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***Evolution and Creation Controversy in Biology Guidelines
and Provincially Recommended Textbooks in British
Columbia, Canada***

ABSTRACT

Given the traditional leading presence of American educational publishing firms in the Canadian context, this paper examines whether –and how– the controversy between evolution and creation is referred in educational discourse in British Columbia, Canada. By comparing and contrasting the discursive strategies that are used in curriculum guidelines as well as grade 11 and 12 biology textbooks, published by either national or American-based companies to teach evolution in British Columbia, the aim is to reflect about the transnationalization of school textbooks’ markets and its consequences in terms of homogeneous/heterogeneous cultural processes.

Keywords: *Creationism – Evolution – Textbook – Biology – British Columbia.*

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La controversia entre evolucionistas y creacionistas en las disposiciones curriculares y los libros de texto de Biología recomendados en Columbia Británica, Canadá

RESUMEN

Dado el liderazgo de la presencia de empresas editoriales estadounidenses en el contexto canadiense, en este artículo se examina si –y cómo– la controversia entre evolucionistas y creacionistas es referida en el discurso escolar en

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Columbia Británica, Canadá. A partir de la comparación y el contraste de las estrategias discursivas utilizadas en las disposiciones curriculares así como en los libros de texto de Biología para el 11° y 12° grados, publicados ya sea por editoriales nacionales o con sede en los Estados Unidos para enseñar la evolución en Columbia Británica, el propósito es reflexionar sobre la transnacionalización de los mercados del libro de texto escolar y sus consecuencias en términos de homogeneidad/heterogeneidad cultural.

Palabras clave: *Creacionismo - Evolución - Libro de texto - Biología - Columbia Británica.*

Agradecimiento: Mi gratitud al Dr. Rowland Lorimer por haber leído y comentado diversas versiones del presente artículo. No obstante, la responsabilidad de las ideas expresadas es mía.

Evolution and Creation Controversy in Biology Guidelines and Provincially Recommended Textbooks in British Columbia, Canada

The origins of the famous struggle between evolution and creation in the United States dates from 1925, when John T. Scopes, a high school teacher in Tennessee, was brought to trial for teaching evolution (Hassard 1992). Based on a textbook that presented the ideas of Charles Darwin, Scopes was found guilty of intentional violation of the Butler Act, a state law that forbade any theory that denied “the Story of the Divine Creation of man as taught in the Bible” (Larson in Scott 2009: 99) in the school curriculum. In Grabiner and Miller’s interpretation, “[...] the near-disappearance of the theory of evolution and of Darwin’s role [...] demonstrate[s] the impact of fundamentalist pressure in general, and the Scopes trial in particular, on the textbook industry. [...] Publishers and authors feared that a good treatment of evolution meant the loss of the [lucrative] southern market” (Grabiner and Miller in Scott 2009: 258).

According to Scott (2009), a first phase of the controversy was followed by the claim by antievolutionists to a balanced treatment of the topic in the science curriculum at public schools. Thanks to a federal campaign to improve science education in the context of the space race, the teaching of evolution was fostered in school curriculum by the end of the 1950s. The new governmental curriculum guidelines soon led to inclusion of evolution in commercial publishers’ textbooks (Skoo in Scott 2009). As a means of reacting to the new contents, a “creation science”, led by the engineer Henry Morris and the theologian John Whitcomb, was developed during the 1960s, out of which were written some clearly creation-oriented textbooks. In 1968, a Supreme Court’s decision declared that the “equal treatment” inclusion of creation was unlawful as long as the First Amendment of the Constitution requires public institutions to be religiously neutral.

In the late 1980s, a neo-creationist movement much less explicit about its religious foundation and more scholarly focused called “intelligent design” was

born. However, it did not become generally known until the end of the decade. At that time, “Of Pandas and People”, considered to be the first textbook to teach the new version of the old-fashioned creationism at high school level, was published by the Foundation for Thought and Ethics. Due to the defeats creation had received in the courts during the previous years, the biologists Percival Davis and Dean Kenyon, the book’s authors, were very careful in avoiding the use of the religious tinged term “creationism.” Nevertheless, there is still a reference to a “master intellect” (Scott 2007). The book was submitted to secular publishers for more than two years before one was found: Houghton Publishing Co., a small Texas press that specialized in agricultural materials (Scott 2009).

In 2004, a new battle took place in Dover, Pennsylvania, as the school board accepted a private donation of 60 copies of the book “Of Pandas and People” and mandated science teachers, among other policies, to read a statement, a practice used also in other states, that could be interpreted in terms of what Scott (2009) call the latest strategy of antievolutionist to construct Darwin’s findings as a weak, and thus, unsatisfactory theory. The response to this statement was a refusal by a number of teachers to read bolstered by several parental complaints. The case, known as *Kitzmiller v. Dover School District*, was presented to the court (McMaster and Johnstone, 2008). The judge concluded that intelligent design “cannot uncouple itself from its creationist, and thus religious, antecedents.”¹ He justified his ruling by citing the intent of the First Amendment “to preserve the separation of church and state mandated by the [...] United States Constitution [...]”²

Is creationism v. evolution an issue in Canada?

According to Barker, even if Christian creationism does not recognize the political border between Canada and the United States, and although Canadian creationism has been mainly supported by literature proceeding from the United States, “like Niagara Falls, creationism looks different from Canadian and American vantage points” (Barker 2004: 85). He suggests that some clues could be found in “the present configuration of religious adherence and practice in Canada and the dominant political discourse of ‘multiculturalism’” (Barker 2004: 85). From his perspective, not only would Canadians be less religious-devoted in comparison with Americans, but also the aboriginal creation interpretations must be taken into account in order to explain the difference.

On the other hand, Wiles believes that “most Canadians are unaware of just how little evolution is represented in Canadian curricula, and they are generally unaware of Canada’s own controversies regarding evolution education.” (Wiles 2006: 135). Alongside a resolution in which the Prince Edward Island’s Education Department called for fair treatment of creation and evolution at school, some cases in which science teachers in different Canadian provinces were put under pressure by their students’ families, or even by their own students, not to teach evolution at school, Wiles quotes some prayers of the Creation Sci-

ence Association of Quebec to support his point that “there is intent, as well as organized strategy, within this creationist community to have anti-evolution materials presented in Canadian public schools” (Wiles 2006: 138).

In reference to the distribution of creationism in Canadian provinces, the results of an online survey that was carried out in 2008 by Angus Reid³ show that the majority of Canadians believe in the theory of evolution (58%). However, there is a 22% of the population that accepts creationism and a considerable 20% is undecided on this issue. The key findings of this study reveal that men are more likely than women to believe in evolution (69% versus 48%). Secondly, younger adults (67%) with at least one university degree (71%) proved to be more inclined to support evolution. Finally, respondents living in Quebec (63%), Manitoba and Saskatchewan (63%) are particularly convinced about evolution while Albertans (40%) and Conservative Party voters (29%) tend to think that humans were created by God. Compared to a poll conducted by the same firm the previous year, these figures represent no changes in trends.

The situation in British Columbia

According to Barker (2004), the story of creationism in British Columbia started in the 1920s with the promotion of fundamental American Baptists' ideas. Later, the movement received further support from Arthur Brown, an old-earth creationist and Vancouver-based doctor who wrote pamphlets and gave public talks. Another major contribution was made by the industrial chemist Earl Hallonquist, who in 1967 founded the young-earth Creation Science Association of Canada in Vancouver. Located in White Rock, the association is still active: it is now called Creation Science Association of British Columbia. Committed to bring to Canadians the findings produced by American-based creationist institutions, it defines itself as a “non-profit educational organizations [...] to compile scientific as well as Biblical evidence which supports creation and contradicts evolution and to communicate this information to schools, churches and the general public.”⁴

In 1981, the association lobbied the provincial educational authorities for a fair treatment of origins-related contents⁵. The comments by the then Ministry of Education, Brian Smith, on the benefit of that treatment brought about the first criticisms. In 1983, the Abbotsford School Board passed a two-model policy to teach both evolution and creation at school (Todd in Barker 2004). The response of teachers to this requirement varied from welcoming discussion of creationism in their classes, inviting speakers from the Creation Science Association to just skipping the topic.

This policy was not formally contested until 1995. The Abbotsford Teachers' Association strived to remove from school what they considered “a veiled attempt to inject biblical doctrine into science classes.” (Todd in Barker 2004: 90). Based on the provincial School Act, in which it was established that

All schools [...] must be conducted on strictly secular and non-sectarian principles. [...] no religious dogma or creed is to be taught in a school or Provincial school (Ministry of Education 1996: Chapter 412, Part 6, Division 2, Section 76).

Art Charbonneau, the then Minister of Education, issued a directive in which it was stated that religious views were not to be taught as science. "Evolution and adaptation had to be taught according to the ministry's own curriculum guidelines" (Barker 2004: 91).

In light of this case, Barker suggests that there are some evidences to assume that this was not merely a replay of what is going on in the United States. In first place, he considers that "it is hard to imagine that a creationist school policy could remain unchallenged for more than a decade in an American urban setting as dominated by non-evangelicals as the greater Vancouver area" (Barker 2004: 91). Following the Charbonneau directive, the public debate over the teaching of creationism at school "vanished as rapidly as it appeared" (Barker 2004: 91). He explains that the topic was soon forgotten by the local press and no party made it an issue during the 1996 political campaign. Yet, Meijer (2005) reports that "apparently up to 30% of science teachers in BC are actually sympathetic to creationism". However, Meijer provides no information in his article on the procedures used for this estimation or how the creation sympathy is defined.

Before the Abbotsford's controversy

In response to a Biology Teacher Survey Report presented by the British Columbia Science Teachers' Association to the Ministry of Education in 1981, a Provincial Science Assessment Report published in 1982 and the Science Council of Canada's Report on science education released in 1984, the biology 11 and 12 curriculum guidelines approved in 1974 were replaced in 1986. Reviewed by nine School Division representatives and a scholar from the Department of Botany, University of British Columbia, under the supervision of two ministry coordinators, the new document refers to the teaching of evolution in its philosophy section as follows:

An evolutionary perspective is [...] one of the central organizing principles of biology. Although the relative contribution of different evolutionary mechanisms is the subject of academic debate, there is very little disagreement among professional biologists about the concept of evolution and these basic facts: Life is very old, lifeforms have changed over time, and present day species are directly related to previously existing species through genetic inheritance (Ministry of Education 1987: 3).

While the above statement seems strong and unequivocal, it could be argued that the ideas expressed in the next paragraph are informed by the "fair treatment" approach claimed by creation supporters:

Concern may also be expressed by some students and parents because the evolutionary perspective of modern biology conflicts with personal beliefs. These individuals have a right to expect that science and the education system will respect their beliefs. Teachers should explain to students that science is only one way of learning about life, and that other explanations have been put forth besides that of biological science. In some cases individual teachers may choose to discuss various alternative viewpoints on these matters with their biology classes. However, because these viewpoints are not derived from the discipline of biological science, they are not a part of the curriculum (Ministry of Education 1987: 4).

Interestingly, here it is recognized that the study of biological concepts may be a sensitive issue in British Columbia as well as in the United States. The allusion to individual rights, to the idea that “science is only one way of learning about life” and to the possibility of teachers opting to “discuss alternative viewpoints” could be identified as favourable to the inclusion of the creationist perspective. Nevertheless, what appears to be an explicit religious orientation is mitigated, to a certain extent, by stating that these “alternative viewpoints” are “not part of the curriculum.” It is curious to note the assumption that what is taught in class may not be informed by the Ministry’s document on the matter.

The impact of the Abbotsford’s controversy

In the context of the Abbotsford controversy, the biology 11 and 12 curriculum guidelines went through revision in 1996. The process solicited contributions from provincial authorities, organizations such as the Confederation of Parent Advisory Councils, experts such as the School Superintendents’ Association, the Teachers’ Federation, the Business Council, the Principals’ and Vice-principals’ Associations, the Partners in Science Awareness Committee, the Federation of Labour, the Ministry of Environment, Camosun College, the University of British Columbia, Simon Fraser University, University of Northern British Columbia and University of Victoria.

In the introduction to biology 11 and 12, the policy dealing with the inclusion of creationism is described under a section called “course requirements respecting beliefs” Although the text is based on the previous version, significant changes are added:

Concern may also be expressed by some students and parents because the evolutionary perspective of modern biology conflicts with personal beliefs. Teachers should respect these religious beliefs; however, because religious beliefs and views flowing from religious beliefs on these matters are not derived from the discipline of biological science, teachers should refrain from providing instruction in or requiring discussions on these beliefs. Under no circumstances may a teacher as part of a science

course provide instruction in a religious dogma or religious belief system (Ministry of Education 1997: 4).

In line with the secularity principle expressed in the provincial School Act previously referred, references to individual rights, the notion of science being only one model and “alternative explanations” are eliminated, together with the former ambiguity about discussing religious beliefs in biology class, and they are now replaced by the directive not to discuss religious beliefs in class.

Two new paragraphs are also included in the new version. The first is this:

While respecting the personal beliefs of students, teachers are only to provide instruction in classroom activities in accordance with the scientific purpose and scope of the learning outcomes set out in this curriculum guide. These learning outcomes do not include any instruction based on an interpretation of religious scriptures or writings nor on beliefs or viewpoints commonly characterized as creationism, theory of divine creation, intelligent design theory, or other theories based on religious beliefs (Ministry of Education, 1997: 4).

Both creationism and intelligent design are explicitly excluded from the curriculum. It is also interesting to note that the creationist conceptualization of these religious interpretations as “theories” is challenged; they are given the status of “viewpoints”.

In the second paragraph, it is added:

Similarly, in the choice and use of learning resources to support the learning outcomes of the science curriculum, school boards, administrative officers, and teachers should ensure that no religious dogma or religious belief system is advocated or presented as part of the discipline of science (Ministry of Education 1997: 4).

Here it is clearly stated that the separation between biology course content and religious beliefs criterion must be applied in the adoption of learning materials, too.

The current situation

Ten years later, in 2006, the curriculum was updated by a team of six school division officers, a scholar from Simon Fraser University, an independent school representative and a local contract publisher. The purpose of the update was

[...] to include suggested achievement indicators, a more clear and succinct set of prescribed learning outcomes, a snapshot of the course’s key elements, and other minor refinements, while maintaining the original

intent and essence of the 1996 curricular content (Ministry of Education 2006: III).

Despite the declared intention to keep the “essence of the 1996 curricular content”, in reference to the teaching of evolution several aspects deserve attention. First of all, the space devoted to describing the way the issue must be dealt with in class is noticeably reduced to a few lines embedded in “considerations for the program delivery”. Besides, its lack of placement among the very first pages of the document suggests a lesser importance than the inclusion of creationism was given in past curricular documents.

Secondly, the idea of conflict recognized in the old versions is replaced in the new version by the softer “challenge” to be faced by some faithful students:

Reconciling scientific discoveries (for example, in genetic engineering) and religious faith poses a particular challenge for some students. While respecting the personal beliefs of students, teachers should be careful to distinguish between knowledge based on the application of scientific methods, and religious teachings and associated beliefs such as creationism, theory of divine creation, or intelligent design theory (Ministry of Education 2006: 10).

Unlike the preceding document, teachers should not strictly refrain from engaging in religious discussions but “distinguish” between scientific knowledge and “religious teachings”. The use of the term “careful” suggests a prudent treatment. While seemingly quite reasonable, research argues that such an approach can be problematic. For instance, Larson & Witham (in Alters & Alters 2001) found that students are more likely to reject the division between science knowledge and religious beliefs than to accept conflicting ideas and change their religious views.

The textbook analysis

Case 1: Nelson

Released immediately after the Abbotsford’s controversy, “Nelson Biology” (1996) was not included in the provincial Grade Collection until 1999. According to the Ministry’s general description, “British Columbia examples are used to give a regional context to broader Canadian and global issues” in this book.⁶ At its preliminary pages, key features as well as general assumptions that have guided its design are detailed: “You will have an opportunity to learn more about social issues through debates that appear at the end of every chapter. These social issues will allow you to view controversies from different viewpoints” (Ritter, Coombs & Drysdale 1996: 16).

Within the book, evolution-related contents are presented mainly in the first chapters under headings and sub-headings such as: “Understanding of Diversity”, “Origins of Living Things”, “Adaptation and Change”, “Theories to Explain Variation”, “Continuity of Life”, “The Genetic Basis for Evolution”, “The Chordates”, etc. Even if no formal definition of creationism can be found along the book, in chapter three it is possible to read:

[...] the great Greek philosopher, Aristotle, proposed that all creatures could be arranged in a hierarchy of complexity. [...] The Aristotelian view was accepted by many religious scholars who drew support from the Old Testament. They suggested that living things came into existence in their present form. This theory continues to be accepted by some today (Ritter, Coombs & Drysdale 1996: 91).

Although it is not named, creationism is presented as a past view that it is still supported in the present. The allusion to the Old Testament suggests that the use of the term “some” would be euphemistically referring to Christian creationism. No references to the aboriginal creationist interpretations are either described or implied.

Soon afterwards, it is added:

[Early beliefs] [...] Before the 18th century [...] [i]t was widely believed that living things were “fixed” and that they existed much as they did when they first appeared on earth. [...] (Ritter, Coombs & Drysdale 1996: 91).

By contrasting this quotation with the previous one, it appears that those early religious beliefs according to which living things are created in their existing form are given the status of a present-day theory. This construction might be explained in terms of the general assumption that “anything that happened in the past [...] is somehow less scientifically accurate [...] than something more current” (Alters & Alters 2001: 98), albeit essentially alike.

In the final section of the chapter the following task is proposed:

[Enrichment activities] Development relating to evolution and the origin of life continue to interest members of the scientific community. Using references such as newspapers, magazines, and periodicals, prepare an up-to-date report on one of the following topics: exobiology, creationism, or recent microfossil discoveries (Ritter, Coombs & Drysdale 1996: 109).

Here creationism is presented as an activity to “enrich” knowledge about a briefly mentioned topic during the chapter with no focus in the present time. On the basis of the few analytical tools included, the proposal to consider written mass media sources to write an “up-to-date” report, especially in the context of the Abbotsford’s controversy, does not seem to be an educationally de-

fensible decision. All in all, it could be argued that the rigorous ban to deal with religious views expressed in both the School Act and the curriculum guidelines are not fully applied in the recommendation of this book.

Case 2: McGraw-Hill/Glencoe

“Biology: The Dynamics of Life” (2004) was designed and published in the United States. It was recommended in 1999; the consulted edition was issued in 2004. According to the general description provided in the British Columbia’s Ministry of Education web site, it is a “comprehensive resource [...] visually inviting and well organized. Scientific inquiry, form and function, phylogenetic relationships, and ecology are its main emphasis.”⁷ There are no further references to the provincial curriculum guidelines fit.

One of its innovative features refers to the presentation of some information, in both English and Spanish language. For many concepts, a pronunciation key for non English-speakers is also provided. Although it could turn out to be an added-value in markets with a high participation of Spanish native speakers, such as many Southern and Western American states, this bilingual approach does not appear to be of relevance in the British Columbian context.

Unit 5, called “Change through Time”, includes four chapters on “The History of Life”, “The theory of evolution”, “Primate evolution” and “Organizing Life’s diversity”, containing two sections each. Alongside theoretical developments, mini-lab sequences, problem-solving activities, progress assessment tasks, section, chapter and unit key concepts’ reviews, standardized test practice and cross-curricular connections are included. By the end of the chapter, it is possible to read:

[Biology and Society] How life originated on Earth is a fascinating and challenging question. Many have proposed answers, but the mystery remains unsolved. Because it is impossible to travel in time, the questions of how life originated on Earth might never be answered. However, a number of beliefs and hypotheses exist. Some of these are described below. Divine origins. Common to human cultures throughout history is the belief that life on Earth did not arise spontaneously. Many of the world’s major religions teach that life was created on Earth by a supreme being. The followers of these religions believe that life could only have arisen through the direct action of a divine force. A variation of this belief is that organisms are too complex to have developed only by evolution. Instead, some people believe that the complex structures and processes of life could not have formed without some guiding intelligence (Biggs et al 2004: 388).

These lines are followed by the “Meteorites”, “Primordial soup” and “RNA” hypotheses. Although a distinction between “beliefs and hypotheses” is clearly

stated, the precedence given to the religious interpretation suggests a hierarchy among them.

It could be argued that there is an implication in the quoted paragraph that scientific explanation of the origin of molecular life is not satisfactory. The basis for this implication is the contention that some believe that “life on Earth did not arise spontaneously.” The creation by a supreme being is introduced through a metonymic association with the teachings of “major religions”. Although many religious discourses rely on such a figure, there are important discrepancies to be recognized among them. Even within creationism, there are different interpretations: Hindus, Japanese Shintos, North American tribes, etc. (Alters & Alters 2001). Not only are those divergences opaque here, but also no faiths other than Christian creationism are referred.

In reference to the differences in religious interpretations, Eco (2006) claims that the literalist understanding of the bible, on which the main Christian creationist discourse is based among other religious viewpoints, could not be assimilated to other religions that interpret divine creation in a metaphorical way. For instance, evolution has no formal doctrinal conflict with Catholic theology (Scott 2009; Eco 2006), the religion that is dominant among the Spanish native speakers that the book originally addressed. Hence, a generalized image of a conflict between science and religion as a whole is inaccurate. Thus, instead of presenting critical inputs to challenge a sensible but wrong idea, the textbook is (re)producing a popular misconception among literalist Christian students, in particular, and many non religious students, in general (Alters & Alters 2001).

After reading the four explanations of the beginnings of life, students are asked to consider strengths and weaknesses of the different ideas. Furthermore, in the index section included at the end of the book it is possible to read: “**Creator:** religious belief in life’s origins from, 388. *See also* Origins.” (Biggs et al 2004: 1160; bold and italic letters in the original).

In conclusion, Christian creationist arguments are presented - or implied - mainly to “balance” the acknowledged centrality of evolution. The inclusion of Christian creationist discursive traits might be informed by the construction of a “model reader”, mainly located in American states with a high presence of Spanish native speakers, where public opinion on the controversy between evolution and creation is widely recognized to be split. In light of the described characteristics, it is evident that neither the secularity principle expressed in the provincial School Act nor the explicit ban to include religious beliefs in the biology class conveyed in the correspondent curriculum guidelines are met in the recommendation of this title to support biology 11 and 12 courses in British Columbia.

Case 3: Thomson/Brooks/Cole

This textbook was published by Brooks/Cole. The consulted edition was issued in 2004, in the United States. It was included in the British Columbia Biol-

ogy 11 and 12 Grade Collection in 1999. No comments are included in the Ministry's general description in reference to the way the textbook should address the local and educational level curricular requirements, where it is described as a comprehensive resource package to teach cell biology and genetics, evolution, plant structure and function, animal structure and ecology, available either in hard-cover format or softcover separated modules⁸.

Evolution is covered in the third ("Principles of Evolution") and fourth units ("Evolution and Biodiversity"). Unit 3 is organized in four chapters: "Microevolution", "Speciation", "The Macroevolution Puzzle", and "The Origin and Evolution of Life". Unit 4 deals with "Prokaryotes and Viruses", "Protistans", "Plants", "Fungi", "Animals: the invertebrates", "Animals: the vertebrates" and Biodiversity.

Although it is not possible to find creationist references neither in the glossary nor in the index, the controversy between evolution and antievolution is addressed in different parts of the book, either through direct or indirect treatment. For instance, a section called "Concepts and Methods in Biology" deals with the conflicting interpretations of "theory":

You may hear someone apply the word "theory" to a speculative idea, as in the expression "It's only a theory." But a scientific theory differs from speculation for this reason: *Researchers have tested its predictive power many times and in many ways in the natural world and have yet to find evidence that disproves it.* This is why the theory of natural selection is respected. [...]. [s]cience is a competitive yet cooperative community. Ideally, individuals share ideas, knowing it's as useful to expose errors as to applaud insights. They can and often do change their mind when shown contradictory evidence. This is a strength of science, not a weakness (Starr & Taggart 2004: 13: italics in the original).

Although Christian creationists are not identified, the expressed arguments are in dialogue with one of the most common challenges posed by them to evolutionists. Then, the theory of natural selection is clearly contrasted to a speculative idea.

The controversy around Darwin's postulates is directly addressed in this next statement. In discussing the limits of science the book offers the following:

Beyond the realm of science, some events remain unexplained. Why do we exist, for what purpose? Why does any one of us have to die at a particular moment? Such questions lead to *subjective* answers. These come from within, as an outcome of all the experiences and mental connections that shape human consciousness. Because people differ vastly in this regard, subjective answers do not readily lend themselves to scientific analysis and experiments. This is not to say subjective answers are

without value. No human society can function for long unless its members share a commitment to certain standards for making judgments, even subjective ones. Moral, aesthetic, philosophical, and economic standards vary from one society to the next. But they all guide people in deciding what is important and good, and what is not. All attempt to give meaning to what we do. Every so often, scientists stir up controversy when they explain something that was thought to be beyond natural explanation –as belonging to the supernatural. This is often the case when a society’s moral codes are interwoven with religious narratives. Exploring a long-standing view of the natural world from the scientific point of view might be misinterpreted as questioning morality, even though the two are not the same thing. As one example, centuries ago in Europe, Nicolaus Copernicus studied the planets and concluded the Earth circled the sun. Today this seems obvious enough. Back then, it was heresy. The prevailing belief was that the Creator made the Earth - and, by extension, humans - the immovable center of the universe. Later a respected scholar, Galileo Galilei, studied the Copernican model of the solar system, thought it was a good one, and said so. He was forced to retract his statement publicly, on his knees [...]. Later still, Darwin’s theory of evolution ran up against the same prevailing belief. Today, as then, society has sets of standards. Those standards might be questioned when some new, natural explanation runs counter to supernatural beliefs. This doesn’t mean that scientists who raise the questions are less moral, less lawful, less sensitive, or less caring than anyone else. It simply means one more standard guides their work: *The external world, not internal conviction, must be the testing ground for scientific beliefs* (Starr & Taggart 2004: 15; italics in the original).

According to the vision conveyed, only “subjective answers” could vary from one society to the next. In contrast, it could be argued that scientific explanations of the natural world are constructed as long lasting valid views. In reference to this point, it is interesting to note that here “subjective answers” do not refer merely to religious perspectives but to social ones in general.

In an attempt to distinguish scientific endeavor from religious beliefs, well-known historical examples are put forth, implying a certain awkwardness of religious-oriented questioning of scientific principles. The above-quoted statement is followed by a red rectangle containing these lines: **“Systematic observations, hypotheses, predictions, tests. In all these ways, science differs from systems of belief that are based on faith, force, or simple consensus”** (Starr & Taggart 2004: 15; bold letters in the original). In order to avoid further misconceptions, it would be necessary to recognize, somehow, that there is not only one scientific endeavor but many that, even if they are ruled by different epistemological criteria, they are still part of the scientific discourse.

At the beginning of chapter 17, another allusion to creationist challenges is found, albeit it is not named:

[...] when you hear someone wonder about whether “evolution” takes place, remind yourself that **evolution** simply means genetic change in a line of descent over the generations. Selective breeding practices provide abundant, tangible evidence that heritable changes do, indeed, occur. [...]. (Starr & Taggart 2004: 271; bold letters in the original).

Later on the chapter, it is explained:

[in reference to the ancient Greece] At the time, popular belief held that supernatural beings intervened directly and often in human affairs. [...] Aristotle believed (as did others) that each kind of organism was distinct from all the rest. [...] By the fourteenth century, Aristotle’s idea has been transformed into a rigid view of life. A Chain of Being was seen to extend from the “lowest” forms of life to humans, then on up to spiritual beings. Each kind of being, or “species” as it was called, was a separate link in the great chain. All links were designed and forged at the same time, at the same center of creation, and had not changed since then. [...] (Starr & Taggart 2004: 272).

[...] According to Cuvier, there was but one time of creation that populated the world with every species. A global catastrophe destroyed many of them. The survivors repopulated the world. There were not *new* species; naturalists simply hadn’t yet found fossils of them that would date to the time of creation. [...] (Starr & Taggart 2004: 274; bold letters in the original).

[The] view of gradual, uniformly repetitive change became the theory of **uniformity**. It directly challenged prevailing views of the age of the Earth. The theory bothered scholars who firmly believed the Earth was only about 6,000 years old. [...] (Starr & Taggart 2004: 275; italics in the original).

Anticipating that his view would be controversial, Darwin waited to announce it and searched for flaws in his reasoning. [...] the idea that diversity is the product of evolution was accepted almost at once by most naturalists. But Darwin’s specific explanation, of gradual evolution by natural selection, was fiercely debated. [...]. (Starr & Taggart 2004: 277)

Although the controversy is acknowledged, creationism is exclusively constructed as a past event without any mention to the present time.

Case 4: Pearson/Prentice Hall

The seventh edition of “Life on Earth” was published in the United States in 2005. According to the description offered in its preface, it “[...] is more than

a textbook, but rather a complete package of teaching aids for the instructor and learning aids for students” (Audesirk, Audesirk & Byers 2005: XXI). Focused primarily on the features of the digital resources included in it, there are no references to the fulfillment of curricular requirements in the ministry’s general description.

Unit 3 is devoted to evolution and comprises 10 chapters, in one of which creationism is explicitly discussed:

Pre-Darwinian science, heavily influenced by theology, held that all organisms were created simultaneously by God, and that each distinct life-form remained fixed and unchanging from the moment of its creation. [...] [Expressed by Plato and Aristotle] [t]hese ideas formed the intellectual basis for the view that each type of organism has a form that is permanently fixed. [...] (Audesirk, Audesirk & Byers 2005: 266).

[...] while preserving the notion of creation by God, Georges Cuvier (1769 - 1832) proposed the theory of **catastrophism**. Cuvier [...] hypothesized that a vast supply of species was created initially. [...] (Audesirk, Audesirk & Byers 2005: 268; bold letters in the original).

[...] French geologist Louis Agassiz (1807 - 1873) proposed that new creations after each catastrophe produced new and different species, and that modern species therefore result from the most recent creation. [...] (Audesirk, Audesirk & Byers 2005: 268).

Associated with the historical development of the discipline’s knowledge, creationist views are taught mainly as part of an early stage of the biological thought, as it was observed in case 3.

This construction is consistent, to a certain extent, with the definition given in the glossary: “**creationism**: the hypothesis that all species on Earth were created in essentially their present form by a supernatural being and that significant modification of those species –specifically, their transformation into new species- cannot occur by natural processes.” (Audesirk, Audesirk & Byers 2005: G6). Considering that the word “hypothesis” is used to define creationism, its roots in the scientific, or at least early scientific method, are emphasized. Unlike the previously quoted examples, no reference to the early biological assumptions is mentioned here. Besides, although it is implied in the recognition of a supernatural being, it could be argued that the relation to religious beliefs is avoided.

From the way they are constructed in the text, it seems that the difference between creationism (hypothesis) and evolution (theory) could be explained in terms of different scientific status rather than of science and religion discourses:

[...] the theory of evolution has been supported by fossil finds, geological studies, radioactive dating of rocks, genetics, molecular biology, biochemistry, and breeding experiments. People who refer to evolution as “just a theory” profoundly misunderstand what scientists mean by the word *theory* (Audesirk, Audesirk & Byers 2005: 12; italics in the original).

Secondly, it is useful to observe that those who refer to evolution as “just a theory” are not identified as Christian creationists.

Yet, in the “applying the concepts” section, included at the end of chapter 14, the following activities are proposed to encourage debate in class:

Both the study of fossils and the idea of divine creation have had an impact on evolutionary thought. Discuss why one is considered scientific endeavor and the other is not. [...]. Darwin and Wallace’s discovery of natural selection is one of the great revolutions in scientific thought. Some scientific revolutions spill over and affect the development of philosophy and religion. Is this true of evolution? Does (or should) the idea of evolution by natural selection affect the way humans view their place in the world? (Audesirk, Audesirk & Byers 2005: 281).

The required tasks are bound to relate creationism to the present time, albeit very little information is offered along the chapter to do an informed connection. The risk of such an approach would be to reinforce existing pre-conceptions.

Case 5: McGraw-Hill Higher Education

As in case 2, “Inquiry into Life” (2006) was developed and published in the United States by McGraw-Hill. It is recognized to be a traditional text with a distinctive human approach, beginning with chemistry and ending with ecology (Mader 2006). First published in 1976, its eleventh edition is aimed to “blend the classic with the new” (Mader 2006: IX).

The book was included in the British Columbia Grade Collections in 2005. According to the description provided in the provincial Ministry of Education’s web site, it “focuses on human biology”⁹, which is a topic to be covered in biology 12 within the local curricular design. It is also recommended for biology 11 as it “includes plants and other animals.”¹⁰ No further references to the fit of curricular requirements are mentioned. Together with the Instructor orientation CD-ROM, the optional electronic resources, its student friendly text, illustrations, proposed experiments and study aids are also highlighted in the ministry’s report.

The book presents: an introductory guide, seven parts, 36 chapters, four appendixes, a glossary, a general index and a historical time line. Part VI deals with “Evolution and Diversity”. By the end of chapter 27, the following text is proposed under the heading “Bioethical focus”:

The Theory of Evolution. The term “theory” in science is reserved for those ideas that scientists have found to be all-encompassing because they are based on data collected in a number of different fields. Evolution is a scientific theory. So is the cell theory, which says that all organisms are composed of cells, and so is the atomic theory, which says that all matter is composed of atoms. No one argues that schools should teach alternatives to the cell theory or the atomic theory. Yet confusion reigns over the use of the expression “the theory of evolution”. No wonder most scientists in our country are dismayed when state legislatures or school boards rule that teachers must put forward a variety of “theories” on the origin of life, including one that runs contrary to the mass of data that supports the theory of evolution. An organization in California called the Institute for Creation Research advocates that students be taught an “intelligent-design theory”, which says that DNA could never have arisen without the involvement of an “intelligent agent” and that gaps in the fossil record mean that species arose fully developed with no antecedents. Since our country forbids the mingling of church and state – no purely religious ideas can be taught in the schools – the advocates for an intelligent-design theory are careful not to mention the Bible or any strictly religious ideas (i.e., God created the world in seven days). Still, the majority of educators do not feel comfortable teaching an intelligent-design theory because it does not meet the test of a scientific theory. Science is based on hypotheses that have been tested by observation and/or experimentation. A scientific theory has stood the test of time – that is, no hypotheses have been supported by observation and/or experimentation that run contrary to the theory. On the contrary, the theory of evolution is supported by data collected in such wide-ranging fields as development, anatomy, geology, and biochemistry. The polls consistently show that nearly half of all Americans prefer to believe the Old Testament account of creation. That, of course, is their right, but should schools be required to teach beliefs that are not supported by observation and experimentation? (Mader 2006: 568).

On the basis of this reading, these questions are suggested next:

Decide Your Opinion. 1. Should teachers be required to teach an intelligent-design theory of the origin of life in schools? Why or why not? 2. Should schools rightly teach that science is based on data collected by the testing of hypotheses by observation and experimentation? Why or why not? 3. Should schools be required to show that the intelligent-de-

sign theory does not meet the test of being scientific? Why or why not? (Mader 2006: 568).

If compared to the section called "Biology and Society", analyzed in case 2, a more critical approach rather than a dogmatic one is conveyed. Although both are bound to open the debate in class about Christian creationism and intelligent design, in this case not only religious but also scientific, legal and even educational-based arguments are put forth.

On the other hand, it is interesting to note that an American reader is appealed to by the use of the plural form of the possessive adjective in the second person to describe the secular basis of the American state, proving that not only are universally valid principles taught in biology textbooks but also context-informed knowledge. In reference to the strategy used, it is necessary to make evident that no adaptation of the original version to the local milieu is applied in this example.

Although this book is undoubtedly science-oriented, it is possible to find some references to the Christian creationist discourse, too. If compared to the other recommended title published by the same company, important innovations in the way the theme is defined, in the strategies used to convey the meaning as well as in the construction of the reader are to be taken into account. As the contrast between the two cases would be indicating, the discursive strategies appear to depend not only on the editorial level but also on decisions made by the authors.

Conclusions

In light of the previous analysis, it is possible to conclude by stating that the controversy between evolution and Christian creationism is also an issue in British Columbia, albeit with different features if compared with the situation in the United States. The Abbotsford case and its impact on the 1996 provincial biology 11 and 12 curriculum guidelines are proof of that.

Then, it is interesting to observe that the explicit ban on teaching any form of creationism as articulated in the provincial curricular framework is not fully applied in the Ministry's own recommendation of textbooks to support these courses. If compared to the 1996 and 2006 curriculum guidelines, it could be argued that textbooks anticipated the Ministry's directives, allowing creationism discussion in class. Creationism is referred in all five provincially recommended titles, albeit with different purposes: presenting an "alternative" view, responding to creationists' criticisms, reconstructing the history of the discipline's development or "apply" concepts. Creationism is defined either as a religious belief, a hypothesis or a theory. In some cases, it is constructed as a past event while in others the link with the present time is made or suggested.

Thirdly, it is interesting to note that the chosen approach is not in direct relation with the origin of the company's ownership. The combination of strategies in a same book, or even the variety of approaches registered within a same firm, does not justify such association. On the other hand, this does not necessarily indicate that biology textbooks contents are universally valid. As the previous analysis shows, even the most "neutral" scientific principles are grounded in social and cultural contexts. Thus, the description of the American situation and the inclusion of American examples do not appear to be meaningful in the local milieu.

At this point, it is worth discussing whether this could be considered a case of cultural homogeneity. Although Christian creationism is referred in both American and British Columbia's textbooks, it is also possible to identify some social (role of the media), religious (adherence) and political (multicultural discourse) circumstances that suggest differences in the way the textbooks might be locally read. As Spring suggests (2009), teachers and students give meaning to the influence of global educational practices through the lens of their own cultural perspectives and adapt them to local conditions.

Notes

- 1 Source: http://www.pamd.uscourts.gov/kitzmiller/kitzmiller_342.pdf
- 2 Source: http://www.pamd.uscourts.gov/kitzmiller/kitzmiller_342.pdf
- 3 Source: http://www.angusreid.com/polls/view/canadians_choose_evolution_over_creationism/
- 4 Source: <http://www.creationbc.org>
- 5 Source: <http://news.google.com/newspapers?nid=1314&dat=19810809&id=1-gRAAAAIBAJ&sjid=de4DAAAIAIAJ&pg=4095,3267960>
- 6 Source: http://www.bced.gov.bc.ca/irp_resources/docs/bio1112ant.pdf
- 7 Source: http://www.bced.gov.bc.ca/irp_resources/docs/bio1112ant.pdf
- 8 Source: http://www.bced.gov.bc.ca/irp_resources/docs/bio1112ant.pdf
- 9 Source: http://www.bced.gov.bc.ca/irp_resources/docs/bio1112ant.pdf
- 10 Source: http://www.bced.gov.bc.ca/irp_resources/docs/bio1112ant.pdf

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