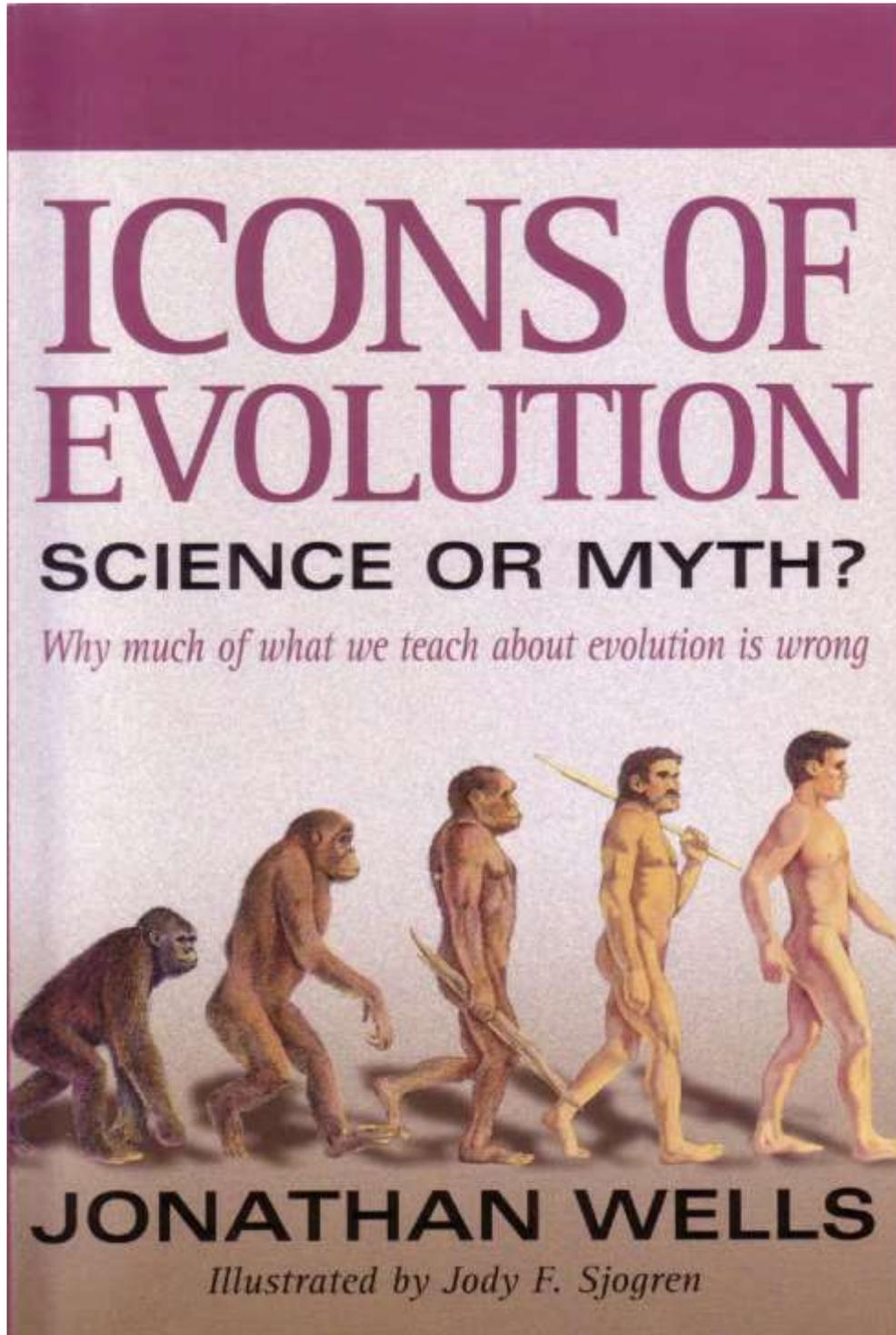


بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

**Icons of Evolution
Science or Myth?**

Why Much of What We Teach About Evolution Is Wrong

By: Jonathan Wells



الكتاب الرائع، الذي أعده الأشمل في نقد نظرية التطور الداروينية، والمتوفر بفضل الله عز وجل باللغة العربية، بعنوان: «أيقونات التطور، علم أم خرافة!»، من إصدارات «مركز براهين»، والتي تستطيع الحصول عليها عن طريق «دار الكاتب».

الكتاب للعالم الأمريكي «جوناثان ويلز»، أحد أعمدة «مركز ديسكفري» المشهور جداً، وهو حاصل على درجتَي دكتوراه، الأولى في الدراسات الدينية، والثانية علم الأحياء الجزيئي والخلوي!

هذا الكتاب يستحق العناية والدراسة الدقيقة من قِبَل كل المهتمين بنقد نظرية التطور الداروينية، فالكتاب يتناول أشهر الأدلة على صحة النظرية بمفهومها الشامل العام، وهو أن كل الكائنات الحية المختلفة جاءت من سلف مشترك واحد، عن طريق التغيرات الطفيفة العشوائية العمياء التي تراكم مع الوقت.

الجانب الهام جداً في هذا الكتاب، بالإضافة إلى عرض الأدلة العلمية المختلفة على بُطلان أيقونات التطور المختلفة، هو أن المؤلف حريص جداً على بيان موقف المجتمع العلمي المنحاز للدفاع عن نظرية التطور الداروينية في المؤلفات التعليمية العامة، سواء في المدارس أو في الجامعات، وأن هذه المؤلفات تعرض أيقونات التطور على أنها حقيقة علمية ثابتة بالأدلة، رغم أن العلماء أثبتوا بُطلان هذه الأيقونات، ومع ذلك فإن المؤلفات التعليمية ما زالت تتكلم عن هذه الأيقونات الباطلة على أنها الدليل العلمي الثابت على صحة نظرية التطور الداروينية!

إذن، المؤلف في هذا الكتاب كالاتي: أيقونات التطور باطلة، والعلماء كشفوا بُطلانها وزيفها وعدم صحتها، ومع ذلك فإن المؤلفات التعليمية في المدارس ما زالت تُعلم الناس هذه الأيقونات وكأنها حقيقة علمية ثابتة، وهذا يعني أن عملية الدفاع عن نظرية التطور الداروينية ليست إلا بدافع إيماني إيديولوجي، وليس بدافع نشر العلم الصحيح والمبني على الأدلة والبراهين، وأن المؤلفات التعليمية بهذا تُعلم الناس الخرافة وليس العلم، لأن العلماء أثبتوا عدم صحة هذه الأيقونات، ولكن أصحاب هذه المؤلفات ما زالوا مُصرِّين على تعليمها للناس كدليل على صحة نظرية التطور الداروينية، سواء قاصدين هذا، أو عن جهل! وفي كلا الحالتين، فإن هذا لا يُعدّ نشرًا للعلم، بل الخرافة!

1 Introduction

- Science is the search for the truth,» wrote chemist Linus Pauling, winner of two Nobel prizes. Bruce Alberts, current president of the U. S. National Academy of Sciences, agrees. «Science and lies cannot co-exist,» said Alberts in May 2000, quoting Israeli statesman Shimon Peres. «You don't have a scientific lie, and you cannot lie scientifically. Science is basically the search of truth.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p1.]
- Truth-seeking is not only noble, but also enormously useful. By providing us with the closest thing we have to a true understanding of the natural world, science enables us to live safer, healthier and more productive lives. If science weren't the search for truth, our bridges wouldn't support the weight we put on them, our lives wouldn't be as long as they are, and modern technological civilization wouldn't exist. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p1, 2.]
- According to a 1998 booklet on science teaching issued by the National Academy of Sciences, «it is the nature of science to test and retest explanations against the natural world.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p2.]
- Theories that survive repeated testing may be tentatively regarded as true statements about the world. But if there is persistent conflict between theory and evidence, the former must yield to the latter. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p2.]
- The National Academy's booklet correctly states that «all scientific knowledge is, in principle, subject to change as new evidence becomes available.» It doesn't matter how long a theory has been held, or how many scientists currently believe it. If contradictory evidence turns up, the theory must be reevaluated or even abandoned. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p2, 3.]

- «This process of public scrutiny,» according to the National Academy's booklet, «is an essential part of science. It works to eliminate individual bias and subjectivity, because others must also be able to determine whether a proposed explanation is consistent with the available evidence.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p3.]
- This book was written in the conviction that scientific theories in general, and Darwinian evolution in particular, can be evaluated by any intelligent person with access to the evidence. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p4.]
- Biological evolution is the theory that all living things are modified descendants of a common ancestor that lived in the distant past. It claims that you and I are descendants of ape-like ancestors, and that they in turn came from still more primitive animals. This is the primary meaning of «evolution» among biologists. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p4.]
- «Biological evolution,» according to the National Academy's booklet, «explains that living things share common ancestors. Over time, evolutionary change gives rise to new species. Darwin called this process 'descent with modification,' and it remains a good definition of biological evolution today.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p4.]
- For Charles Darwin, descent with modification was the origin of all living things after the first organisms. He wrote in *The Origin of Species*: «I view all beings not as special creations, but as the lineal descendants of some few beings» that lived in the distant past. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p4, 5.]
- Darwin believed, is that they have been modified by natural selection, or survival of the fittest: «I am convinced that Natural Selection has been the most important, but not the exclusive, means of modification.» [Jonathan

Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p5.]

- When proponents of Darwin's theory are responding to critics, they sometimes claim that «evolution» means simply change over time. But this is clearly an evasion. No rational person denies the reality of change, and we did not need Charles Darwin to convince us of it. If «evolution» meant only this, it would be utterly uncontroversial. Nobody believes that biological evolution is simply change over time. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p5.]
- No one doubts that descent with modification occurs in the course of ordinary biological reproduction. The question is whether descent with modification accounts for the origin of new species—in fact, of every species. Like change over time, descent with modification within a species is utterly uncontroversial. But Darwinian evolution claims much more. In particular, it claims that descent with modification explains the origin and diversification of all living things. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p5.]
- The only way anyone can determine whether this claim is true is by comparing it with observations or experiments. Like all other scientific theories, Darwinian evolution must be continually compared with the evidence. If it does not fit the evidence, it must be reevaluated or abandoned—otherwise it is not science, but myth. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p5.]

2 The Miller-Urey Experiment

- The Miller-Urey experiment is still featured prominently in textbooks, magazines, and television documentaries as an icon of evolution. Yet for more than a decade most geochemists have been convinced that the experiment failed to simulate conditions on the early Earth, and thus has little or nothing to do with the origin of life. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p11.]

- The Earth's present atmosphere is about 21 percent oxygen gas. We tend to think of an oxygen-rich atmosphere as essential to life, because we would die without it. Yet, paradoxically, life's building blocks could not have formed in such an atmosphere. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p12.]
- In the 1960s Princeton University geochemist Heinrich Holland and Carnegie Institution geophysicist Philip Abelson agreed with Brown. Holland and Abelson independently concluded that the Earth's primitive atmosphere was not derived from interstellar gas clouds, but from gases released by the Earth's own volcanoes. They saw no reason to believe that ancient volcanoes were different from modern ones, which release primarily water vapor, carbon dioxide, nitrogen, and trace amounts of hydrogen. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p15.]
- But if the principal ingredient of the primitive atmosphere was water vapor, the atmosphere must also have contained some oxygen. Atmospheric scientists know that ultraviolet rays from sunlight cause dissociation of water vapor in the upper atmosphere. This process, called «photodissociation,» splits water molecules into hydrogen and oxygen. The hydrogen escapes into space, leaving the oxygen behind in the atmosphere. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p15.]
- Canadian geologists Erich Dimroth and Michael Kimberly wrote in 1979 that they saw «no evidence» in the sedimentary distribution of iron «that an oxygen-free atmosphere has existed at any time during the span of geological history recorded in well preserved sedimentary rocks.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p16.]
- Biochemical evidence has been used to infer primitive oxygen levels, as well. In 1975 British biologists J. Lumsden and D. O. Hall reported that an enzyme (superoxide dismutase) used by living cells to protect themselves from the damaging effects of oxygen is present even in organisms whose ancestors are thought to have existed before the advent of photosynthesis. [Jonathan Wells:

Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong, Regnery Publishing 2000, p16.]

- In 1977 origin-of-life researchers Sidney Fox and Klaus Dose reported that a major reason why the Earth's primitive atmosphere «is widely believed not to have contained in its early stage significant amounts of oxygen» is that «laboratory experiments show that chemical evolution, as accounted for by present models, would be largely inhibited by oxygen.» James C. G. Walker likewise wrote that «the strongest evidence» for the composition of the primitive atmosphere «is provided by conditions for the origin of life. A reducing atmosphere is required.» [Jonathan Wells: ***Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong***, Regnery Publishing 2000, p18.]
- In fact, evidence for primitive oxygen continues to mount: Smithsonian Institution paleobiologist Kenneth Towe (now emeritus) reviewed the evidence in 1996, and concluded that «the early Earth very likely had an atmosphere that contained free oxygen.» [Jonathan Wells: ***Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong***, Regnery Publishing 2000, p19.]
- Holland and Abelson concluded in the 1960s that the Earth's primitive atmosphere was derived from volcanic outgassing, and consisted primarily of water vapor, carbon dioxide, nitrogen, and trace amounts of hydrogen. With most of the hydrogen being lost to space, there would have been nothing to reduce the carbon dioxide and nitrogen, so methane and ammonia could not have been major constituents of the early atmosphere. Abelson also noted that ammonia absorbs ultraviolet radiation from sunlight, and would have been rapidly destroyed by it. [Jonathan Wells: ***Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong***, Regnery Publishing 2000, p20.]
- Abelson concluded: «What is the evidence for a primitive methane-ammonia atmosphere on Earth? The answer is that there is no evidence for it, but much against it.» (emphasis in original) In other words, the Oparin-Haldane scenario was wrong, and the early atmosphere was nothing like the strongly reducing mixture used in Miller's experiment. [Jonathan Wells: ***Icons of Evolution, Science or Myth? Why Much of What We Teach About***

Evolution Is Wrong, Regnery Publishing 2000, p20.]

- In 1975 Belgian biochemist Marcel Florkin announced that «the concept of a reducing primitive atmosphere has been abandoned,» and the Miller-Urey experiment is «not now considered geologically adequate.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p20.]
- Sidney Fox and Klaus Dose—though they argued that the primitive atmosphere lacked oxygen—conceded in 1977 that a reducing atmosphere did «not seem to be geologically realistic because evidence indicates that... most of the free hydrogen probably had disappeared into outer space and what was left of methane and ammonia was oxidized.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p20.]
- According to Fox and Dose, not only did the Miller-Urey experiment start with the wrong gas mixture, but also it did «not satisfactorily represent early geological reality because no provisions [were] made to remove hydrogen from the system.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p21.]
- Fox and Dose concluded: «The inference that Miller's synthesis does not have a geological relevance has become increasingly widespread.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p21.]
- As Jon Cohen wrote in *Science* in 1995, many origin- of-life researchers now dismiss the 1953 experiment because «the early atmosphere looked nothing like the Miller-Urey simulation.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p21.]
- As John Horgan wrote in *Scientific American* in 1991, an atmosphere of carbon dioxide, nitrogen, and water vapor «would not have been conducive to the synthesis of amino acids.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p21, 22.]
- According to Scripps Research Institute biochemist Gerald Joyce, RNA is not

a plausible candidate for the first building block of life «because it is unlikely to have been produced in significant quantities on the primitive Earth.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p23.]

- Origin- of-life researchers have been unable to show how the molecular building blocks of life formed on the early Earth. But even if they had discovered the origin of the building blocks, the origin of life would remain a mystery. A biochemist can mix all the chemical building blocks of life in a test tube and still not produce a living cell. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p23, 24.]
- The origin of life problem is so difficult that German researcher Klaus Dose wrote in 1988 that current theory is «a scheme of ignorance. Without fundamentally new insights in evolutionary processes... this ignorance is likely to persist.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p24.]
- Salk Institute scientist Leslie Orgel acknowledged that «we are very far from knowing whodunit.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p24.]
- And New York Times science writer Nicholas Wade reported in June 2000: «Everything about the origin of life on Earth is a mystery, and it seems the more that is known, the more acute the puzzles get.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p24.]
- So we remain profoundly ignorant of how life originated. Yet the Miller-Urey experiment continues to be used as an icon of evolution, because nothing better has turned up. Instead of being told the truth, we are given the misleading impression that scientists have empirically demonstrated the first step in the origin of life. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p24.]
- In 1986 chemist Robert Shapiro wrote a book criticizing several aspects of

research on the origin of life. He was especially critical of the argument that the Miller-Urey experiment proved that the Earth's primitive atmosphere was strongly reducing. «We have reached a situation,» he wrote, «where a theory has been accepted as fact by some, and possible contrary evidence is shunted aside.» He concluded that this is «mythology rather than science.» Are we teaching our biology students mythology rather than science? [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p27.]

3 Darwin's Tree of Life

- This was Charles Darwin's view in *The Origin of Species*: «I view all beings not as special creations, but as the lineal descendants of some few beings which lived long before the first bed of the Cambrian system was deposited.» (When Darwin wrote *The Origin of Species* in 1859, the Cambrian was the oldest geological period in which fossils had been found.) Indeed, Darwin thought that «all the organic beings which have ever lived on this earth may be descended from some one primordial form.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p29.]
- Neo-Darwinist Ernst Mayr boldly proclaimed in 1991 that «there is probably no biologist left today who would question that all organisms now found on the earth have descended from a single origin of life.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p31.]
- He wrote in *The Origin of Species* that «if the theory be true, it is indisputable that before the lowest Cambrian stratum was deposited long periods elapsed... [in which] the world swarmed with living creatures.» Yet he acknowledged that «several of the main divisions of the animal kingdom suddenly appear in the lowest known fossiliferous rocks.» Darwin called this a «serious» problem which «at present must remain inexplicable; and may be truly urged as a valid argument against the views here entertained.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p35.]
- Since that time, further exploration has turned up many fossil beds older than the Cambrian, so our present understanding of Precambrian history is far

better than Darwin's. Paleontologists have also found Cambrian rocks in Canada, Greenland, and China where well-preserved fossils are particularly plentiful. But this vastly improved knowledge of Cambrian and Precambrian fossils has aggravated Darwin's problem rather than alleviated it. Many paleontologists are now convinced that the major groups of animals really did appear abruptly in the early Cambrian. The fossil evidence is so strong, and the event so dramatic, that it has become known as «the Cambrian explosion,» or «biology's big bang.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p37.]

- Some paleontologists argue that the Ediacaran fossils were ancestors of the animals that appeared later in the Cambrian, while others claim they are so utterly different from all other life-forms that they should be placed in their own kingdom. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p38.]
- British paleontologist Simon Conway Morris believes that at least some of the Ediacaran fossils were animals, but maintains that most of the many species appearing in the Cambrian did not have ancestors in Ediacara. «Apart from the few Ediacaran survivors,» wrote Conway Morris in 1998, «there seems to be a sharp demarcation between the strange world of Ediacaran life and the relatively familiar Cambrian fossils.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p38.]
- But except for the latter, and possibly a few survivors from Ediacara, there is no fossil evidence connecting Cambrian animals to organisms that preceded them. The now well-documented Precambrian fossil record does not provide anything like the long history of gradual divergence required by Darwin's theory. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p38.]
- In 1993 geologist Samuel Bowring and his colleagues summarized the available evidence from the rock strata and radioactive dating methods, and concluded that the Cambrian period began about 544 million years ago. The

major increase in animal fossils that marks the Cambrian explosion began about 530 million years ago, and lasted a maximum of 5 to 10 million years. (Although 10 million years is a long time in human terms, it is short in geological terms, amounting to less than 2 percent of the time elapsed since the beginning of the Cambrian.) The Cambrian explosion gave rise to most of the animal phyla alive today, as well as some that are now extinct. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p39.]

- According to paleontologists James Valentine, Stanley Awramik, Philip Signor, and Peter Sadler, «the single most spectacular phenomenon evident in the fossil record is the abrupt appearance and diversification of many living and extinct phyla» near the beginning of the Cambrian. Many animal body plans ranked as phyla and classes «first evolved at that time, during an interval that may have lasted no more than a few million years.» Valentine and his colleagues concluded that the Cambrian explosion «was even more abrupt and extensive than previously envisioned.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p39.]
- But its challenge to Darwin's theory lies not so much in its abruptness (it doesn't really matter whether it lasted 5 million years or 15 million years), or in its extent (it doesn't really matter that sponges preceded it, or that some types of worms appeared later), as in the fact that phyla and classes appeared right at the start. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p41.]
- As evolutionary theorist Jeffrey Schwartz puts it, the major animal groups «appear in the fossil record as Athena did from the head of Zeus—full blown and raring to go.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p41.]
- According to James Valentine and Douglas Erwin: «The sections of Cambrian rocks that we do have (and we have many) are essentially as complete as sections of equivalent time duration from similar depositional environments» in more recent rocks. ... Yet «ancestors or intermediates» are «unknown or

unconfirmed» for any of the phyla or classes appearing in the Cambrian explosion. Valentine and Erwin conclude that the «explosion is real; it is too big to be masked by flaws in the fossil record.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p42-44.]

- In February 2000, British geologists M. J. Benton, M. A. Wills, and R. Hitchin concluded: «Early parts of the fossil record are clearly incomplete, but they can be regarded as adequate to illustrate the broad patterns of the history of life.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p44.]
- Did the ancestors of the animal phyla fail to fossilize because they were too small, or soft-bodied? The problem with this explanation is that microfossils of tiny bacteria have been found in rocks more than three billion years old. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p44.]
- the Pre-cambrian organisms found fossilized in the Australian Ediacara Hills were soft-bodied. «In the Ediacaran organisms there is no evidence for any skeletal hard parts,» wrote Simon Conway Morris in his 1998 book, *The Crucible of Creation*. «Ediacaran fossils look as if they were effectively soft-bodied.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p44.]
- The Burgess Shale, for example, includes many fossils of completely soft-bodied animals. «These remarkable fossils,» according to Conway Morris, «reveal not only their outlines but sometimes even internal organs such as the intestines or muscles.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p44.]
- As geologist William Schopf wrote in 1994: «There is only one source of direct evidence of the early history of life—the Precambrian fossil record; speculations made in the absence of such evidence, even by widely acclaimed evolutionists, have commonly proved groundless.» One such speculation is «the long-held notion that Precambrian organisms must have been too small or too delicate to have been preserved in geological

materials.» According to Schopf, this notion is «now recognized as incorrect.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p44, 45.]

- A phylogeny is the evolutionary history of a group of organisms. Until recently, phylogenies were inferred from anatomical and physiological features (such as the number of limbs, or warm-bloodedness). Since the advent of modern molecular biology, however, many phylogenies have been based on DNA and protein comparisons. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p45.]
- It is important to remember that the only actual data in a phylogenetic tree (with rare exceptions) come from living organisms, which are the tips of the branches. Everything else about a phylogenetic tree is hypothetical. The arrangement of the tips, the branches and branch-points, and the root itself are all based on methodological assumptions and sequence comparisons. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p49.]
- But the expectation that more data would help matters «began to crumble a decade ago,» wrote University of California molecular biologists James Lake, Ravi Jain, and Maria Rivera in 1999, «when scientists started analyzing a variety of genes from different organisms and found that their relationships to each other contradicted the evolutionary tree of life derived from rRNA analysis alone.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p49.]
- According to French biologists Herve Philippe and Patrick Forterre: «With more and more sequences available, it turned out that most protein phylogenies contradict each other as well as the rRNA tree.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p49, 50.]
- According to University of Illinois biologist Carl Woese, an early pioneer in constructing rRNA-based phylogenetic trees: «No consistent organismal phylogeny has emerged from the many individual protein phylogenies so far

produced. Phylogenetic incongruities can be seen everywhere in the universal tree, from its root to the major branchings within and among the various [groups] to the makeup of the primary groupings themselves.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p50.]

- «Clarification of the phylogenetic relationships of the major animal phyla has been an elusive problem,» wrote biologist Michael Lynch in 1999, «with analyses based on different genes and even different analyses based on the same genes yielding a diversity of phylogenetic trees.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p51.]
- According to the same 1998 National Academy of Sciences booklet mentioned in the previous chapters: «Scientists most often use the word 'fact' to describe an observation. But scientists can also use fact to mean something that has been tested or observed so many times that there is no longer a compelling reason to keep testing or looking for examples. The occurrence of evolution in this sense is a fact. Scientists no longer question whether descent with modification occurred because the evidence supporting the idea is so strong.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p54.]
- Whittington wrote in 1985: «I look skeptically upon diagrams that show the branching diversity of animal life through time, and come down at the base to a single kind of animal.... Animals may have originated more than once, in different places and at different times.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p56, 57.]
- Biologist Malcolm Gordon, who does know about it, wrote in 1999 that «life appears to have had many origins. The base of the universal tree of life appears not to have been a single root.» Gordon concluded: «The traditional version of the theory of common descent apparently does not apply to kingdoms... [or] phyla, and possibly also not to many classes within the phyla.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000,

p57.]

- In 1999, a Chinese paleontologist who is an acknowledged expert on Cambrian fossils visited the United States to lecture on several university campuses. I attended one lecture in which he pointed out that the «top-down» pattern of the Cambrian explosion contradicts Darwin's theory of evolution. Afterwards, scientists in the audience asked him many questions about specific fossils, but they completely avoided the topic of Darwinian evolution. When our Chinese visitor later asked me why, I told him that perhaps they were just being polite to their visitor, because criticizing Darwinism is unpopular with American scientists. At that he laughed, and said: «In China we can criticize Darwin, but not the government; in America, you can criticize the government, but not Darwin.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p57, 58.]

4 Homology in Vertebrate Limbs

- One kind of similarity is functional: Butterflies have wings for flying, and so do bats, but the two animals are constructed very differently. Another kind of similarity is structural: The pattern of bones in a bat's wing is similar to that in a porpoise's flipper, though the wing is used for flying and the flipper is used for swimming. In the 1840s British anatomist Richard Owen called the first kind of similarity «analogy,» and the second kind «homology.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p59.]
- In *The Origin of Species* Darwin argued that the best explanation for homology is descent with modification. «If we suppose that an early progenitor—the archetype as it may be called—of all mammals, birds and reptiles, had its limbs constructed on the existing pattern,» then «the similar framework of bones in the hand of a man, wing of a bat, fin of the porpoise, and leg of the horse... at once explain themselves on the theory of descent with slow and slight modifications.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p61.]
- But for twentieth-century neo-Darwinists, common ancestry is the definition of homology as well as its explanation. According to Ernst Mayr, one of the

principal architects of neo-Darwinism: «After 1859 there has been only one definition of homologous that makes biological sense.... Attributes of two organisms are homologous when they are derived from an equivalent characteristic of the common ancestor.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p62.]

- Philosopher Ronald Brady wrote in 1985: «By making our explanation into the definition of the condition to be explained, we express not scientific hypothesis but belief. We are so convinced that our explanation is true that we no longer see any need to distinguish it from the situation we were trying to explain. Dogmatic endeavors of this kind must eventually leave the realm of science.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p65.]
- «Common ancestry is all there is to homology,» wrote evolutionary biologist David Wake in 1999; thus «homology is the anticipated and expected consequence of evolution. Homology is not evidence of evolution.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p65, 66.]
- A second way is to retain the pre-Darwinian definition of homology as structural similarity, but acknowledge that this reopens the question of whether descent with modification is the best explanation for it. Recent advocates of this position are hard to find, because among biologists in the United States it is extremely unpopular (and professionally risky) to question whether Darwinian evolution is the best explanation. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p66.]
- The third (and currently most popular) way to deal with the problem is to define homology in terms of common ancestry and then seek evidence for descent with modification that is independent of homology. Such evidence may come from pattern (DNA sequence comparisons or the fossil record) or process (developmental pathways and developmental genetics). [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p66.]

- As molecular biologist David Hillis wrote in 1994, «the word homology is now used in molecular biology to describe everything from simple similarity (whatever its cause) to common ancestry (no matter how dissimilar the structures).» Thus «molecular biologists may have done more to confound the meaning of the term homology than have any other group of scientists.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p67.]
- According to Hillis: «Some proponents of molecular techniques have claimed that molecular biology 'solves the problem of homology'... [but] the difficulties of assigning homology to molecules parallel many of the difficulties of assigning homology to morphological structures.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p67.]
- As Sokal and Sneath pointed out in 1963: «Even when fossil evidence is available, this evidence itself must first be interpreted» by comparing similar features. Any attempt to infer evolutionary relationships among fossils based on homology-as-common-ancestry «soon leads to a tangle of circular arguments from which there is no escape.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p68.]
- As biologist Bruce Young wrote in 1993: «If anything, fossils are of less value in establishing homologues since they normally include far fewer characters» than living organisms. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p68.]
- Berra compared the fossil record to a series of automobile models: «If you compare a 1953 and a 1954 Corvette, side by side, then a 1954 and a 1955 model, and so on, the descent with modification is overwhelmingly obvious. This is what [paleontologists] do with fossils, and the evidence is so solid and comprehensive that it cannot be denied by reasonable people.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p68.]
- Law professor (and critic of Darwinism) Phillip E. Johnson dubbed this «Berra's Blunder.» Berra's Blunder demonstrates that a mere succession of

similar forms does not furnish its own explanation. Something more is needed—a mechanism. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p69.]

- For Darwin, the mechanism is descent with modification. But «descent» and «modification» are merely words, unless they can be tied to actual biological processes. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p69.]
- Darwin realized this. He wrote in *The Origin of Species* that a naturalist reflecting on the geological evidence «might come to the conclusion that species had not been independently created, but had descended, like varieties, from other species. Nevertheless, such a conclusion, even if well founded, would be unsatisfactory, until it could be shown how the innumerable species inhabiting this world have been modified.» Darwin concluded: «It is, therefore, of the highest importance to gain a clear insight into the means of modification.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p69.]
- «It is a familiar fact,» said American embryologist Edmund Wilson in 1894, «that parts which closely agree in the adult, and are undoubtedly homologous, often differ widely in larval or embryonic origin either in mode of formation or in position, or in both.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p71.]
- British biologist Gavin de Beer agreed: «The fact is that correspondence between homologous structures cannot be pressed back to similarity of position of the cells in the embryo, or of the parts of the egg out of which the structures are ultimately composed, or of developmental mechanisms by which they are formed.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p71.]
- Evolutionary developmental biologist Rudolf Raff, who studies two species of sea urchin that develop by radically different pathways into almost

identical adult forms, restated the problem in 1999: «Homologous features in two related organisms should arise by similar developmental processes... [but] features that we regard as homologous from morphological and phylogenetic criteria can arise in different ways in development.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p72.]

- Skeletal patterns in vertebrate limbs initially form as cartilage, which later turn into bone. If the development of vertebrate limbs reflected their origin in a common ancestor, one might expect to see a common ancestral cartilage pattern early in vertebrate limb development. But this is not the case. Cartilage patterns correspond to the form of the adult limb from the beginning, not only in salamanders, but also in frogs, chicks and mice. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p72.]
- According to British zoologist Richard Hinchliffe and P. J. Griffiths, the idea that vertebrate limbs develop from a common ancestral pattern in the embryo «has arisen because investigators have superimposed their preconceptions» on the evidence. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p72, 73.]
- In 1971 Gavin de Beer wrote: «Because homology implies community of descent from... a common ancestor it might be thought that genetics would provide the key to the problem of homology. This is where the worst shock of all is encountered... [because] characters controlled by identical genes are not necessarily homologous... [and] homologous structures need not be controlled by identical genes.» De Beer concluded that «the inheritance of homologous structures from a common ancestor... cannot be ascribed to identity of genes.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p73.]
- In 1999 Gregory Wray found «surprising» the association between Distal-less and «what are superficially similar, but non-homologous structures.» He concluded: «This association between a regulatory gene and several non-homologous structures seems to be the rule rather than the exception.»

[Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p76.]

- Clifford Tabin, Sean Carroll, and Grace Panganiban, who described these networks in 1999, noted that «there has been no continuity of any structure from which the insect and vertebrate appendages could be derived, i.e., they are not homologous structures. However, there is abundant evidence for continuity in the genetic information» involved in their development. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p76.]
- In 1971 Gavin de Beer wrote: «What mechanism can it be that results in the production of homologous organs, the same 'patterns', in spite of their not being controlled by the same genes? I asked this question in 1938, and it has not been answered.» Today, more than sixty years after it was first asked, de Beer's question still has not been answered. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p76, 77.]
- According to Henry Gee, Chief Science Writer for the prestigious journal, Nature, «nobody should be afraid to ask a silly question.» In science, Gee writes, «statements from authorities in a field should be as subject to scrutiny as those emanating from the most humble sources, even a beginning student.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p78.]
- Student: So regardless of similarity, features are not homologous unless they are inherited from a common ancestor? Teacher: Yes, now you're catching on. Student (looking puzzled): Well, actually, I'm still confused. You say homologous features provide some of our best evidence for common ancestry. But before we can tell whether features are homologous, we have to know whether they came from a common ancestor. Teacher: That's right. Student (scratching head): I must be missing something. It sounds as though you're saying that we know features are derived from a common ancestor because they're derived from a common ancestor. Isn't that circular reasoning? [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing

5 Haeckel's Embryos

- «It seems to me,» Darwin wrote in *The Origin of Species*, «the leading facts in embryology, which are second to none in importance, are explained on the principle of variations in the many descendants from some one ancient progenitor.» And those leading facts, according to him, were that «the embryos of the most distinct species belonging to the same class are closely similar, but become, when fully developed, widely dissimilar.» Reasoning that «community in embryonic structure reveals community of descent,» Darwin concluded that early embryos «show us, more or less completely, the condition of the progenitor of the whole group in its adult state.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p81.]
- Darwin wrote in *The Origin of Species* that Professor Haeckel «brought his great knowledge and abilities to bear on what he calls phylogeny, or the lines of descent of all organic beings. In drawing up the several series he trusts chiefly to embryological characters.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p82.]
- It was this pattern of early similarity and later difference that Darwin found so convincing in *The Origin of Species*. Thus «it is probable, from what we know of the embryos of mammals, birds, fishes and reptiles, that these animals are the modified descendants of some ancient progenitor.» In *The Descent of Man*, Darwin extended the inference to humans: «The [human] embryo itself at a very early period can hardly be distinguished from that of other members of the vertebrate kingdom.» Since humans and other vertebrates «pass through the I same early stages of development,... we ought frankly to admit their community of descent.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p82.]
- Darwin wrote: «Generally the embryos of the most distinct species belonging to the same class are closely similar, but become, when fully developed, widely dissimilar. A better proof of this latter fact cannot be given than the statement by von Baer that 'the embryos of mammals, birds, lizards and

snakes, and probably [turtles] are in their earliest states exceedingly like one another.... In my possession are two little embryos in spirit, whose names I have omitted to attach, and at present I am quite unable to say to what class they belong. They may be lizards or small birds, or very young mammals, so complete is the similarity in the mode of formation of the head and trunk in these animals.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p85, 86.]

- Darwin claimed that «it is probable, from what we know of the embryos of mammals, birds, fishes and reptiles, that these animals are the modified descendants of some ancient progenitor,» and that «with many animals the embryonic or larval stages show us, more or less completely, the condition of the progenitor of the whole group in its adult state.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p86.]
- British embryologist Michael Richardson noted in 1995 that the top row of embryos in Haeckel's drawings is «not consistent with other data on the development of these species.» Richardson concluded: «These famous images are inaccurate and give a misleading view of embryonic development.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p91.]
- Writing in the March 2000, issue of *Natural History*, Stephen Jay Gould noted that Haeckel «exaggerated the similarities by idealizations and omissions,» and concluded that his drawings are characterized by «inaccuracies and outright falsification.» Richardson, interviewed by *Science* after he and his colleagues published their now-famous comparisons between Haeckel's drawings and actual embryos, put it bluntly: «It looks like it's turning out to be one of the most famous fakes in biology.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p93, 94.]
- As we have seen, Haeckel's drawings are misleading in three ways: (1) they include only those classes and orders that come closest to fitting Haeckel's theory; (2) they distort the embryos they purport to show; and (3) most

seriously, they entirely omit earlier stages in which vertebrate embryos look very different. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p102.]

6 Archaeopteryx: The Missing Link

- When Charles Darwin published *The Origin of Species* in 1859, he acknowledged that the fossil record was a serious problem for his theory. «By the theory of natural selection,» he wrote, «all living species have been connected with the parent-species of each genus, by differences not greater than we see between the natural and domestic varieties of the same species at the present day.» As a consequence, «the number of intermediate and transitional links, between all living and extinct species, must have been inconceivably great.» Yet in 1859 those transitional links had not been found. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p111.]
- Darwin attributed their absence to «the imperfection of the geological record.» He argued that most organisms were never preserved, or if preserved were subsequently destroyed, so that «we have no right to expect to find, in our geological formations, an infinite number of those transitional forms which, on our theory, have connected all the past and present species of the same group into one long and branching chain of life. We ought only to look for a few links.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p111.]
- In the words of ornithologist Alan Feduccia, the Berlin Archaeopteryx «may well be the most important natural history specimen in existence...Beyond doubt, it is the most widely known and illustrated fossil animal.» And to paleontologist Pat Shipman it is «more than the world's most beautiful fossil.... [it is] an icon—a holy relic of the past that has become a powerful symbol of the evolutionary process itself. It is the First Bird.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p112-114.]
- In 1985 University of Kansas paleontologist Larry Martin wrote: «Archaeopteryx is not ancestral of any group of modern birds.» Instead, it is

«the earliest known member of a totally extinct group of birds.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p116.]

- And in 1996 paleontologist Mark Norell, of the American Museum of Natural History in New York, called Archaeopteryx «a very important fossil,» but added that most paleontologists now believe it is not a direct ancestor of modern birds. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p116.]
- The controversy involves two different sets of issues: How did flight originate? And how do we go about determining fossil ancestors? [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p116.]
- The evolution of birds from non-flying predecessors would not have been a simple matter, because flight requires extensive modifications to an animals anatomy and physiology. There are currently two theories of how flight might have originated: the «trees down» theory, and the «ground up» theory. According to the first, the ancestors of birds began their evolutionary journey by leaping from trees, gradually accumulating small adaptations that extended their ability to parachute and glide. According to the second, small animals running after prey on the ground gradually accumulated small adaptations that facilitated their ability to reach and jump. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p116.]
- «Once upon a time, Archaeopteryx stood alone as the earliest fossil bird. Its uniqueness made it an icon, conferring on it the status of an ancestor,» wrote Gee in 1999. But the existence of other bird ancestors (even if their fossils are more recent) «shows that Archaeopteryx is just another dinosaur with feathers.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p123.]
- In 1912 amateur geologist Charles Dawson and the British Museum announced the discovery near Piltdown, England, of a missing link between apes and humans. The specimen lay in the British Museum until it was

exposed as a fake in 1953. Someone had combined an ancient human skull with the lower jaw of a modern orangutan, modified to look like part of the same individual. «Piltdown man» (to whom we shall return in Chapter 11) remains the most famous fossil fraud in the history of science. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p123, 124.]

- In 1999 amateur dinosaur enthusiast Stephen Czerkas and the National Geographic Society announced that a fossil purchased for \$80,000 at an Arizona mineral show was «the missing link between terrestrial dinosaurs and birds that could actually fly.» The fossil, which was apparently smuggled out of China, had the forelimbs of a primitive bird and the tail of a dinosaur. Czerkas named it Archaeoraptor. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p124.]
- It turns out that Archaeoraptor had exactly the features scientists were expecting to find because a clever forger had fabricated it that way, knowing it would bring big bucks in the international fossil market. The fabrication was discovered by Chinese paleontologist Xu Xing, who proved that the specimen consisted of a dinosaur tail glued to the body of a primitive bird. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p124.]
- There were several outspoken critics of the dino-bird theory at the Florida symposium. One was University of North Carolina ornithologist Alan Feduccia, who has predicted that the dino-bird theory will turn out to be «the greatest embarrassment of paleontology of the 20th century.» Another was Larry Martin, who has said that if he had to defend the dino-bird theory, «I'd be embarrassed every time I had to get up and talk about it.» And Storrs Olson ruffled some dino-feathers by passing out buttons that proclaimed «Birds are NOT dinosaurs.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p130.]
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- Even more revealing, however, was that the DNA Garstka and his colleagues found was 100 percent identical to the DNA of living turkeys. Not 99 percent,

not 99.9 percent, but 100 percent. Not even DNA obtained from other birds is 100 percent identical to turkey DNA (the next closest match in their study was 94.5 percent, with another species of bird). In other words, the DNA that had supposedly been extracted from the Triceratops bone was not just similar to turkey DNA—it was turkey DNA. Garstka said he and his colleagues considered the possibility that someone had been eating a turkey sandwich nearby, but they were unable to confirm that. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p131.]

- The moral of the story is: If you're going to fake something, don't make it so obvious. The DNA from Triceratops might not have been so funny if it hadn't been 100 percent identical to turkey DNA. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p131.]

7 Peppered Moths

- Darwin was convinced that in the course of evolution «Natural Selection has been the most important, but not the exclusive, means of modification,» but he had no direct evidence of natural selection. There was plenty of evidence that plants and animals vary, and that they struggle for survival. It was reasonable to conclude, by analogy with domestic breeding, that organisms with the most advantageous variations would survive and pass them on to their offspring. But no one had actually documented this process in the wild. The best Darwin could do in *The Origin of Species* was «give one or two imaginary illustrations.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p137.]
- Kettlewell called industrial melanism in peppered moths «the most striking evolutionary change ever actually witnessed in any organism.» Since his experiments seemed to provide empirical confirmation of natural selection, Kettlewell dubbed his results «Darwin's missing evidence» in an article written for *Scientific American*. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p143.]
- In 1975 British geneticist P. M. Sheppard called the phenomenon «the most

spectacular evolutionary change ever witnessed and recorded by man, with the possible exception of some examples of pesticide resistance,» and famed evolutionary biologist Sewall Wright called it «the clearest case in which a conspicuous evolutionary process has actually been observed.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p143.]

- In the early 1980s Cyril Clarke and his colleagues found «a reasonable correlation» in the U.K. between the decline in melanism and decrease in sulfur dioxide pollution, but were surprised to note «that throughout this time the appearance of the trees in Wirral does not seem to have changed appreciably» American biologist Bruce Grant and Cambridge biologist Rory Howlett noted in 1988 that if the rise of industrial melanism had originally been due to the demise of lichens on trees, then «the prediction is that lichens should precede the recovery of the typical morph as the common form. That is, the hiding places should recover before the hider.» But their field work showed that «this is clearly not the case in at least two regions where the recovery of typicals has been especially well documented in the virtual absence of these lichens: on the Wirral... and in East Anglia.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p147.]
- For example, Jim Bishop and Laurence Cook conducted predation experiments using dead moths glued to trees; but they noted discrepancies in their results which «may indicate that we are not correctly assessing the true nature of the resting sites of living moths when we are conducting experiments with dead ones.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p149.]
- In a 1998 book on industrial melanism, Michael Majerus defended the classical story but criticized the «artificiality» of much of the work on peppered moths, noting that in most predation experiments they were «positioned on vertical tree trunks, despite the fact that they rarely chose such surfaces to rest upon in the wild.» But if peppered moths don't rest on tree trunks, where did all those photographs come from? [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About*

Evolution Is Wrong, Regnery Publishing 2000, p150.]

- Pictures of peppered moths on tree trunks must be staged. Some are made using dead specimens that are glued or pinned to the trunk, while others use live specimens that are manually placed in desired positions. Since peppered moths are quite torpid in daylight, they remain where they are put. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p150.]
- University of Massachusetts biologist Theodore Sargent told a Washington Times reporter in 1999 that he once glued some dead specimens on a tree trunk for a TV documentary about peppered moths. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p150.]
- When birds preyed on Kettlewell's moths, the moths were not in their natural hiding places. This one fact casts serious doubt on the validity of his experiments. In the mid-1980s, Italian biologists Giuseppe Sermonti and Paola Catastini criticized Kettlewell's daytime releases and concluded that his experiments «do not prove in any acceptable way, according to the current scientific standard, the process he maintains to have experimentally demonstrated.» Sermonti and Catastini concluded that «the evidence Darwin lacked, Kettlewell lacked as well.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p151.]
- In 1998 University of Chicago evolutionary biologist Jerry Coyne wrote a review in Nature of Michael Majerus's book, *Melanism: Evolution in Action*. As we have seen, Majerus defended the classical story, but he also acknowledged the problems with it. And the problems were enough to convince Coyne that the story is in serious trouble. «From time to time,» Coyne wrote, «evolutionists re-examine a classic experimental study and find, to their horror, that it is flawed or downright wrong.» According to Coyne, the fact that peppered moths do not rest on tree trunks «alone invalidates Kettlewell's release-and-recapture experiments, as moths were released by placing them directly onto tree trunks.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p153.]

- Coyne was understandably «embarrassed» when he finally learned that the peppered moth story he had been teaching for years was a myth. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p157.]

8 Darwin's Finches

- Yet the Galapagos finches had almost nothing to do with the formulation of Darwin's theory. They are not discussed in his diary of the Beagle voyage except for one passing reference, and they are never mentioned in *The Origin of Species*. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p160.]
- Thus, according to historian of science Frank Sulloway, Darwin «possessed only a limited and largely erroneous conception of both the feeding habits and the geographical distribution of these birds.» And as for the claim that the Galapagos finches impressed Darwin as evidence of evolution, Sulloway wrote, «nothing could be further from the truth.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p161.]
- In fact, Darwin did not become an evolutionist until many months after his return to England. Only years later did he look back at the finches and reinterpret them in the light of his new theory. In 1845 he wrote in the second edition of his *Journal of Researches*: «The most curious fact is the perfect gradation in the size of the beaks of the different species of [finches]. Seeing this gradation and diversity of structure in one small, intimately related group of birds, one might really fancy that from an original paucity of birds in this archipelago, one species had been taken and modified for different ends.» But this was a speculative afterthought, not an inference from evidence he collected. Indeed, the confusion surrounding the geographical labeling of Darwin's specimens made it impossible for him to use them as evidence for his theory. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p162.]
- Although they were first called «Darwin's finches» by Percy Lowe in 1936, it

was ornithologist David Lack who popularized the name a decade later. Lack's 1947 book, *Darwin's Finches* summarized the evidence correlating variations in finch beaks with different food sources, and argued that the beaks were adaptations caused by natural selection. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p162.]

- One sort of direct evidence could be genetic. But apart from knowing that finch beaks are highly heritable—that the beak of finch is very likely to resemble the beaks of its biological parents—we know nothing about the genetics of finch beaks. Chromosome studies show no differences among the Galapagos finches and the DNA studies that have been used to construct molecular phylogenies relied on genes unrelated to beak shape. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p164.]
- «Selection had flipped,» wrote Weiner. «The birds took a giant step backward, after their giant step forward.» As Peter Grant wrote in 1991, «the population, subjected to natural selection, is oscillating back and forth» with every shift in climate. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p169.]
- Of course, the fluctuating climate of the Galapagos means that neither process is likely to continue indefinitely, and the Grants concluded that «over the long term there should be a selection-hybridization balance.» According to Weiner it seems that a «vast, invisible pendulum [is] swinging back and forth in Darwin's islands, an oscillation with two phases,» in which the finches «are perpetually being forced slightly apart and drifting back together again.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p171.]
- Does the National Academy of Sciences endorse «arguments of this kind» that exaggerate the evidence? A 1999 booklet published by the National Academy describes Darwin's finches as «a particularly compelling example» of the origin of species, booklet goes on to explain how the Grants and their colleagues showed «that a single year of drought on the islands can drive evolutionary changes in the finches,» and that «if droughts occur about once

every 10 years on the islands, a new species of finch might arise in only about 200 years.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p174.]

- Like a stock promoter who claims a stock might double in value in twenty years because it increased 5 percent in 1998, but doesn't mention that it decreased 5 percent in 1999, the booklet misleads the public by concealing a crucial part of the evidence. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p175.]
- As Berkeley law professor and Darwin critic Phillip E. Johnson wrote in The Wall Street Journal in 1999: «When our leading scientists have to resort to the sort of distortion that would land a stock promoter in jail, you know they are in trouble.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p175.]

9 Four-Winged Fruit Flies

- In Darwin's theory, evolution is a product of two factors: natural selection and heritable variation. Natural selection molds populations by preserving favorable variations that are passed on to succeeding generations. Small-scale evolution within a species (such as we see in domestic breeding) makes use of variations already present in a population, but large-scale evolution (such as Darwin envisioned) is impossible unless new variations arise from time to time. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p177.]
- According to modern neo-Darwinism, genes consisting of DNA are the carriers of hereditary information; information encoded in DNA sequences directs the development of the organism; and new variations originate as mutations, or accidental changes in the DNA. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p177.]
- Some DNA mutations have no effect, and most others are harmful.

Occasionally, however, a mutation comes along that is beneficial—it confers some advantage on an organism, which can then leave more offspring. According to neo-Darwinism, beneficial DNA mutations—though not needed for limited modifications within a species—provide the raw materials necessary for large-scale evolution. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p178.]

- Beneficial mutations are rare, but they do occur. For example, mutations can have biochemical effects that render bacteria resistant to antibiotics or insects resistant to insecticides. But biochemical mutations cannot explain the large-scale changes in organisms that we see in the history of life. Unless a mutation affects morphology—the shape of an organism—it cannot provide raw materials for morphological evolution. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p178.]
- According to Peter Raven and George Johnson's 1999 textbook, *Biology*, «all evolution begins with alterations in the genetic message... Genetic change through mutation and recombination [the re-arrangement of existing genes] provides the raw materials for evolution.» The same page features a photo of a four-winged fruit fly, which is described as «a mutant because of changes in Ultrabithorax, a gene regulating a critical stage of development; it possesses two thoracic segments and thus two sets of wings.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p185.]
- Ernst Mayr wrote in 1963 that major mutations such as bithorax "are such evident freaks that these monsters can be designated only as 'hopeless.' They are so utterly unbalanced that they would not have the slightest chance of escaping elimination" through natural selection. In addition, finding a suitable mate for the "hopeless monster" seemed to Mayr to be an insurmountable difficulty. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p186.]
- In support of the view that two-winged flies evolved from four-winged flies, a 1998 booklet published by the National Academy of Sciences points out

that «geneticists have found that the number of wings in flies can be changed through mutations in a single gene.» Although this statement is technically true, it is quite misleading—and not just because three separate mutations are necessary and the extra wings are nonfunctional. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p187.]

- So the four-winged fruit fly is a useful window on the genetics of development, but it provides no evidence that mutations supply the raw materials for morphological evolution. It does not even show us evolution in reverse. As evidence for evolution, the four-winged fruit fly is no better than a two-headed calf in a circus sideshow. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p188.]
- For example, the 1998 edition of Cede Starr and Ralph Taggart's *Biology: The Unity and Diversity of Life* tells students that «every so often, a new mutation bestows an advantage on the individual... beneficial mutations, and neutral ones, have been accumulating in different lineages for billions of years. Through all that time, they have been the raw material for evolutionary change—the basis for the staggering range of biological diversity, past and present.» [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p189.]
- Burton Guttman's 1999 textbook, *Biology*, declares that «mutation is ultimately the source of all genetic variation and therefore the foundation for evolution.» (emphasis in original) [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p189.]
- For a neo-Darwinist, genomic equivalence is a paradox: If genes control development, and the genes in every cell are the same, why are the cells so different? According to the standard explanation, cells differ because the genes are differentially turned on or off. Cells in one part of the embryo turn on some genes, while cells in another part turn on others. This certainly happens, as we saw in the case of *Ultrabithorax*. But it doesn't resolve the paradox, because it means that genes are being turned on or off by factors

outside themselves. In other words, control rests with something beyond the genes—something "epigenetic." This does not imply that mystical forces are at work, but only that genes are being regulated by cellular factors outside the DNA. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p191.]

- In fact, the paradox recently deepened with the discovery that developmental genes such as Ultrabithorax are similar in many different animals—including flies and humans. If our developmental genes are similar to those of other animals, why don't we give birth to fruit flies instead of human beings? [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p192.]
- It seems that scientists in Germany, like scientists in communist China, have more freedom to criticize Darwinism than scientists in America. Yet we are constantly told that scientists welcome critical thinking, and that America treasures freedom of speech. Except, apparently, when it comes to Darwinian evolution. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p193.]

10 Fossil Horses and Directed Evolution

- But the doctrine of undirected evolution is philosophical, not empirical. It preceded all evidence for Darwin's theory, and it goes far beyond the evidence we now have. Like several other Darwinian claims we've seen, it is a concept masquerading as a neutral description of nature. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p197.]
- Most evolutionists who were Darwin's contemporaries believed that evolution was directed. Some regarded human beings as the divinely pre-ordained goal of the evolutionary process, while others saw evolutionary trends as directed by forces inherent in organisms themselves. Those forces might be vital principles, or simply built-in constraints that channeled evolution in particular directions. The view that evolution was directed by internal forces or constraints became known as "orthogenesis (from the Greek words for "straight" and "origin"). [Jonathan Wells: *Icons of Evolution, Science or*

Myth? Why Much of What We Teach About Evolution Is Wrong, Regnery Publishing 2000, p197.]

- In 1949 American paleontologist George Gaylord Simpson (one of the architects of neo-Darwinism) wrote: "Adaptation has a known mechanism: natural selection acting on the genetics of populations...It is not quite completely understood as yet, but its reality is established and its adequacy is highly probable." Thus "we have a choice between a concrete factor with a known mechanism and the vagueness of inherent tendencies, vital urges, or cosmic goals, without known mechanism." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p198.]
- In Charles Darwin's view, the process of evolution by natural selection excluded designed results. He wrote: "There seems to be no more design in the variability of organic beings, and in the action of natural selection, than in the course which the wind blows." Darwin did not exclude design entirely, since the laws of nature—including the law of natural selection—might have been supernaturally designed. But he believed that survival of the fittest, acting on random variations, was inherently undirected, and thus could not produce designed results. He wrote that he was "inclined to look at everything as resulting from designed laws, with the details, whether good or bad, left to the working out of chance." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p202.]
- According to historian of science Neal Gillespie, Darwin excluded directed evolution and designed results because he wanted to place science on a foundation of materialistic philosophy. Since Darwin's view was primarily a philosophical doctrine rather than an empirical inference, its success depended less on marshalling evidence than on winning a war of ideas. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p202, 203.]
- As Simpson put it, he favored the view that evolution "is dependent only on the physical possibilities of the situation and on the interplay of organism and environment, the usual materialist hypothesis." And he didn't limit himself to horses. Although the evidence for human evolution was (and still is) much

scantier than that for horses, Simpson extrapolated his materialistic conclusion to our own species. "Man," he declared, "is the result of a purposeless and natural process that did not have him in mind." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p203.]

- As we have seen, the doctrine that evolution was undirected, and consequently that human existence is a mere accident, is rooted in materialistic philosophy rather than empirical science. The doctrine existed long before the meager evidence now cited to justify it. Since the doctrine is very influential in our culture, it is a good idea to teach students about it—but as philosophy, not science. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p206.]
- Yet Miller and Levine's high school textbook, *Biology*, teaches students that as they learn about "the nature of life" they must "keep this concept in mind: Evolution is random and undirected." (emphasis in the original) [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p206.]
- College students using *Life: The Science of Biology*, by Purves, Orians, Heller and Sadava, read that the Darwinian world view "means accepting not only the processes of evolution, but also the view that... evolutionary change is not directed toward a final goal or state." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p206.]
- Campbell, Reece and Mitchell's *Biology* treats students to an interview with Richard Dawkins, who tells them: "Natural selection is a bewilderingly simple idea. And yet what it explains is the whole of life, the diversity of life, the complexity of life, the apparent design of life," including human beings, "who are fundamentally not exceptional because we came from the same evolutionary source as every other species. It is natural selection of selfish genes that has given us our bodies and our brains." But our existence was not planned, because natural selection is the blind watchmaker, "totally blind to the future." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing

2000, p206, 207.]

- Douglas Futuyma's textbook, *Evolutionary Biology*. According to Futuyma, Darwin's "theory of random, purposeless variations acted on by blind, purposeless natural selection provided a revolutionary new answer to almost all questions that begin with 'Why?'" The "profound, and deeply unsettling, implication of this purely mechanical, material explanation for the existence and characteristics of diverse organisms is that we need not invoke, nor can we find any evidence for, any design, goal, or purpose anywhere in the natural world, except in human behavior." (emphasis in original) Futuyma goes on to explain that "it was Darwin's theory of evolution, followed by Marx's materialistic (even if inadequate or wrong) theory of history and society and Freud's attribution of human behavior to influences over which we have little control, that provided a crucial plank to the platform of mechanism and materialism" that has since been "the stage of most Western thought." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p207.]

11 From Ape to Human: The Ultimate Icon

- The most controversial aspect of Darwin's theory has always been its implications for human origins. Perhaps for this reason, Darwin did not even mention human evolution in *The Origin of Species*, except as a brief afterthought: "Much light will be thrown on the origin of man and his history." Twelve years went by before he wrote about this issue in any detail—in the first half of *The Descent of Man and Selection in Relation to Sex*. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p209.]
- Darwin's view had two implications which were (and continue to be) especially controversial: humans are nothing but animals, and they are not the preordained goal of a directed process. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p209.]
- "My object," Darwin explained, "is to show that there is no fundamental difference between man and the higher animals in their mental faculties." He

argued that all have "similar passions, affections, and emotions, even the more complex ones, such as jealousy, suspicion, emulation, gratitude, and magnanimity... they possess the same faculties of imitation, attention, deliberation, choice, memory, imagination, the association of ideas, and reason, though in very different degrees." Thus "the difference in mind between man and the higher animals, great as it is, certainly is one of degree and not of kind." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p212.]

- For Darwin, the continuity between animals and human extended even to morality and religion. It seemed to him "any animal whatever, endowed with well-marked social instincts, the parental and filial affections being here included, would inevitably acquire a moral sense or conscience, as soon as its intellectual powers had become as well, or nearly as well developed, as in man." And the "tendency in savages to imagine that natural objects and agencies are animated by spiritual and living essences," which Darwin compared to a dog's tendency to imagine hidden agency in things moved by the wind, "would easily pass into the belief in the existence of one or more gods." Thus the "feeling of religious devotion" is merely a higher form of "the deep love of a dog for his master." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p212, 213.]
- There are at least three questions here. First, do human beings have some features in common with other animals? Second, did human beings acquire these features through descent with modification from animal ancestors? And third, are humans just animals? Darwin explicitly answered "yes" to the first two questions; and by maintaining that human morality and religion differ only in degree rather than kind from animal instincts, he implicitly answered "yes" to the third. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p213.]
- Then, having already lost much of its iconic status, Piltdown was exposed as a fraud. In 1953 Joseph Weiner, Kenneth Oakley, and Wilfrid Le Gros Clark proved that the Piltdown skull, though perhaps thousands years old, belonged

to a modern human, while the jaw fragment more recent, and belonged to a modern orangutan. The jaw had been chemically treated to make it look like a fossil and its teeth had been deliberately filed down to make them look human. Weiner and his colleagues concluded that Piltdown man was a forgery. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p217, 218.]

- Most modern biology textbooks do not even mention Piltdown. When critics of Darwinism bring it up, they are usually told that the incident merely proves that science is self-correcting. And so it was, in this case—though the self-correcting took over forty years. But the more interesting lesson to be learned from Piltdown is that scientists, like everyone else, can be fooled into seeing what they want to see. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p218.]
- As paleoanthropologist Roger Lewin wrote recently: "Given all the many anatomical incongruities in the Piltdown remains, which of course are glaringly obvious from the vantage of the present, it is truly astonishing that the forgery was so eagerly embraced." Thus "the real interest of Piltdown" is "how those who believed in the fossil saw in it what they wanted to see." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p218.]
- And according to historian of biology Jane Maienschein, Piltdown shows us "how easily susceptible researchers can be manipulated into believing that they have actually found just what it was they had been looking for." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p218.]
- But even genuine fossils that bear on human origins have typically been so controversial that in 1970 British anthropologist John Napier called them "bones of contention." And each new discovery seems to add to the problem rather than alleviate it. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p218.]
- In 1982 American paleontologists Niles Eldredge and Ian Tattersall noted that

it is a "myth that the evolutionary histories of living things are essentially a matter of discovery." If this were really true, they wrote, "one could confidently expect that as more hominid fossils were found the story of human evolution would become clearer. Whereas if anything, the opposite has occurred." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p218, 219.]

- According to Lewin, Walker said: "You could hold the [upper jaw] forward, and give it a long face, or you could tuck it in, making the face short.... How you held it really depended on your preconceptions. It was very interesting watching what people did with it." Lewin reports that Leakey recalled the incident, too: "Yes. If you held it one way, it looked like one thing; if you held it another, it looked like something else." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p219.]
- Another reason why fossils have not solved the problem of human origins is the difficulty or impossibility of determining ancestor-descendant relationships from the fossil record. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p220.]
- In 1981 Constance Holden wrote in *Science*: "The primary scientific evidence is a pitifully small array of bones from which to construct man's evolutionary history. One anthropologist has compared the task to that of reconstructing the plot of *War and Peace* with 13 randomly selected pages." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p220.]
- Henry Gee, Chief Science Writer for *Nature*, is even more pessimistic. "No fossil is buried with its birth certificate," he wrote in 1999, and "the intervals of time that separate fossils are so huge that we cannot say anything definite about their possible connection through ancestry and descent." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p220.]
- Gee regards each fossil as "an isolated point, with no knowable connection to any other given fossil, and all float around in an overwhelming sea of gaps."

He points out, for example, that all the evidence for human evolution "between about 10 and 5 million years ago—several thousand generations of living creatures—can be fitted into a small box." Thus the conventional picture of human evolution as lines of ancestry and descent is "a completely human invention created after the fact, shaped to accord with human prejudices." Putting it even more bluntly, Gee concludes: "To take a line of fossils and claim that they represent a lineage is not a scientific hypothesis that can be tested, but an assertion that carries the same validity as a bedtime story—amusing, perhaps even instructive, but not scientific." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p221.]

- Durant later wrote that "it is surely worth asking whether ideas about human evolution might serve essentially similar functions in both pre-scientific and scientific cultures.... Time and again, ideas of human origins turn out on closer examination to tell us as much about the present as the past, and as much about our own experiences as about those of our remote ancestors." Durant concluded: "As things stand at the present time, we are in urgent need of the de-mythologisation of science." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p221, 222.]
- In 1996 American Museum of Natural History Curator Ian Tattersall acknowledged that "in paleoanthropology, the patterns we perceive are as likely to result from our unconscious mindsets as from the evidence itself." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p223.]
- Arizona State University anthropologist Geoffrey Clark echoed this view in 1997 when he wrote that "we select among alternative sets of research conclusions in accordance with our biases and preconceptions—a process that is, at once, both political and subjective." Clark suggested "that paleoanthropology has the form but not the substance of a science." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p223.]
- Currently in the news is the never-ending controversy over Neanderthals. Were they our ancestors? Were they a separate species, now extinct? Or were

they a race of humans, eventually absorbed into our modern global family? Almost every month, a proponent of one view or another takes to the print media or the airwaves, declaring the matter settled. Wait a few months, however, and someone will probably say the opposite with equal confidence. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p224.]

- In 1995 science writer James Shreeve reported that he had "talked to one hundred and fifty scientists—archaeologists, anatomists, geneticists, geologists, dating experts—and sometimes it seemed I had come away with one hundred and fifty different points of view" about the place of Neanderthals in human evolution. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p224.]
- In 1996 Berkeley evolutionary biologist F. Clark Howell wrote: "There is no encompassing theory of [human] evolution... Alas, there never really has been." The field is characterized by "narrative treatments" based on little evidence, so "it is probably true that an encompassing scenario" of human evolution "is beyond our grasp, now if not forever." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p225.]
- Arizona State University anthropologist Geoffrey Clark in 1997: "Scientists have been trying to arrive at a consensus about modern human origins for more than a century. Why haven't they been successful?" In Clark's opinion, it is because paleoanthropologists proceed from such different "biases, preconceptions and assumptions." Thus explanatory models of human evolution, according to Clark, "are little more than a house of cards—remove one card... and the whole structure of inference is threatened with collapse." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p225.]
- Harvard paleontologist Stephen Jay Gould. In fact, the epigraph that introduces this book was taken from Gould's critique of "the iconography of progress" in his 1989 book, *Wonderful Life*. When Gould alerts his readers to "the evocative power of a well-chosen picture," and warns them that "ideas passing as descriptions lead us to equate the tentative with the

unambiguously factual," his eloquence is aimed at the idea of goal-oriented evolution. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p226.]

- Canadian philosopher of biology Michael Ruse recently criticized the tendency of Gould and others to use biological evolution as a platform for sermonizing about the meaning of human existence. "If people want to make a religion of evolution, that is their business," Ruse wrote, but "we should recognize when people are going beyond the strict science, moving into moral and social claims, thinking of their theory as an all-embracing world picture. All too often, there is a slide from science to something more." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p227, 228.]

12 Science or Myth?

- No educated person any longer questions the validity of the so-called theory of evolution, which we now know to be a simple fact" announced Ernst Mayr in the July 2000 issue of Scientific American. Mayr continued: "Likewise, most of Darwin's particular theses have been fully confirmed, such as that of common descent, the gradualism of evolution, and his explanatory theory of natural selection." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p229.]
- A few years ago, Berkeley law professor and Darwin critic Phillip E. Johnson was discussing evolution with a well-known cell biologist. The biologist insisted that Darwinian evolution is generally true, but acknowledged that it could not explain the origin of the cell. "Has it occurred to you," Johnson said, "that the cell is the only thing you know anything about?"—suggesting that if he knew more about other fields he would realize that Darwinian evolution doesn't work in them, either. Thus it is with many biologists: They realize that Darwinian evolution cannot adequately explain what they know in their own field, but assume that it explains what they don't know in others. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p231.]
- Dogmatic defenders of Darwinian evolution control not only most American

universities, but they also wield enormous power over most public school systems. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p237.]

- In 1973, neo-Darwinist Theodosius Dobzhansky announced that "nothing in biology makes sense except in the light of evolution." Ever since, Dobzhansky's maxim has been the rallying cry people who think that everything in biology should evolve around evolutionary theory. [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p245.]
- Evolutionary biologist Peter Grant (famous for his research on Darwin's finches) acknowledged in his presidential address to the American Society of Naturalists in 1999 that "not all biologists who would call themselves naturalists pay attention to [Dobzhansky's maxim] or even feel the need to. For example, an ecologist's world can make perfect sense, in the short term at least, in the absence of evolutionary considerations." [Jonathan Wells: *Icons of Evolution, Science or Myth? Why Much of What We Teach About Evolution Is Wrong*, Regnery Publishing 2000, p247.]

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