Paradise Regained: Teaching Science from a Christian Standpoint in a Postmodern Age

Amalee Meehan

The scientific study of life and questions of faith have always been wedded, until the age of modernism provoked an uneasy but prolonged divorce. This article addresses the need to reclaim an ancient paradise where the Christian story/vision and the world of science are partners rather than enemies, and suggests Shared Praxis in the science classroom as a possible approach. It supports a perspective that honors science as a rigorous discipline whose fruits have advanced the human race in ways unimaginable to our ancestors yet at the same time seeks the wisdom of our Christian tradition.

... Earth's crammed with heaven,
And every common bush afire with God;
But only he who sees, takes off his shoes,
The rest sit round it and pluck blackberries ...

Early May is the season of contented mating and proud parenthood along the banks of the River Charles. Only this morning, I spotted two terrapins floating on an old tree trunk, content in each other and with the morning's sun. Further along, two proud Canada geese displayed their brood of downy goslings for all the world to admire. These moments of perfection are moments in the human quest for truth when the forces of faith and reason click in a collective effort to explain and give glory for the created world and wonder of life. These creatures who have made their home along the Charles—feeding, breathing, procreating, and caring for their young—manifest the characteristics of living things clearer than any biology lesson could communicate. The natural world around us has so much to teach, not only knowledge of facts but wisdom for life, if only we are prepared to open our minds and our hearts.

Modern science was born out of an intellectual revolution sparked by Galileo (1564-1642) that became a bonfire with Newton (1642-1727). Galileo attempted to investigate the world from a strictly quantitative point of view. Experimentation that yields quantifiable results became the central methodology of the emerging scientific enterprise. The advances of Galileo and Newton led modern thinkers to reject the ancient understanding of the world as organic, and to replace it with a mechanistic model. Armed with this mechanistic outlook, which reduces reality to a set of basic particles and forces, the modern scientific enterprise set about unlocking the mysteries of the universe, presuming that even the greatest mysteries were now within reach of their scientific method. With each new discovery, modern science tightened its grip as the only system of explanations necessary for the heretofore incomprehensible; science became the new religion. Rather than seeking the answers to the great questions of life and death through faith, modern thinkers looked to hard-nosed, empirical data and to hypotheses advanced, confirmed, or rejected through the scientific method for certainty and reliability.

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This age of postmodernism has brought another new way of understanding the whole process of learning. The atomic structure of the material world reveals that it is dynamic, relational, paradoxical, predictable in its effects, and yet uncertain and relative ... Yet science continues to be taught and examined as if it had never left the age of modernism ...
Christian insight and now affirmed by postmodernism, science education and religious education can be partners for the spiritual benefit of students. Science can be taught in ways that nurture people in spiritual wisdom for life; religious education can be taught in ways that respect, and are enhanced by, the findings of science. My focus here is squarely on the spiritual potential of science education.

I propose ... a pedagogy [particularly in the science class] that honors both the rigorous discipline of science and a life-giving faith.

The science class offers limitless opportunities to acknowledge the human tendency to ask questions, to investigate life, to soul search. As spiritual beings we are constantly searching; there is a persistent desire in us to understand the source of that yearning within. Our Christian tradition sees the quest to know the world as the search for God. Church-sponsored schools present us with an abundance of opportunities to work with ourselves and our students as time and tide allow, so that we do not end up teaching in a vacuum, transmitting no coherent set of values but whatever might be the flavor of the day. Therefore, I propose a pedagogy that raises a consciousness of our Christian faith, particularly in the traditional hotbed of questions—the science class. It is a pedagogy that honors both the rigorous discipline of science and a life-giving faith. We are, in the end, two-winged creatures—we fly to deep truths on the wings of reason and faith.

Biology As a Representative Discipline
Although other fields can be included, science is generally taught as the disciplines of biology, chemistry, environmental science, and physics (standardized testing and curricular frameworks tend to reflect this division). This article concentrates on biology (the science of life and life processes) as a representative discipline. I locate the teaching-learning process in secondary schools that uphold Christian values in their mission and identity, and I suggest shared praxis as a teaching approach that lends itself to teaching biology grounded in Christian faith for a postmodern world. I focus on Darwin’s theory of natural selection (“Survival of the Fittest”) as a case study of one aspect of the biology curriculum; in the current climate, it appears most pressing. My premise is that both the spiritual perspective of Christian faith and the work of scientists have worthy voices to lend in the balanced learning of the origin, development, and continuation of life.

In schools across the western world, including Christian institutions, what students encounter in biology class regarding the theory of evolution can be very different from what they have learned in Sunday school and religious education classes, or stories they have heard in Christian community settings. The experience can be confusing and disconcerting. It can give the impression that science is attempting to de-throne God as the author of life and to install a random world “red in tooth and claw” instead. The biology teacher has a unique opportunity to offer uncompromised scientific integrity that is not only supported but enhanced by Christian faith. There can be no conflict between Scripture and nature when God is the Author of both. Confident that all truth is of God, there is no fear of what we might discover. Christian educators are uniquely poised to raise a sacramental consciousness—a disposition to see the ultimate in the ordinary—in their teaching of biology.

Darwin and Evolution
From the ballrooms of Paris to the bivouacs around Gettysburg, Darwin’s theory of evolution was the talking point of the 1860s. There was nothing new in the notion of evolution; many early Greek philosophers had evolutionary views. By the time Darwin was born, the view among “naturalists” that the world is developing and changing continually had been in circulation for some time. Darwin’s contribution was to explain how this happens. Hence, it was more for his theory of natural selection that Darwin was both lauded and vilified.

Darwin’s theory of natural selection suggests that many more individuals are born than can possibly survive. Nature selects as survivors those organisms with some competitive edge that makes them best adapted to survive the harsh conditions of life. In the “struggle for existence,” any member of a particular species who gains an advantage over fellow members is more likely to survive and procreate its kind, whereas those with weaker traits are weeded out: “This preservation of favorable individual differences and variations, and the destruction
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Shared Praxis As an Approach That Honors Faith and Reason

Shared Praxis is a comprehensive approach to religious education and pastoral ministry developed by Thomas Groome in the 1980s. A shared praxis approach invites people to bring their lives to faith, and their faith to life, in order to come to a lived faith. In the context of religious education, the dynamic moves from people reflecting on their own lives, to the resources of a religious tradition, to return to life with more faith-filled praxis. In the context of science education, students would be given access to scientific knowledge in the context of their own lives and interests, with the specific intention of enhancing their human living, including their spirituality. This approach reaches beyond knowledge in the objective information sense toward wisdom for life. Its pedagogical circle closes (and begins again), inviting participants to see for themselves and make decisions (cognitive, affective, or behavioral) about what to “do” with their newfound knowledge/wisdom. In this sense, a shared praxis approach to science education can reach beyond depositing data toward enhancing people’s lives, including their spiritual lives.

Groome’s shared praxis approach consists of a focusing act and five subsequent (but often overlapping) movements built around a generative theme. After each movement, Groome encourages participants to write down their thoughts, and to share them with conversation partners or the whole group. In that moment, participants get a chance to reflect, to pull their thoughts and feelings together in an environment of engaged, active communal learning.

The success of Shared Praxis is evidenced by the wide use of the approach. From its inception twenty-five years ago, it has become the standard approach to religious education in the United States and beyond.
The grade school Catholic religious education curricula of the three major publishers in that field—Sadlier, Silver Burdett, and Resources of Christian Living—are all based on Shared Praxis. Likewise, the Unitarian Church of America and the Baptist Church have national curricula rooted in this approach. The Catholic Church in Australia and the Catholic bishops of Canada as well as the Alive-O series in Ireland all produce series overtly based on Groome’s pedagogy. Moreover, the success of Shared Praxis extends far beyond the English-speaking world. For instance, religious education series from Lithuania, Sweden, and Korea all claim Shared Praxis as their pedagogical foundation.

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There are obvious openings for this approach right across the biology curriculum. As a practical example, I apply a shared praxis approach to Darwin’s theory of natural selection.10

Focusing Act: Groome suggests that the focusing act is tied to interests, not just honoring the existing interests of participants, but also generating interests, as long as they actively engage people. Therefore, I might begin the session by turning students to the natural world with a field trip to a local ecosystem. Any ecosystem—a forest, seashore, woodland, grassland, backyard, even the town dump—will provide ample evidence of competition, interdependence, and the struggle for life. What is important is that students get a feel for the lived reality of “wild” life in both supportive and adverse conditions, and what the different organisms, plant and animal, might need to survive in that ecosystem.

Movement 1: Groome describes the essential task of the first movement as offering “an expression in present praxis of the theme, so that participants can perceive what is going on ... regarding this issue in their lives.”11 Students’ own thoughts and feelings about the field trip are crucial here; how it engaged them personally. I invite initial expression from life around the theme by asking questions that evoke people’s consciousness of what they have experienced such as: what plant and animal organisms did you notice in the ecosystem we visited; what ways are they dependent on/independent of each other; are any organisms vulnerable or threatened in this habitat; did you experience this habitat as a peaceful/turbulent place and why? In this way, I introduce the notions of competition and interdependence, with a hint toward responsibility.

Movement 2: The aim here is to bring participants “beyond recognition to some level of critical reflection” regarding present praxis.12 Groome advises that such reflection can draw from reason, memory, and imagination so a variety of questions that engage all of these faculties should be crafted. In this case I start by prompting some social analysis and critical reflection on their experience of the field trip; what of society supports or threatens this ecosystem; why they saw what they saw and what they think it means. We might then consider their interpretations in light of Darwin’s theory of natural selection using questions such as: does Darwin’s picture of the natural world help you to understand the ecosystem of the field trip; does it help you to relate to your experiences of life in general; how long do you imagine that you could survive living “wild” in this habitat?

Movement 3: The aim of the previous movements is to enable people to come to recognize their own stories and visions of the learning experience that they now bring into dialogue with both Darwin’s theory and an exposition of Christian faith. Movement 3 involves seeking the practical wisdom of the learning; it does not ask people to defend their positions, rather it seeks to go a little deeper and examine the hopes, expectations, images, and stories they hold that influenced what was brought to mind and heart.

The substantive element of movement 3 is Darwin’s theory of natural selection. Every species—plant, animal, and micro-organic—produces many more young than could possibly survive. Only those who are best adapted to their particular environment will survive into adulthood, mate, and produce offspring. In this way, the strongest prevail. Movement 3 initially sets up a dialectic between this theory and student’s own experience by asking questions such as in what ways did your field trip experience confirm or refute Darwin’s theory; how does your experience of life confirm/contradict Darwin’s view of nature; does the theory of natural selection apply equally to human beings as to animals and plants?

At this point, opportunities need to be taken to raise up a Christian vision, so that rather than merely learning about natural selection, we learn from it, and in line with Groome’s great paradigm of learning, we see the implications for ourselves. In addition to the sources of Scripture and tradition, material for Christian vision can be drawn from the world of poetry, prose, art, or any aspect of
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popular culture that brings the content of the science lesson into conversation with Christian faith. For this lesson, the two stories of creation from Genesis 1 and 2 respectively are appropriate. I propose to lift up both accounts on the advice of Hebrew scholarship: "the contrast and interaction of the creation accounts offer a richer understanding of the relationship of God to human kind than we would have if the accounts were read in isolation."13

Genesis 1: 24 God said, “Let the earth bring forth every kind of living creature: cattle, creeping things, and wild beasts of every kind.” ... 26 And God said, “Let us make man in our image, after our likeness” ... 27 And God created man in his image ... male and female he created them. 28 God blessed them and God said to them, “Be fertile and increase, fill the earth and master it.”

Genesis 2: 7 The Lord formed ‘adam’ from the dust of the earth. He blew into his nostrils the breath of life ... 18 The Lord God said, “It is not good for man to be alone; I will make a fitting helper for him.” ... 20 And the man gave names to all the cattle and to the birds of the sky and to all the wild beasts; but for Adam no fitting helper was found. 21 So the Lord God cast a deep sleep upon the man; and, while he slept, he took one of his ribs ... and fashioned the rib that he had taken from the man into a woman; and he brought her to the man.

After the creation accounts are read, a shared praxis approach would ask, what did the passage say to you on this occasion; how did it make you feel; what memories did it evoke; what images came to mind? Engaging the faculties of memory, reasoning, and imagination can elicit many and varied responses. A key theme from this discussion is that the creation account is not a treatise on scientific origins. Here the language of faith speaks of something lying behind or beyond human experience: the origination and ordering of all that exists by the will of the Creator.

The central learning of the Genesis accounts is that humanity is set apart from other animals. Unlike every other species of animal and every species of plant, humans are conscious beings, not bound to live by the force of instinct. This theme reaches climactic expression with the creation of humanity, commissioned with a special role in God’s creation, and gifted a special relationship with God the Creator. Each of us is loved uniquely; we are aware at our deepest core of this love and we search for its source and origin.

Movement 4: Although we have heard them many times, the biblical accounts still evoke a sense of wonder before the mystery and marvel of creation. During the first human voyage around the moon, millions of people listened on Earth as Apollo 8 commander, Frank Borman, read the first ten verses of Genesis (Christmas Eve, 1968). The key intention of movement 4 is to invite students to create a dialectic between the Darwinian “struggle for existence” and the loving Creator God of the Genesis creation accounts, coming to “see for themselves” where they stand or the wisdom emerging.

Movement 3 has set out the resources for students to enter into a conversation between a Darwinian view and a view of Scripture. Movement 4 asks people to engage in this conversation and rather than simply co-relating the message, to integrate it, coming to their own insights and positions. Again, this can be done by a series of reflective questions such as; how is Darwin’s theory resonant or dissonant with a faith perspective; could God’s providence be “working” through natural selectivity; what does this mean for our free will, for human agency, for our responsibility for neighbor; can Darwin’s theory be applied to human society, even if it is true of nature; what about Christian outreach to people who are poor and weak; what insights emerge for you from this conversation? In one way or another, these questions ask “what are you coming to see for yourself?” The message of the creation accounts can provide a welcome counter voice to that of survival of the fittest, but the reassurance it promises also denotes responsibility. Movement 4 focuses on people coming to their own positions; each student is encouraged to figure out what they really believe and the wisdom this learning has for their lives.

Movement 5: A shared praxis style invites participants to make decisions—cognitive, affective, or behavioral—around the
generative theme. Ours is not the view of a hyperactive God who created all things in a fever of activity and then withdrew to admire from a distance. Rather, we belong to a world that is radically dependent on God for its origin, continuation and development. God calls us into partnership as stewards of creation (Gen. 2:15); movement 5 helps students to consider that responsibility and how it pertains to each one of them.

Groom’s advice is to “pose questions that invite participants’ own praxis like decisions and responses” such as what are you thinking; what does this mean for how you live your life? Therefore, we might reflect as a group on how difficult it can be to live in appreciation of the created world, to face our obligations to it, or on how it relates to a holistic view of living that includes the spiritual and how this can be sustained by a consciousness of nature.

Shared Praxis also challenges us to look beyond the content of our teaching, which often seems to be our primary concern, to take equal care of who we are teaching, where this takes place, and how we go about it. Too often in our state-imposed, syllabus-oriented classrooms and exam-driven high schools, we focus primarily on content to the exclusion of all these other worthwhile factors. The goal of Shared Praxis is that, whatever the topic, students find spiritual wisdom for their lives.

Further Opportunities for Shared Praxis in Teaching-Learning Biology

Any biology curriculum provides scores of opportunities for a shared praxis approach. For example, the proposed Massachusetts Biology High School Standards (March 2006) outlines how:

- At the high school level, students study life by examining systems from the molecular level through cell biology and genetics, to the tissue and organ level in vertebrate anatomy and physiology, and at the level of organisms and populations through ecology. A solid understanding of the processes of life allows students to make scientifically informed decisions related to their health, and to the health of the planet. Unifying these diverse topics of study is the concept of organic evolution, which is fundamental to understanding modern biology.

This document goes on to stress the importance of scientific inquiry as an integral part of a well-planned biology curriculum. Inquiry is essential to the shared praxis approach of reflecting critically on life by remembering, reasoning, and imagining, and of asking good questions in a manner that engages the student in active learning, while adopting an open posture to the spiritual wisdom to be gleaned from their encounter with science.

There are a multitude of curricular opportunities for Shared Praxis in this proposal: cell biology and genetics with implications for genetic engineering and cloning; how artificial nutrition, hydration, and reproduction has changed our view of human anatomy and physiology; the complexity of systems, organs, and tissues, and the causes and effects of breakdown; organism populations and the effects of different types of pollution; the pressing concerns of ecology and conservation; and the bioethics involved in the decisions we make regarding our own health and the health of the planet. All of these offer opportunity for placing explicitly Christian spirituality in dialogue with the practical wisdom to be gained from science—for life.

No pedagogy or curricular choice is value-free; we inevitably transmit values in the education process, either by design or default. It is against this background that I envisage the teaching of biology in a life-giving way that might make a difference to the learners themselves and to the world about which they are learning and in which they live by encouraging them to let their faith permeate their science and their sciences enhance their faith.

Conclusion

Influenced by the prevailing climate of postmodernism, our understanding of science has changed; no longer do we believe that merely examining the cells of life through a microscope can give us the measure of the wonder and mystery of life. But if the consciousness of scientists has shifted, so too has the language of faith. It has become much less the dogmatic language of certainty. This article proposes that it is possible to have distinct scientific understandings but deep faith. As educators in Christian schools, we need to reclaim the deep convictions between our faith and our science.

Monsieur Jourdain, in Molière’s Le Bourgeois Gentilhomme, startles himself with the discovery that he had been speaking prose all his life and had not known it—his teacher had given him only a word and not an insight. Even in teaching science, what we wish to pass on is more than a set of facts; it is a way of knowing that honors the complexity of life and the holistic nature of humanity, and nurtures a spiritual wisdom that is life-giving for self, others, and the created order. It moves beyond information to wisdom. It supports an outlook and perspective that honors science as a rigorous discipline whose fruits have advanced the human family in ways unimaginable to our ancestors yet at the same time places science in dialogue with the wisdom of Christian tradition.

Notes

Further References

Upcoming ASA Annual Meetings

August 1–4, 2008
Location: George Fox University
Newberg, OR
Program Chairs: John Van Zytveld
Arnold Sikkema
Local Arrangements Chair: Michael Everest

July 31–August 3, 2009
Location: Baylor University
Waco, TX
Program Chair: Walter Bradley
Local Arrangements Chair: William Jordan