of evolution by means of natural selection. In this class we will look at Darwin’s responses to the criticisms that he recognised as being the most severe. Notably, those raised by Fleming Jenkin, Mivart, Thompson.
**Reading:**

**PART IV**
DARWINISM AND POLITICS

**Week Eleven:**
**Tuesday March 31st:**
**Thomas Huxley and Peter Kropotkin.**
Evolution, as we have already hinted at, was taken to have political as well as theological implications. Huxley, as we know, welcomed Darwin’s work as “a Whitworth Gun in the armoury of liberalism”, and he continued to argue that evolution endorsed liberal views throughout his life. Significantly, in 1888 he wrote an article in the periodical *Nineteenth Century* entitled “The Struggle for Existence in Human Society” in which he described nature – and human nature – as being governed by the same rules and passions as governed the gladiators arena. In drawing this conclusion he drew the ire of Peter Kropotkin (1842-1921), a Russian Geographer who was then living in exile in London. Kropotkin was moved to respond, arguing that Huxley had grossly misrepresented Darwin’s work. At least as important for evolution as competition, he argued, was mutual aid. Kropotkin went on to write a number of articles expanding on his point over the next twenty years which were collected in *Mutual Aid* (1902) and *Ethics* (1921). In stressing cooperation over competition, Kropotkin recognised his own anarchist-communist political views in nature. His work which not only naturalised cooperation, but also rejected Malthusianism, was particularly influential in the British socialist movement.
**Reading:**

**Thursday April 2nd:**
**Evolution and Ethics: Reform Darwinism.**
Thomas Henry Huxley (1825-1895) wrote *Evolution and Ethics* in 1893-4. In it he considered the apparent conflict between human civilisation – the ethical treatment of one person by another, and the social provision of aid, and the natural processes of struggle and competition. Although Huxley believed that ethics were opposed to the operation of the laws of natural selection on an individual, he also believed that they were a product of natural selection on a social level.
Ironically, our ethical nature would ultimately undermine the fitness of our society, as the unfit would tend to survive. Unlike Spencer and other advocates of Social Darwinism however, Huxley did not see this as a reason to leave the weakest to live or die by their own efforts.

Reading:

**Week Twelve:**
**Tuesday April 7th:**
In the early 1880s the German cytologist August Weismann (1834-1914), largely through experiments in which he cut the tails off of successive generations of mice, came to the conclusion that “acquired characters” simply were not inherited, thus significantly undermining the theory of Neo-Lamarckism. Weismann suggested that there were two types of cells in the human body – the somatic cells of the body, that could be altered in the course of our lives, and the germ cells, that contained the essence of life that would be passed on to form the next generation. This latter, he argued, were not influenced by “acquired characters”.

In the mid-1880s Herbert George Wells (1866-1946) was a young science student with a passion for geology and zoology. Significantly he studied under Huxley, who by this time was an established figure at what was shortly to become the Royal College of Science – a sure sign of how much society had changed in just twenty years. Wells was deeply impressed with Huxley’s Malthusian biology, and although he went on to become a famous author and socialist, after graduating he worked briefly as a science teacher (writing his 1893 *Textbook of Biology*, the first biology textbook in the English Language), and later, as a science journalist. Although first introduced to Weismann’s work as a student, it was through his science journalism that Wells really engaged with Weismann’s theory of heredity. Wells, like many of his (and our own) contemporaries, saw profound social implications in biology, and Weismann – coupled with the Malthusianism he had learnt from Huxley – radically influenced his views about socialism. Although credited with founding the genre of “science fiction”, Wells rejected this accolade, arguing that his books were “fantasies of possibility”, and he explored many of these themes in his fictional works.

Reading:
August Weismann, *Essays on Heredity*, extracts, [1881]
H.G. Wells, “The Limits to Individual Plasticity”.
H. G. Wells, *Time Machine* [1894/ 1895].

**Thursday April 9th:**
*Dreamcourse lecturer: John van Wyhe*
*“Darwin’s Delay”*
Dr. John van Wyhe will teach this class revisiting the publication of the Origin of Species, and how historians of science have usually viewed what has frequently been termed “Darwin’s Delay.” It has often been argued, notably by the historian James Moore in his significant biography of Darwin, that Darwin delayed publication out of serious concern for his theories theological implications. Van Wyhe argues this was not the case.
Week Thirteen:
Tuesday April 14th:
Hereditary Genius
Francis Galton (1822-1911) was an anthropologist and pioneer in the study of the intelligence of mankind. He also coined the word “eugenics” to describe the science of racial improvement. Darwin’s cousin, Galton was also a respected researcher and held a chair at University College London. In Hereditary Genius (1869), a book that impressed Darwin, Galton sought to quantify the hereditary relationship between members of high social position (which he took for a measure of their inherent quality), and their offspring. Charles Benedict Davenport (1866-1944) was an American evolutionary biologist who led the study of genetics and its application to eugenic ends in the United States. In 1902 he founded the Station for Experimental Evolution in Cold Spring Harbor, New York, and in 1910, the Eugenic Record Office to promote and disseminate eugenic research.

Reading:

(PART V)
EUGENICS AND THE HEALTH OF THE RACE

Thursday April 16th:
Dreamcourse Lecturer: Garland Allen
BUCK v. BECK: The Case of Eugenic Sterilization in America
Harry H. Laughlin (1880-1943) was the single most influential proponent of eugenics in the United States. Hired by Charles Davenport to head the Eugenics Record Office in 1910, throughout the 1920s he served as the “Expert Eugenical Agent” to the United States House of Representative and provided scientific justification for the limitation of immigration, and sterilization – both voluntary and coerced – to limit the increase of “feeble-minded” citizens. Laughlin’s paved the way for Oliver Wendell Holmes’ work for the United States Supreme Court in the famous Buck v. Bell case in 1927. In this case, the court supported the use of involuntary sterilization to prevent criminals and mental health patients from reproducing their kind. Referring to the family of Carrie Buck, Holmes notoriously stated: “Three generations of imbeciles are enough.”

Reading:
(PART VI)
THE MODERN EVOLUTIONARY SYNTHESIS
AND TEACHING EVOLUTION

Week Fourteen:
Tuesday April 21st:
Dreamcourse Lecturer: Dr. Joe Cain.
The Modern Synthesis
Julian Huxley (1887-1975), grandson of Thomas Henry Huxley and brother of the novelist Aldous Huxley, was an important evolutionary biologist in his own right. In the mid-twentieth century he helped to develop what is now termed the “modern synthesis”, a multi-disciplinary effort to synthesise existing knowledge in biology, and to identify short-comings and agree on the essential elements of evolutionary theory. In this section Huxley explains the confused state of evolutionary science as it existed in the first half of the twentieth century. Theodosious Dobzhansky (1900-1975) was a geneticist and another key figure in the Modern Synthesis. A Russian immigrant, he came to the United States in 1927, and studied genetics and heredity in insects. In this piece Dobzhansky demonstrated the concern that many American biologists had about widespread public animosity toward evolutionary science and explained why he believed it was so vital to the progress of modern biology.

Reading:

Thursday April 23rd:
No class today.

Week Fifteen:
Tuesday April 28th:
Continuous or Discontinuous Evolution?
Hugo de Vries (1848-1935), a Dutch physiologist, was one of three biologists who independently rediscovered the 1865 work of Gregor Mendel on inheritance. At the time, Mendel’s work was interpreted as an alternative to Darwinian selection. This was largely because de Vries argued that evolution occurred in “jumps”, as opposed to Darwin’s belief in a uniformitarian gradual and continuous change. As a result he argued that evolution occurred in fits and starts as new mutations appeared. William Bateson (1861-1926) was an English biologist and advocate of Mendelism and was the founder of the science of genetics. In this piece Bateson presented the problems that biologists confronted in explaining the precise mechanisms of evolution. Bateson certainly believed that evolution occurred, and most other biologists viewed the article as a call to action, but religious critics of evolutionary theory used it to attack the reality of evolutionary change.

Reading:
*Tuesday and Wednesday evenings (pick one!!): 7:00pm: film showing of *Inherit the Wind.* Location TBA.

**Thursday April 30**th:

**Evolution in the Class Room: The Scopes Monkey Trial**

In the early 1920s, several southern states passed legislation prohibiting the teaching of evolution in public schools, the Tennessee law declaring that it was a crime to teach that “man had descended from lower animals.” In a challenge to the constitutionality of these legislations the American Civil Liberties Union instigated the famous Scopes Trial in Dayton, Tennessee in 1925. The trial made national news, not least because of the celebrity advocates for each side, William Jennings Bryan for the State and Clarence Darrow who defended Scopes. Immortalised in the public mind through the televised play *Inherit the Wind*, the trial – and its consequences - have been somewhat misrepresented.

**Reading:**

**Week Sixteen:*

**Tuesday May 5**th:

**Creationism and Intelligent Design: On Teaching the ‘Debate’?***

The Scopes Trial was clearly not the end of Creationist attempts to prohibit the teaching of evolution in American classrooms, or indeed, to gain equal time for what they termed “Creation Science” – the argument that there is scientific evidence for the Divine Creation – as an alternative to the scientific evidence for evolution. Indeed both Arkansas and Louisiana passed legislation to this effect in the late 1970s. Following the ruling of Judge Overton in January 1982 that the teaching of Creation Science alongside evolutionary explanations of the development of life on earth is unconstitutional, an appeal to the U.S. Supreme Court was made on behalf of the State of Louisiana. This in turn resulted in the 1987 case *Edwards vs. Aguillard* – in which the unconstitutionality of teaching Creation Science in public schools was upheld. More recently Creationism re-emerged in the form of “Intelligent Design” – a similar set of claims, but in which there is no explicit reference to a Christian God as the designer. However, in Pennsylvania in 2005, in the case of *Kitzmiller vs Dover Area School District*, Judge Jones also ruled the teaching of “Intelligent Design” unconstitutional. – It is unlikely, however, that this will be the end of the matter…

**Reading:**
Extract from *Kitzmiller vs. Dover School Area District*, filed December 20th 2005.

**Thursday April May 7**th:

**The Search for Purpose in a Darwinian world:**

In this last class we shall consider the importance of these implications in light of the reflections of John Maynard Smith (1920-2004) on the cultural importance of “origin stories”. As well as being one of the finest evolutionary biologists of the twentieth century, Maynard Smith also thought deeply about the social and moral implications of evolution.
Friday May 8th: Last classes of Spring semester.

May 11th – May 15th Semester Examinations.

Course Formalities and Expectations

Attendance and Participation:

Attendance in class is mandatory. If you repeatedly miss class without good cause you will receive a written warning. Persistent absences may result in your receiving a failing grade for the course. For this reason if you have good cause to miss class, it is imperative that you discuss this with your instructor BEFOREHAND.

Due Dates and Late Penalty:

Essay one: February 10th
Essay two: March 12th
Essay three: May 7th

An essay will suffer a 5% penalty for each weekday it is late after the final submission date. Write-ups on the week’s readings will be due by 3:30 Friday. Late submissions will receive 0%. Extensions for extenuating circumstances must be arranged with your course tutor in advance. Extensions will only be granted for serious reasons relating to student welfare.

Academic Integrity and Plagiarism:

Plagiarism is the unacknowledged appropriation of someone else’s words, ideas, or work which is then represented as your own. It will not be tolerated and carries significant and serious penalties. At a minimum you will receive 0% for the assignment, and your name put on record. It is possible that you might receive 0% for the course, and in extreme cases may be expelled from the college. You are therefore strongly recommended to educate yourself regarding what plagiarism is and how to avoid it. Your instructor and/or the staff at the writing centre will be happy to advise you on this matter if you are in any doubt.
OU operates an equal opportunities policy. For information on Disability Resources and Policy see: The Disability Resource Centre web site: http://drc.ou.edu/

Tips on Effective Essay Writing

Since writing an effective essay is not a straightforward task, and improving your essay technique is one of the most important skills you will learn during any class, here are some initial suggestions. First write some general notes on what you already know about the subject of your essay, outlining the most striking points. Think why these points are so important, and what they entail for the particular methodological or ethical approach with which you are concerned. Then turn to the notes taken during class and to the set readings themselves, as well as any further background readings you may have identified through bibliographic surveys. Continually re-examine your list of striking features and the organisational structure you have imposed upon them, and think how these materials might help you to articulate your analysis more clearly. When you are ready, sketch an outline of your argument, and then write your first draft. Make sure that to the best of your knowledge there are no logical gaps in your argument. If you can identify some, go back to the literature to see if you can close them. This second look at the literature (and your reading notes) is important. Once you have constructed a hypothesis, you will be able to test it against the arguments of the various authors, and to find those who support your case, and those who are your opponents. (note: having your own hypothesis is the point at which the essay truly becomes your own contribution to the debate). You are then ready to proceed to the second phase.

Writing multiple drafts is a good way to produce a good essay, especially if you can gain some distance from early drafts, for example, by having someone else read them. This is how professional academics work, and so you should try to do so too. You are encouraged to exchange your essays with one another and discuss your work with your colleagues as the course progresses. You should be aware that essays written the night before they are due invariably read like they were written the night before they were due, and as a result often appear ill-considered, disorganised, and incoherent. You should aim to manage your time to allow for at least two drafts and revisions. This will pay significant dividends in terms of the quality of your submitted
work, and correspondingly, with the grade you can expect. Your tutor will be happy to discuss early drafts of your work, as will staff at the writing centre.

What makes a good essay

**Introduction and argument:** A good essay does not simply summarise the argument of the text(s) under examination. It also involves you constructing a coherent narrative about how those texts relate to a broader argument of your own. So, a good essay might start off with a short introduction to the particular element of the topic that you discuss. This might be followed with a similarly brief account of what you intend to say and how you intend to convince the reader of your argument, which brings us to the importance of clear organisation.

**Argument and organisation:** A good essay should not simply be a list of points about the subject under examination, all arranged in a haphazard manner. It should instead take the reader step by step through the argument so that they will end up seeing the logical progression of your narrative, even if they might not agree with your conclusions. This means that after a good introduction, each subsequent paragraph should introduce one particular idea about the episode and finish with a statement that prepares the reader for the next paragraph and its particular idea. These paragraphs should be arranged in a logical sequence that takes the reader from the introduction to the conclusion, which means, of course, that the paragraphs should not contradict each other. A good organisation of these steps then depends critically on a very clear understanding of your essays’ aims and objectives. A clear understanding of your readers’ likely assumptions is equally important to avoid their misunderstanding any part of your argument. Think of it as a chess game, and so always try to put yourself in your readers’ shoes! Do not annoy them unnecessarily by forcing them to ask ‘where is this essay going?’

**Evidence:** A good essay should not only be a logical argument, but it should have the aim of convincing your reader of your point of view. To this end each point of the argument should be backed by evidence from the literature you have consulted, as is appropriate to the specific point being made. Importantly, direct quotes or paraphrases of the text or other literature should be carefully referenced, in footnotes and in a full bibliography of all works cited.
Preferred reference style

Article: First name(s) and last name(s), ‘Title’, Journal Title, Volume, (Year), Page-Page, on p. XXXX or pp. XXXX-XXXX (if you are quoting or referring to specific passages).

Book: First name(s) and last name(s), Title, (Place of publication: Publisher, Year), Page (p. XXXX) or pages (pp. XXXX-XXXX).

Essay in an edited collection: First name and last name, ‘Title’, in First name(s) and last name(s) (ed. or eds.), Title, (Place of publication: Publisher, Year), Page-Page, on p. XXXX or pp. XXXX-XXXX (if you are quoting or referring to specific passages).

Web site: http://www. (Full site address): First name(s) and last name(s), ‘Title’, Date accessed.

[You may use any recognised style of referencing – as long as you are consistent]

Accurate referencing is not simply a matter of avoiding any accusation of plagiarism, but also of leaving open the possibility for your readers to explore the point you make in greater detail than is appropriate to the argument of your essay. It is perhaps needless to say, but you must always take care that your quotations or references support your point, and this may sometimes mean that you will have to explain how this is the case.

Style: A good essay should also be written well, attentive to syntax, grammar and spelling. This is not because your reader is pedantic, but because good syntax and grammar helps clarify your argument. For example, if you compare the passive statement ‘it was said that…’ with the active statement ‘so-and-so said that…’, in the second statement you are providing the reader with much more, possibly important information about ‘so-and-so’, and you will not beg questions about who exactly ‘said that…’. Also, when you write in one sentence that ‘so-and-so said’, and ‘so-and-so says’ in the next, your readers might wonder about chronology and the order of causes and effects. Wanting good spelling may seem even more pedantic, but why risk aggravating your reader when you can use the spell-checker? Lastly, always have a good dictionary at hand, because different words for the same concept often convey different meanings, some of which may not fit well with the point you are making. (You should be aware however, that common dictionary definitions of terms may lack the nuances of how we might interpret these terms in historical perspective philosophy (for instance a dictionary is unlikely to give you a full appreciation of the changing meaning of a word like “evolution” for example). You might also consult subject specific dictionaries (A Dictionary of Biology, for example). If you are in doubt about how an author is using a word, you should feel free to ask).

You are encouraged to review each other’s work in progress, and to provide comments to the author on the effectiveness of their argument. You should be aware that this is an important part
of learning how to write, (and to be a generous member of an academic community) and remember that a thorough review of someone else’s essay probably benefits you more than the author, as you discover how others go about their task and thus what might be the limitations of your own compositions.

The writing and the peer review of your essays in such a painstaking fashion will enable you to further develop your research skills. You will improve the effectiveness of your handling of primary and of secondary materials and thus your understanding of the historical significance of the development of environmental thought. Moreover, you should find that the exercise helps you advance your ability to analyse material and express an argument in a persuasive and informed manner.
GRADING PRACTICES AND STANDARDS

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<th>Percent</th>
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<tr>
<td>90-100</td>
<td>A exceptional</td>
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<td>87-89</td>
<td>B+ competent</td>
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<td>84-86</td>
<td>B competent</td>
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The following guidelines offer a characterisation of the type of work that might be associated with various ranges of grades. The intent here is to encourage general consistency across faculty and Graduate Teaching Assistants, and to give a guide to what is required in academic writing rather than to provide precise specifications.

90% to 100% (A)

“A” grade work is exceptional, showing strong evidence of original thinking and good organisation. The student will have shown a capacity to analyse and synthesize information, as well as a superior grasp of the subject matter in hand and an ability to make sound critical evaluations based upon an extensive knowledge base. Work of this standard should be well argued, well documented, and well written.

80% to 89% (B- to B+)

Work of this grade is competent, showing evidence of a reasonable-to-solid grasp of the subject matter. It should also show evidence of critical and analytical thinking. The work should also indicate a familiarity with the literature. It should be clearly written, accurate and coherent, including major points from the course material and an appreciation of their importance.
70% to 79% (C- to C+)

Work of this grade is of *adequate* performance, showing a fair understanding of the subject matter and an ability to develop solutions to simple problems in the material. It may include some errors and slight misconceptions, but should be indicative of a reasonable engagement with the course material. An acceptable although uninspired piece of work, it should not contain serious errors, but may lack style and vigour in its articulation.

60% to 69% (D- to D+)

Work of this grade is *adequate, but poor*. Poorly articulated and lacking in a coherent argument it may also lack sufficient documentation. Although it may provide some relevant information, it omits many important points and contains a number of substantial errors or misconceptions.

00% to 59% (F) *Inadequate.*

Work of this standard is *inadequate*, showing little or no understanding of the subject matter. Exhibiting little evidence of critical and analytic skills, this work contains only a limited or irrelevant use of the literature. Poorly articulated it is likely to lack coherence and be difficult to comprehend. Work of this grade is not of degree standard.