

[Public testimony as appears in the document “TEAJUL9 Hearing Trans.V11.doc”]

This document contains Holt, Rinehart and Winston’s response to specific comments made during the public testimony given before the State Board of Education on July 9, 2003 about *Holt Biology Texas* and about the biology books being considered for adoption in general

If the written comments distributed on July 9, 2003 reflect the public testimony, the publisher’s response is found within this document. If the documents distributed by the speaker on July 9, 2003 contain text other than the text of the oral testimony, the publisher’s response to that text is found in the accompanying document “Response to Written Comments—June 25, 2003 and July 9, 2003.”

For ease of reading this document, the publisher has duplicated the specific comments made by the petitioner (as recorded in the transcript of the hearing) and has followed each comment with its response.

Francis Beckwith

(No specific reference to *Holt Biology Texas*)

Jennifer Walker

(No specific reference to *Holt Biology Texas*)

Sandra Coffey

(No specific reference to *Holt Biology Texas*)

Nate McVay

(No specific reference to *Holt Biology Texas*)

John Courage,

(No specific reference to *Holt Biology Texas*)

Ed Darrell’s Comments

p. 48, lines 3–13

“I reviewed the books proposed for acceptance before you now. I read a few of them rather deeply. Generally these textbooks are all acceptable in terms of the material they cover. Specifically some of the books are outstanding. The photos and illustrations are vastly improved in the last years. Publishers are recruiting top notch authors, Kenneth Miller is one of the nation's better biology instructors. Peter Raven, in addition to being perhaps the world's best botanist, is the past winner of MacArthur Foundation Grant.”

HRW Response: The publisher thanks the petitioner for his favorable comments about the biology books being considered for adoption and about Peter Raven, an author of *Holt Biology Texas*.

Ed Darrell's Comments

p. 48, lines 19–23

"I think generally evolution needs a better coverage than it gets in these books. There are simple four or five step explanations for evolution by natural selection, especially as developed by Ernst Mayr."

HRW Response: Regarding a four or five step explanation for evolution by natural selection, the publisher refers the petitioner to a four-point discussion of factors in play in the process of natural selection, found on p. 288 of *Holt Biology Texas*. These four points recapitulate, though not in the same order, the first two of Ernst Mayr's three inferences about natural selection and evolution (to which the publisher believes the petitioner is referring) as Mayr articulated them in the 1982 *The Growth of Biological Thought: Diversity, Evolution and Inheritance*. The thrust of Mayr's third inference, which describes evolution itself, is discussed elsewhere in the same chapter of *Holt Biology Texas*.

Beverly Tobian (representing also Morton Prager)

(No specific reference to *Holt Biology Texas*)

Terry Maxwell

(No specific reference to *Holt Biology Texas*)

Robert Bohmfalk

(No specific reference to *Holt Biology Texas*)

Gerald Skoog

(No specific reference to *Holt Biology Texas*)

Bassett Maguire's Comments

p. 68, lines 11–13

"Let me say that, the books I have looked at are really very good. I recommend that you allow our students to use them. They need it."

HRW Response: The publisher thanks the petitioner for his favorable comments about the biology books being considered for adoption.

Robert Dennison's (TABT) Comments

p. 78, lines 13–17

"I am here to strongly encourage the Board to adopt the texts currently on the Biology Textbook List thereby providing teachers with numerous quality of books from which to choose."

Robert Dennison's (TABT) Comments

p. 80, lines 11–14

"The textbooks being considered for adoption do an admirable job of presenting the theory of evolution in a manner befitting its importance to biology."

HRW Response: The publisher thanks the petitioner for his favorable comments about the biology books being considered for adoption.

Catherine McGovern

(No specific reference to *Holt Biology Texas*)

Brian McGovern

(No specific reference to *Holt Biology Texas*)

Oak Denberg's Comments

p. 84, lines 24–25 and p. 85, lines 1–3

"My main concern is the way biology teaches evolution. I have briefly reviewed several of the texts up for consideration. And it has been a cursory review. But from what I have seen, they are all adequate to good."

HRW Response: The publisher thanks the petitioner for his favorable comments about the biology books being considered for adoption.

Bret Corum's Comments

p. 87, lines 17–18

"Overall, I was quite pleased in the quality of the textbooks."

p. 87, line 25 and p. 88, lines 1–3

"In my view, the best of the textbooks, the two of the best that I found were the Miller-Levine textbook and the Johnson and Raven textbook."

HRW Response: The publisher thanks the petitioner for his favorable comments about the biology books being considered for adoption and about *Holt Biology Texas*, by George B. Johnson and Peter Raven.

Richard Fralin

(No specific reference to *Holt Biology Texas*)

Eleanor Hutcheson

(No specific reference to *Holt Biology Texas*; discussion of this petitioner's general comments is found in "Response to Written Comments—June 25, 2003 and July 9, 2003)

John Roland's Comments

p. 98, lines 19–25 and p. 99, lines 1–17

"I am going to comment today on weaknesses I find in all of the textbooks. Indeed, by your own TEKS, I would have to say that none of them meet those standards, at least the standards that the TEKS were intended to represent.

The fundamental problem with all of these textbooks is: They don't really adequately present scientific method what it is and what it is not. They discuss scientific method in terminology that predates the era of modern physics and computer science, which offers us much more precise language in which to discuss scientific method and the tools of scientific investigation.

We heard here today testimony and comments from members of the Board in such terms as theories, hypotheses, truth, facts, experiment. These are all obsolete terms. If the discussion were cast in terms of operation, observation and model, we have a basis for a much more precise and rigorous discussion of the subject and one that avoids the kind of confusion that arises for our students. When they hear the word proof being used when it means different things in mathematics, in the sciences and in law."

HRW Response: The publisher thanks the petitioner for his comments. The publisher agrees with the petitioner that the scientific method can be couched in the language common to modern physics and computer science, and that in advanced presentations to students well-grounded in science, use of this terminology is indeed more precise. The publisher believes, however, that to completely abandon the more traditional presentation of the scientific methods would engender a distinct disadvantage for high-school students in mainstream biology courses, who likely will encounter the terms "theory," "hypothesis," and "experiment" in their college science courses.

The publisher agrees that the terms "truth" and "fact" are too colloquial and absolute to be germane to a rigorous discussion of empirical science, and so are not used in *Holt Biology Texas* in relation to the scientific methods. The publisher agrees with the petitioner's concern that the lack of introduction to the term "model" as it is used in science is an omission, and the publisher will request permission from the Texas Education Agency to make the following addition to p. 19 under the heading "Scientific Explanations."

"Related to other scientific explanations, a model is a representation of an object or a system. In science, the term *model* is often used to mean a hypothetical description."
(Underline added to show altered wording.)

John Roland's Comments

p. 99, lines 18–25 and p. 100, lines 1–3

"And what is truth? Well, that's a philosophic issue. Now, there is a practical problem with the textbooks, with a single textbook discussing all the weaknesses as well as the strengths of each of the models that it may present. And the practical solution is to provide links to web pages that accomplish that.

The controversies over all of the models presented in our textbooks are far too extensive to be contained in a single printed textbook."

HRW Response: Regarding the problem of presenting the strengths and weaknesses of all scientific models presented in *Holt Biology Texas*, the publisher concurs with the petitioner that it is impractical, given the number of models represented in the textbook. There are practical problems, however, with linking to Websites maintained by outside entities—even academic institutions. These problems include links that become unsupported and primary Web pages that may link—in one or more steps—to material inappropriate for high-school students. In *Holt Biology Texas*, SciLinks margin notes on selected topics refer students to Web pages that are vetted and guaranteed by the National Science Teacher's Association and that enhance and amplify information delivered in the textbook.

Frankin Mayo's Comments

p. 105, lines 13–25 and p. 106, lines 1–24

"A certain set of claimed proofs of this kind of [Darwinian] evolution was presented in textbooks year after year. These items have become known as icons of evolution. During the 1960's and '70 s and '80 s, new evidence came to light that was invalidated some of these icons and greatly weakened others.

But the textbooks had not presented this new evidence. Rather, the same old icons continued to be presented year after year. This practice effectively censors the newer evidence.

In the 1980s and '90s, some main stream scientists began to write books pointing out the new evidence presents great difficulties for the entrenched evolutionary orthodoxy.

Couple good examples are Dr. Michael Denton's book *Evolution, a Theory in Crisis* and professor, biochemistry professor, Dr. Michael Behe's book, *Darwin's Black Box - Biochemical Challenge to Evolution*.

In the year 2000, Dr. Jonathan Wells, a biologist, wrote a book entitled *Icons of Evolution*. And this documents the false information of these icons. As a result some of these icons have been removed from the current offering of biology textbooks; but, unfortunately, other icons still remain. These contain serious factual errors. I want to urge careful attention to these icons in the adoption process. Because textbooks that don't follow the

evidence becomes a major impediment to science and to students trying to learn science.

Frankin Mayo's Comments

p. 105, lines 13–25 and p. 106, lines 1–24 (cont.)

I also want to urge the Board to continue its emphasis on routine student analysis and critique the theories as to strengths and weaknesses using scientific evidence that is required from TEKS such as 3A."

HRW Response: The publisher thanks the petitioner for his comments. During the preparation of *Holt Biology Texas*, the authors and the publisher did reevaluate coverage of several of the "icons of evolution" cited in Wells' book. As a result, discussions of peppered moths and Haeckel's drawings of embryos were removed prior to publication. The discussion in *Holt Biology Texas* of the Miller-Urey experiment carefully indicates the mistakes made in the assumptions about the early atmosphere. Throughout *Holt Biology Texas*, the theory of evolution is described as a true scientific theory that will be refined and improved in the light of new evidence.

Steve Bratteng

(No specific reference to *Holt Biology Texas*)

Stephen Schafersman's (Texas Citizens for Science) Comments

p. 110, lines 23–25

Let's turn to the biology textbooks. I have examined all of them, primarily, looking at their treatment of evolution."

p. 111, lines 5–17

"The six high school biology texts are also very good. Their treatment of evolution is adequate to superior. They all encourage critical thinking and have plenty of information that allow students to analyze, review, and critique scientific explanations, all met the TEKS requirements in my study.

All biology texts are factually accurate and free of errors concerning evolution. The books do not misrepresent any details of the modern scientific understanding of evolution, nor do they omit scientific information critical of evolution."

HRW Response: The publisher thanks the petitioner for his favorable comments about the biology books being considered for adoption.

MerryLynn Gerstenschlager (Texas Eagle Forum)

(No specific reference to *Holt Biology Texas*)

Amanda Walker

(No specific reference to *Holt Biology Texas*)

David Hillis

(No specific reference to *Holt Biology Texas*)

Laura Sargent

(No specific reference to *Holt Biology Texas*)

Laura Brock

(No specific reference to *Holt Biology Texas*)

Raymond Bohlin's Comments

p. 142, lines 15–25

"I commend the Board on a stated desire to approve textbooks for biology that are free from factual error and that enable students to analyze, review and critique scientific explanations.

I do not believe that the current textbooks up for adoption accomplish this goal in regard to the theory of evolution.

For instance, the Miller-Urey experiment from is still offered as evidence that inorganic molecules can give rise to molecules necessary for life, even though the experiment has been irrelevant for years. It's based on a faulty view of the early atmosphere. And though textbooks often mention this, they fail to tell the student that experiments today using the current views of the early atmosphere give rather dismal results."

HRW Response: The publisher thanks the petitioner for his comments. The publisher believes that it is important to study and understand Miller and Urey's work because it was the first successful attempt to understand how the important building blocks of life might arise on the early Earth under conditions that scientists believed to exist at the time.

Miller simulated the Earth's early conditions based on what scientists had understood at the time about the primitive atmosphere—that is, that it was primarily a reducing environment. In the interest of further accuracy, the publisher will request permission from the Texas Education Agency to alter the on p. 254 as follows:

[figure caption]

"Miller simulated an atmospheric composition that Oparin and other scientists incorrectly hypothesized existed on early Earth." (Underline added to show altered wording.)

[text in last paragraph]

"We now know that the reductant molecules used in Miller's experiment could not have existed in abundance on the early Earth." (Underline added to show altered wording.)

In the years since Miller and Urey's experiment, scientists have modified Miller's experimental conditions to better represent our current understanding of the Earth's primitive atmosphere and have synthesized some of the same building blocks, although not in the same quantity. Even a weakly reducing atmosphere will produce lower but significant amounts of amino acids.

Publisher: Holt, Rinehart & Winston
Textbook: *Holt Biology Texas*
Response to Oral Testimony—July 9, 2003

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p. 8/9

Raymond Bohlin's Comments

p. 143, lines 3–11

"Though some textbooks mention the Cambrian explosion of life, they uniformly fail to mention that this event presents an unique challenge to evolutionary theory and that nearly all of the animal fila [sic] appear abruptly in the Cambrian with few, if any, ancestors in the older strata. Darwinian evolution expects a long, slow gradual accumulation of major taxonomic categories not sudden appearance."

HRW Response: Given that *Holt Biology Texas* does not mention the Cambrian explosion by name, or explicitly discuss the conclusion drawn from the fossil record that animal phyla appeared relatively suddenly, the publisher will request permission from the Texas Education Agency to alter the text in the least paragraph on p. 262 as follows:

"Most animal phyla that exist today probably originated during a relatively short time span (about 160 million years) during the late Precambrian and early Cambrian periods. This rapid diversification of animals is known as the "Cambrian explosion." (Underline added to show altered wording.)

The publisher does not agree, however, that the Cambrian explosion challenges Darwin's theory of evolution by natural selection. The rapid diversification of animal phyla that occurred immediate before and during the Cambrian period spans 160 million years of evolution, and many of the major animal groups familiar to us today, such as fishes, amphibians, reptiles, birds, and mammals, evolved long after the Cambrian period. Nevertheless, this remarkable diversification of animal phyla has led to a debate regarding how and why it occurred in such a relatively short period of time.

Tom Davis

(No specific reference to *Holt Biology Texas*)

R. Kelly Wagner

(No specific reference to *Holt Biology Texas*)

R.H. Dick Richardson,

(No specific reference to *Holt Biology Texas*)