

Highlights from our Summer Courses

Evolution: Pattern and Surprise

For a week in June, twenty-one individuals joined Craig Holdrege, Henrike Holdrege, and Nathaniel Williams for an intensive exploration of biological evolution. The course integrated scientific and artistic explorations. A participant commented, “I enjoyed the interplay and resonances between the three activities of projective geometry, discussion of evolution, and sculpture.” Another added, “The three strands played off each other nicely; each one offered its own ‘ahas’ and its own puzzles, and as the week progressed some of those phenomena shed light on each other.”

Having made some notes on Craig’s talks throughout the week, I (SLT) can offer a few glimpses of the world of observation and thought he introduced us to:

“Until we understand organisms, we cannot possibly understand their evolution.” If a single idea should be flagged as fundamental to the course—and as underappreciated within the larger community of evolutionary biologists—surely it is this. Evolutionary theory has long been dominated by the conviction that changing gene distributions within populations tell us just about the whole story of life on earth. A hopeful sign today is the increasing recognition that the gene has been toppled from its pedestal as the decisive explanation for the organism. Biologists are more and more noticing the whole organism as an integral unity, and as they do so, we can expect a transformation of evolutionary thinking.

When we look at the series of leaves upward along the stem of an herbaceous plant (see figure on page 5), some of the lower leaves may suggest what the next higher leaves will look like. We might learn to expect a certain type of continuing transformation. But it is another matter altogether to predict the flower out of the leaves. Much the same holds for our being able to predict the frog from a tadpole, or—to shift from individual development to evolutionary development—the modern horse from a fox-like ancestor. In all these cases, we recognize that something new has arisen.

However, once we do see the later forms, we can observe a relatedness. The new was not something random. In fact, the end of a series of forms may be the best clue for interpreting the whole. In any case, the series itself, as a whole, is the fullest expression of the unity we are looking for. And this recognition of the whole enables us to say: “The frog takes hold of the tadpole in order to become a frog.” This is very different from the building-block model of the organism’s development.

The embryo doesn’t *develop into* the adult, but is a field of potential in which the adult can appear. Likewise, you and I are not simply a bacterium that evolved, because we can’t *derive* the human from the bacterial. But we could not be here without the bacterium. There has been a stream of development. And, not incidentally, one of our connections to all other things (which at the same time distinguishes us from them) consists in our ability to think our relations to them.

The transformation we see in organismal development and evolutionary sequences is reflected in our own learning processes. Suddenly we gain a new insight that is not a mere logical or automatic implication of past thinking. And yet, in hindsight, we can recognize it as part of a coherent time series. We can bring this truth to bear upon our study of evolution itself: there is required a kind of open receptivity to new thoughts as we contemplate the evidences, and out of this openness and these evidences, a new insight may arise—a new form in an organic thinking process.



Life isn't something we *see* in an outward sense, and neither do we *see* development. Dynamic activity as such is never something we see directly. Yet, in talking about these things, we are not just speculating. Rather, we strive to realize how we must *think* in order to “see” the phenomena—in order to bring the phenomena to appearance in their meaningful relationships.

Again: “Until we understand organisms we cannot possibly understand their evolution.” One sign of things to come may be the recent remark by Denis Noble in his President’s Address to the International Union of Physiological Sciences: “The 21st century can look forward to a new synthesis that will reintegrate physiology with evolutionary biology.”

“A challenging and rich course. In many ways it was itself a manifestation of diversity in wholeness and vice versa. ... In the experience entirely new sets of questions and perspectives arose, and now have to be engaged—dealt with in their challenging wholeness. The teaching was imaginative and precise. The combination of the three—the artistic and mathematical along with the consideration of evolution itself—provided new and challenging questions and hints of insight. So everything remained alive” (Emeritus Professor, on the evolution course).

“Outstanding! [The experience raises] the question of how much we as adults need to participate in discovering the concepts versus having them presented. By introducing some of the preliminary ideas this way, Craig was able to take us much further so we could get to the final “ahas.” Everyone was respectful and knew how to listen to each other and allow the subject matter to be presented without constant challenges coming out of the individual’s agenda” (High School Science Teacher, on the evolution course).



The Four Elements: Earth, Water, Air, and Warmth

There is much we can immediately notice about water. Its droplets flow together and lose their identity, unlike, say, rocks. Creeks and rivers meander, forever changing their beds unless forcibly constrained by human intervention. Like fluids in general, water cannot be compressed, a fact making hydraulic technologies possible. And water's great capacity to absorb heat plays a large role in shaping climate and weather patterns. We can, in a disciplined way, take such qualities into ourselves imaginatively, assisted by writing, drawing, painting, sculpture, or the arts of movement. This in turn may open our eyes to processes of change and transformation in the world, in which water is so often instrumental.

Similarly, each of the four elements offers its own instruction of our understanding. And when we compare and contrast the elements, their teachings become particularly forceful.

The study of the four elements provides a doorway into a qualitative perception and understanding of nature-as-process. In a week-long course in July, Henrike Holdrege led phenomenological studies of the characteristics of the different elements and their interrelations, while artist Laura Summer led painting sessions relating to the different elements. Here are some comments by participants:

“The focus on close and patient observation was great, especially as the focus was on what was observed rather than conclusions or what we ‘know’. I really like your teaching style and that combined with conversations after and between sessions has helped me crystallize my understanding of the connection of things in this natural world, techniques in my work and methods/approach to teaching. I’m inspired to lead more through teaching observations than through stating direction” (Software Engineer).

“I really enjoyed the experiments and observations—gave me ideas for teaching. I also liked the context of what is phenomenology and how it is different from traditional scientific approaches” (Middle School Teacher).

“I very much appreciated the experiments—the entry into a scientific understanding of the elements. My own approach has been more through human behavior and observation of the world around us. I have some new ‘fruitful concepts’ to augment my further looking/seeing/experiencing” (Adult Educator and Author).

“Henrike worked hard to bring us demonstrations that enlivened our study. Our discussions after the demonstrations were exciting for me and very energizing. I will be teaching physics and chemistry this year in grade 7 and I never expected that this course would so directly help me with this” (Middle School Teacher).





Here, There, and In Print

At the Institute

• *Still Ahead: Talk on radioactivity.* Sunday, November 17 (3 pm) Johannes Kühl will give a public lecture at The Nature Institute on “Gestures of Radioactivity and its Effect on Life.” Johannes is a physicist and director of the Natural Science Section at the Goetheanum in Dornach, Switzerland.

• *Open house celebration.* At the end of May we celebrated the completion of our new building, and over sixty people attended the event. The program included musical contributions by Paul Hasse, Eric Müller, and Christina Porkert, together with personal reflections upon the work of the Institute. Henrike Holdrege gave a talk on “Why Goethean Science?” that outlined the central features of the approach to research and education we attempt to develop and practice at The Nature Institute. Board member Douglas Sloan situated the Institute’s work within a concise yet sweeping portrayal of its historical and philosophical background. He highlighted the need to develop a science that addresses the world’s qualities and supports an ethical relation to the natural world. Nature Institute director Craig Holdrege followed with a slide show reviewing key aspects of the Nature Institute’s development over the past fifteen years. Board member Signe Schaefer concluded with some personal reflections upon the Nature Institute’s mission and role in the world.

• *Nature, culture, and landscape.* In June, Jean-Michel Florin, co-leader of the Agricultural Section at the Goetheanum in Dornach, Switzerland, gave a public lecture at the Institute on “How Can We Integrate Nature and Culture in the Design of our Landscape?” He discussed how the idea of landscape has evolved in European culture since ancient times, and showed slides from a variety of painters to illustrate how landscape is an ever-changing interface through which nature and the human world interact. It became clear how most European landscapes are in fact cultural/agricultural landscapes that have deep roots in the past. His reflections gave pause to think about how differently landscapes have developed in North America since its settlement by Europeans. There has been, it seems to me (CH), much less integration of urban, agricultural, and natural environments in the U.S.



• *“Inner and Outer Light.”* In this September talk Henrike gave a variety of striking examples showing how our experience of the visual world emerges out of the interplay of “inner light” — intentionality, learning, and thought — with the light of the sun and other sources of illumination. It became clear that our inner light can color what we see, but this light can become ever clearer and more illuminating when we consciously and carefully attend to the manifold and changing aspects of phenomena we encounter.

• *Cleaning up the land.* In late September we held a Volunteer Work Day to do landscaping on the Institute’s property and trail clearing in the 29-acre wetland preserve of which we are stewards.

• *Monday Nights with the Stars.* Again this fall Henrike leads three evening sessions (September 30, October 28,

November 25) on the night sky. This time she collaborates with the eurythmist Jeanne Simon-MacDonald.

- **Social science as Goethe might have done it.** In October Christopher Schaefer gave a talk on “Perceiving, Understanding and Transforming the Social World: A Goethean Approach.” In the talk and ensuing conversation, Chris explored the contours of a Goethean phenomenological social science—one capable of overcoming the often sterile and control-oriented, causal approach of the western social science tradition. Drawing on Steiner, but also on Max Weber and other continental thinkers, he described ways of reconceiving the social world that honor human freedom and dignity. Chris is a social scientist who taught at MIT, Emerson College (UK), and Sunbridge College. He is currently co-director of the Center for Social Research at the Hawthorne Valley Association. He is author of several books, including most recently, *Partnerships of Hope: Building Waldorf School Communities* (AWSNA Publications, 2012).

- **Special connections.** The Nature Institute’s activities are also linked to other organizations or special groups. Starting in late October, Henrike will teach phenomenological optics and color on seven mornings to the students of the Free Columbia Art Course. Then in November, we will host a meeting of the Natural Science Section of the School for Spiritual Science. Craig and Henrike will guide sessions on “Experiencing the Inner Qualities of Animalness and Humanness.” And, also in November, we will host a one-day invitational colloquium on atomism and quantum theory for scientists and science teachers, led by Johannes Kühl. (See also Johannes’ public lecture, described in the first item above.)

Out and About

- **Food Quality Gathering.** What could be more important these days than understanding more deeply the quality of our food? A group of about twenty educators, scientists, journalists, and farmers (organic and biodynamic) met at the Omega Institute in Rhinebeck, New York, in September to exchange ideas about food quality. Henrike and Craig participated.

In the western world, assessing food quality has been reduced to assessing amounts of different nutrients. But is a box of cereal promising 100% of required vitamin intake nutritious? What about the sensory qualities of food (texture, taste, aroma)? Or the way a plant is grown or an animal treated? Or the quality of soil in which the plants grow? Or the quality of relations between producers and

consumers? Or the quality of the dinner table conversation? In shared knowledge about all of these areas a complex and rich picture of food quality began to take form. The gathering marked the formation of a working group to further understanding and awareness of holistic ways of viewing and producing food quality.

Biodynamic farmer Jean-Paul Courtens, whose Roxbury Farm CSA in upstate New York serves over 1,000, characterized the session Craig led on “Schooling the Perception of Qualities” for his CSA members in the following way:

“One workshop leader led us through an exercise whereby we discovered an apple with our full sense perception. He brought three apples with him from the same tree. One was red, the other mixed red and green, and the third one was almost green. We first carefully looked at it and then he sliced it in small slices. First we touched the apple, then we smelled it, and finally we experienced the full flavor by placing it in our mouths and chewing on it. When you do a mindful exercise like this, you realize that we hardly ever experience our food to the fullest extent. We eat because we are hungry; but as the exercise taught us, mindful sense perception greatly enhances our experience of the world. It is so different getting to know an apple by eating one slice over the course of 15 minutes. For most of the participants it was a mind-blowing experience and, yes, the apple was very good.”

- **At Schumacher College.** In September Craig traveled to the United Kingdom, where he taught a one-week course on Goethean Science for the students of the Holistic Science Masters Degree program at Schumacher College. He also gave a talk on “Thinking Alive With the World: Cultivating the Roots of Sustainability” at the South Devon Waldorf School and at the Rudolf Steiner Centre in central London. He gave an all-day workshop, attended by teachers and teacher education students, at the London Waldorf Teacher Education program. The topic was “Cultivating Living Thinking” in education. At the Ruskin Mill Trust, Craig spent an afternoon and evening in a colloquium with scientists, educators, and farmers, sharing ideas about phenomenological methodology. Finally, he visited paleontologist Judyth Sassoon at the University of Bristol, who works with Goethe’s approach to understand patterns in the fossil record of reptiles.

- **At the New York Academy of Sciences.** Craig was invited to speak in early October to the members of the Lyceum group of the New York Academy of Sciences on the topic of “Goethe and Science.”

• **Henrike in California.** John Gouldthorpe, a long-time friend of The Nature Institute, has begun a venture in Point Reyes Station, California, that he calls “The Creative Compound.” He describes part of what inspired it this way: “Even though the leading edges of our contemporary and accepted science may speak of wholeness, they do so in abstractions. Even if you do understand what the new physics is alluding to—strongly suggesting that we are a part of everything and that everything is part of us—it is not an experienced fact. It can be thought, but it is not a fact that you can feel. Contemporary science’s way of making sense, its style, precludes this uniting of fact and feeling. We can feel good about what the facts suggest but we can’t really feel the facts. Goethe the artist devoted his life to creating an alternative science, a science of wholeness, a science that unites head and heart, body and mind.”

The Creative Compound has begun offering lectures and workshops on Goethean science. The inaugural event was a workshop conducted by Henrike: “Color Between Light and Darkness—Atmospheric and Prismatic Color.” John wrote in his notice about the workshop: “I had the privilege of working with Henrike in the summer of 2009 at The Nature Institute and found her to be a rigorous and delightful teacher. She will be guiding us through the experiments with light and color as Goethe and Newton did, creating the atmosphere where their insights can become our own. It is an honor to have Henrike be our first teacher of science at the Creative Compound.”

• **At Chestnut Ridge, NY.** In September Henrike participated in a conference on “The Challenge of Objectivity in Spiritual Research” at the Threefold Educational Center. As one of six research grant recipients, she presented her work in mathematics under the title, “Mathematics—a Preparation for Spiritual Scientific Research.”

• **Book signing.** At the end of October Craig gave a short presentation at the local Chatham Bookstore about his new book, *Thinking Like a Plant: A Living Science for Life*. Afterwards he engaged in a conversation about the book with Thomas Chulak, co-owner of The Chatham Bookstore, and held a book-signing session.

• **In New York City.** Craig gave a talk on “Living Thinking: Developing a Deeply Ecological Consciousness” at the World Goodwill Symposium on November 2 in New York City.

In Print and Online

• **Thinking Like a Plant.** Lindisfarne Books has released Craig’s new book, *Thinking Like a Plant: A Living Science for Life*. The book is crafted as a practical guide for developing

what Craig calls “living thinking.” Craig argues that this radical new, life-infused way of interacting with the world is just what we need to meet our environmental and social predicaments with courage and skill. The book is intended for educators, scientists, farmers and home gardeners, students, environmental advocates, and general readers as well. Look for more about it—including early reviews and information about ordering—on p. 13.

• **“Leave No Child Inside.”** A book with this title, which has been newly released by *Orion* magazine, contains a collection of articles that have appeared in that publication. One of the articles is Steve’s 1998 essay, “Why Is the Moon Getting Farther Away?”

The article is also available at http://netfuture.org/1998/Apr3098_70.html.

The book itself can be ordered from Orion Books: <http://www.orionmagazine.org/cart/index.php?crn=207>.



• **On Intelligent Design.** Over the years we’ve had inquiries about the theory of intelligent design, but have never had much to say. Now we’ve at least begun to remedy that. Steve has published an article commenting on a book called *Darwin’s Doubt*, written by Stephen C. Meyer of Seattle’s Discovery Institute. While intelligent design theorists rightly point to many of the troubles facing current formulations of the theory of evolution, Steve’s suggestion is that the battles between ID proponents and mainstream neo-Darwinians arise from the common ground occupied by both sides. Both parties found their arguments upon “natural process” viewed in a materialistic sense, and therefore neither party “officially” recognizes the wisdom that is immanent in the organism itself. The proponent of intelligent design has removed this wisdom to an external designer who engineers organisms from the outside, and the conventional biologist has removed it to an abstract and incoherent (but god-like) principle of natural selection that likewise operates on the organism from outside.

The article appears in Steve's online notebook, "Rediscovering Life" (see next item).

• *Toward a Biology Worthy of Life*. This online project of Steve's has been rapidly expanding. And in addition to the new content, it also now has a more convenient and descriptive web address: BiologyWorthyofLife.org — which is part of the larger Nature Institute website. One feature of the project, added since the last issue of *In Context*, is an online notebook, or journal, that also has its own web address: RediscoveringLife.org. Recent postings to the notebook include these:

A sectarian quarrel? Intelligent design and neo-Darwinism — a commentary stimulated by Stephen C. Meyer's book in defense of intelligent design theory, *Darwin's Doubt*.

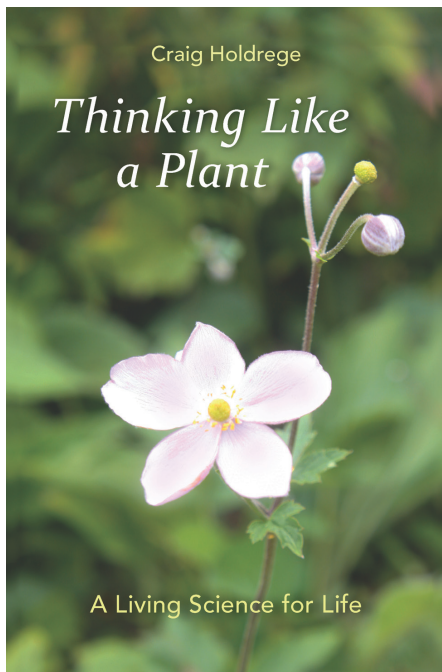
Will the real Walter Gilbert please stand up? — an update on crucial results now emerging from the world's molecu-

lar biology laboratories: we harbor not just one genome in our bodies but, in the typical case, many somewhat different genomes. We are, in the standard terminology, genomic mosaics. What does this mean for our understanding of genes and organisms?

Shattering the genome—This article, regarding a remarkable organism capable of repairing a genome broken into hundreds of fragments, is reprinted in a slightly abbreviated version here on p. 3.

A thousand-stranded tapestry: how organisms employ their genes — an introduction to a massive collection of notes from the technical literature dealing with the regulation of the genome by far-flung processes within the organism.

There is also a new topical index providing convenient access to all parts of the "Toward a Biology Worthy of Life" project. You'll find the index at BiologyWorthyofLife.org/comm/inx.htm.



Order through your local bookstore or directly from The Nature Institute (518-672-0116; natureinstitute.org/store) or from steinerbooks.org.

Available Now

Thinking Like a Plant *A Living Science for Life*

by Craig Holdrege

"Anyone interested in fostering a cultural revolution to develop a 'land ethic' reflecting an 'ecological conscience' that can enhance 'the capacity of the land for self-renewal,' as Aldo Leopold advised, should definitely read this book."

— Frederick Kirschenmann, author, *Cultivating an Ecological Conscience: Essays from a Farmer Philosopher*

"A field guide to new ways of thinking . . . offers practical exercises that invite us to overcome the materialistic, reductionist world view with a holistic way of knowing and experiencing phenomena. Holdrege points the way to a new, integral consciousness that is desperately needed at this moment in time."

— Martin Ping, Executive Director, Hawthorne Valley Association

"The best books are ones that offer an epiphany—a flash of insight that opens a world we'd never known, inviting us to explore its riches. *Thinking Like a Plant* is a book of that kind. The wonderful beings it reveals are ones we see and touch everyday but blithely ignore, to our detriment. What plants have to teach us will enrich our lives and perhaps even save the planet."

— Langdon Winner, Professor, Rensselaer Polytechnic Institute, and author, *Autonomous Technology*