

The Ronald H. Brady Archive

We are pleased to announce a project, already underway, to make available on our website the published work of philosopher Ronald H. Brady.

Throughout his productive scholarly career, Ronald Brady concerned himself with the philosophical foundations and practice of phenomena-centered science. He made substantial contributions to the study of evolutionary morphology and systematics, while also pursuing fundamental issues in epistemology. His 1987 elucidation of “Form and Cause in Goethe’s Morphology” may count among the most decisively revealing biological papers of the past several decades — one that the science has yet to catch up with.

At the time of his death on March 27, 2003, Brady was a professor of philosophy teaching in the School of American and International Studies at Ramapo College, Mahwah, New Jersey, having joined the school’s faculty in 1972.

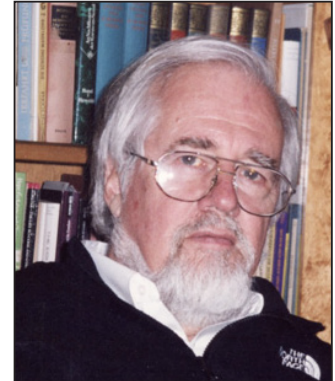
We are now working on The Nature Institute’s “Ronald H. Brady Archive” project, with the intention of putting online as many of Brady’s published scholarly works as possible. The currently available titles are listed below. The project is targeted for completion by June 2015.

Brady told this story about his undergraduate days:

When I began college as a chemistry major my enthusiasm for science was somewhat dampened by meeting a professor of chemistry who pointed out the difference between my own goals and those he, as an experienced professional, would call mature. My passion, he noted, was entirely focused on direct experience — my sense of chemical change was invested in sensible qualities: in smells, colors, the effervescence of liquids, the appearance of precipitates, the light and violence of flame, etc. But, he countered, this was probably closer to medieval alchemy than to chemistry. The latter is really a matter of molecular and atomic events of which we can have only a theoretical grasp, and the sensible experience on which my excitement centered was secondary . . . I was reminded of him when I spoke to a morphologist at Berkeley about my interest in Goethe’s attempt to approach science by keeping to direct experience. The morphologist responded: “You are interested in this approach because you are a Nature appreciator, while I am a productive scientist.” It is always nice to see where one stands.

We think Ron would agree that much of his career was devoted to understanding the views of those college mentors — and also recognizing their limitations. Happily, the fruits of

his work are now becoming conveniently available. We have recently added three papers to the five publications already available on our website. These three deal with problems relating to form, biological classification, and the nature of biological explanation in relation to biological description:



- ◆ “Form and Cause in Goethe’s Morphology” (1987)
- ◆ “Pattern Description, Process Explanation, and the History of the Morphological Sciences” (1994)
- ◆ “Explanation, Description, and the Meaning of ‘Transformation’ in Taxonomic Evidence” (1994)

Here are the other publications by Brady currently accessible via our website:

- ◆ *Being on Earth: Practice In Tending the Appearances* (2006), a book by Georg Maier, Ronald Brady, and Stephen Edlglass. Brady’s chapters are entitled “Direct Experience” (chapter 1), “Intentionality” (chapter 4), and “Manifestation from Inside Out” (chapter 8).
- ◆ “Dogma and Doubt” (1982). This paper explores the role of evidence and belief in the doctrine of natural selection.
- ◆ “Getting Rid of Metaphysics” (2001). Here Brady argues that, because science fails to recognize the mind’s participation in the world it investigates, “scientific thinking is limited to a form of thought that cannot question its own premises.”
- ◆ “The Global Patterns of Life: A New Empiricism in Biogeography” (1989). This essay disentangles the role of observational evidence and “pseudo-phenomenal events” in biogeographical explanations. (Biogeography is the study of the distribution of the ranges of plants and animals.)
- ◆ “Perception: Connections Between Art and Science.” What is the role of thinking (“intentionality”) in the perceived world?

We will complete the project, which includes a further half dozen papers, by June 2015. You will find the up-to-date archive at <http://natureinstitute.org/txt/rb>.

We thank the Foundation for Rudolf Steiner Books, Mahle Foundation, R. Steiner Fund for Scientific Research, and Waldorf Educational Foundation, whose generous support made this project possible.

Form and Pattern in the Amazon

June 1 to June 12, 2015

An invitation to a journey of discovery



Photos by Mark Riegner from previous Amazon trip

Join Prescott College environmental studies professor Mark Riegner and Nature Institute director Craig Holdrege on a twelve-day expedition in the Brazilian Amazon that will apply methods of observation grounded in the view of nature developed by the influential poet and scientist, J. W. von Goethe. This trip will be especially valuable to Waldorf teachers, other educators, nature lovers, artists, and anyone who has an interest in holistic science.

Mark and Craig are long-time colleagues and have decided to team up to co-lead this exciting nature tour that will be tailored to those with an interest in holistic approaches to science and the discovery of patterns in nature. Mark teaches, among other things, ecology field courses in Mexico and Costa Rica, and is author of numerous articles that explore form and pattern in animals as well as the philosophical basis and practical application of Goethe's way of science. He has previously led a tour with this same itinerary.

We will focus on plant morphology and metamorphosis, as well as on form and pattern in mammals and birds. In preparation, and during the trip, we will read and discuss articles and book excerpts by Craig on the practice of Goethean science, plant metamorphosis, and the nature of the sloth (of which we hope to see a few!), and by Mark on Goethe's way of science, form and pattern in mammals, and bird form and color pattern. We will train ourselves to observe nature carefully, using various tools such as clear description, discussion, sketching and other artistic activities, and daily reviews, while also seeking patterns of relationships among the many nature observations we make. We will practice the skill of observation essential to Goethe's holistic way of science and thus try to imagine, and even emulate, how the great poet and scientist would have experienced nature in the Amazon Basin.

We will spend eleven days cruising the Amazon, Solimoes, and Negro rivers and their tributaries aboard our private chartered ship, the *L. V. Dorinha*, operated by Amazonia Expeditions (<http://amazoniaexpeditions.ning.com/>). Each day, we

will explore river tributaries, oxbow lakes, and other channels in small, motorized canoes. Highly skilled boatmen will take us out early in the morning for bird watching and wildlife viewing. In the evening we will explore wildlife with spotlights from the canoes. June is high-water season and will allow us the greatest opportunity to enter deep into the forest by boat and possibly glimpse animals of the forest canopy.

Although we will have a full schedule, this is a relaxing trip. We can settle into our rooms (2 people/room, bunk beds, private bathroom w/shower, air conditioning), unpack just once, and allow the boat to move us every night to a new locale. The seven-person crew is extremely hardworking and very friendly, and will do everything they can to make this trip the best it can be for all on board. We will enjoy an array of fresh foods, local produce, and freshly caught fish (vegetarian diets can be easily accommodated). We'll have the choice to eat in a comfortable dining room furnished with local hardwoods, or enjoy the breezes of the open-air upper deck. Mark and Craig will be available to provide insights into the flora, fauna, and ecological relationships that we'll be encountering along the river. In addition, our captain and some of the crew are experts at locating and identifying wildlife.

We have set the cost of the trip as low as possible. Estimated cost/person (including all accommodation and meals, boat transportation, airport pick up, park entrance fees, etc.):
US \$2,900 (up to 13 participants, 10 minimum) from Manaus
US \$2,800 (14/15 participants) from Manaus
US \$2,700 (16 participants) from Manaus (16 is maximum)
(Note: airfare and Brazilian tourist visa are not included. Participants will make their own travel arrangements to Manaus, Brazil.)

For more detailed information, description, and logistics, please see the Nature Institute website: http://natureinstitute.org/educ/2015_amazon.htm.

We will also provide regular updates through the link. We hope to have commitments by mid-December.

If you have any questions, please contact Mark at mriegner@prescott.edu. We hope you'll join us in the Amazon!

Highlights from Our Summer Courses

In our summer course on “Reading in the Book of Nature” we prepared ourselves each morning with geometry exercises designed to enliven thinking and imagination. Henrike led us in the development of Cassini curves that show a surprising metamorphosis of form. Then we turned to plants. We studied dogbane (*Apocynum cannabinum*), a plant that grows in our old fields. A number of participants noticed that it in some ways resembles milkweed, so we also compared it with the common milkweed and worked to articulate its characteristic features. The transition from carefully taking in all the details to seeing certain qualities or gestures that characterize a plant is the beginning of “reading in the book of nature.”

Later in the week we considered the pea family (Fabaceae) and compared several different species with one another: white sweet clover, crown vetch, red clover, birdsfoot trefoil, yellow sweet clover, cow vetch, and hop clover. It was relatively easy, especially in the flower, to see a shared form and structure. But there was also a wonderful variety in overall plant habit and size, flower color and shape, the way the flowers are arranged on the stem, and in the leaf forms. We began to see in the family a characteristic potential expressing itself in manifold ways. We closed each day working with clay. Patrick Stolfo led us in exercises that further awakened our sense for form and transformation.



Over the course of three and a half days in August, Jaap van der Wal, embryologist and medical doctor from the Netherlands, gave a “performance” of “The Embryo in Us: Dynamic Embryology and Morphology.” Jaap calls what he does a “performance” because he enters into the processes of development and transformation with his attention and imagination so that, in his speaking, gesturing, and the many images he shows, the processes can also come alive in the participants.

What becomes so clear through his presentations is how all form arises out of movement and how gestures and formative movements *performed* by the embryo prefigure later postnatal behavior. For example, the arms and legs develop out of small buds, but the arms grow out to the front in an embracing gesture, while the legs grow down in an extending, standing gesture. Jaap presented an astounding breadth of material and showed in an exemplary way that in order to understand any given detail of the formative process you need to, first, see it in its developing movements and, second, bring it into relation to a broad array of phenomena. Then its deeper significance begins to speak. Readers can go to his website (<http://www.embryo.nl>) and delve into the rich material he provides there.

Fall Events at the Institute

- **A Pathway to the Spiritual in Nature.** At the end of September Henrike and Craig led this weekend workshop in celebration of Michaelmas. The theme was introduced on Friday evening with a talk, “Overcoming the Cartesian Split.” On Saturday and Sunday participants engaged in a variety of observations and exercises.
- **Teach-In on Techno-Utopianism.** Craig was an invited speaker at an October teach-in in New York City on “Techno-Utopianism and the Fate of the Earth,” sponsored by the International Forum on Globalization.
- **Caring for the land.** In October we held a volunteer work day and did landscaping work on the grounds of The Nature Institute. Thank you to all who helped us prepare the land for winter!
- **Technology and us.** Craig held three talks on “Cultivating Humanness in a Technological World” in October and early November. Each talk was followed by conversation. The talks were based on the four talks he gave in June at the annual conference of the Association of Waldorf Schools of North America (see below under “Out and About”).
- **Chasing the light.** Henrike is again giving a course on light and color for the art students of Free Columbia. The expanded facilities at The Nature Institute allow the teaching to be easy and effectual.
- **Math in the upper grades.** In early November we hosted a weekend workshop for middle and high school math teachers: “The Tyranny of ‘Algebra I’: Reimagining Math Curricula.” This weekend was an initiative of Marisha Plotnik, a math educator, mentor of teachers, and new Nature Institute board member, and Beth Weisburn, a high school teacher at the Summerfield Waldorf School in Sebastopol, California.
Henrike also contributed to and participated in the workshop. When she recognized the abstractness in existing Algebra I textbooks, Henrike realized why so many students fail in math. So a goal of the workshop was for teachers to help each other find true inspiration toward shaping an integrated, more meaningful and age-appropriate Algebra curriculum.
- **“Nature’s Gestures in the Cycle of Dying and Becoming”** is the topic of a weekend workshop in mid-November. For the first time Henrike co-teaches with Penelope Baring, who has worked and taught within the Camphill movement around the globe. Their aim is to integrate contemplative practices and exercises in wakeful sense perception to gain a deepening understanding of the world we live in and the role we play in it.

Out and About

- **From compost to freedom and cognition.** In November Craig and Bruno Follador—who has just joined our staff to direct a major new project, *Living Soils*—are leading workshops at the 2014 North American Biodynamic Conference in Louisville, Kentucky. Bruno’s workshop focuses on “Composting as a Free Deed: Being and Becoming.” Craig is leading a half-day pre-conference workshop on “A Goethean Approach in Biodynamic Education and Mentorship,” and also a workshop in the main conference on “A Way of Knowing as a Way of Healing.”
- **Thinking like a plant and sauntering like Thoreau.** Craig was invited by William (Bill) Vitek, Professor of Philosophy and Chair of the Department of Humanities and Social Sciences at Clarkson University in upstate New York, to give a public talk there in late October related to his book *Thinking Like a Plant*. The next day, along with Bill, he co-led a seminar for professors and students on Thoreau’s practice of “sauntering” as a way of knowing. They also dealt with Thoreau’s idea of “wildness.”
- **Activities in England.** In September Craig was in England for ten days. He taught for a week in the Masters of Holistic Science Program at Schumacher College. His topic: “A Practical Introduction to a Goethean Way of Science.” Craig also gave a public talk on “What is Education For?” at the South Devon Steiner School and led a one-day plant study workshop. This, by the way, was the week of the vote on Scottish independence, so Craig had a ringside seat amid the politically intense activities of that week.
- **Teachers and technology.** Craig was the keynote speaker in June at the annual conference of the Association of Waldorf Schools of North America, which was attended by more than 200 teachers and administrators from Waldorf schools in the U.S., Canada, and Mexico. He gave four talks on the conference theme, “Cultivating Humanness in a Technological World.” Craig strove to create an awareness for the ways in which technology is infused into our modern lives and how it both connects and disconnects us from the larger world. To ensure that we don’t get lost in a world of devices, he emphasized, we need to become increasingly aware of ourselves as beings participating in a world of beings. The concrete relation to the sense world and all its qualities is here essential. Participants enthusiastically received that message. For example, one teacher with an advanced degree in computer information systems wrote afterwards, “I think these were some of the most powerful presentations I have ever listened to, and will actually be life changing for some of us (certainly, for me!)” *We plan to make recordings of the talks available. Please watch our website for forthcoming information.*

• **Providing context for a UN advisory group.** At a special June workshop in Montreal, Craig spoke about the risks that *synthetic biology*—an extreme new form of genetic engineering—poses to biodiversity. The workshop was organized to brief official delegates serving on the United Nations’ influential scientific advisory group for the Convention on Biological Diversity, as well as civil society groups that advocate strengthening that international treaty. Craig was asked to provide a contextual critique of assumptions that synthetically engineered organisms can be made to act like controllable and predictable machines. To learn more about synthetic biology, see Craig’s feature article in this issue.

• **Out and about in print.** Craig was invited to write a chapter on “Why Context Matters” for a new book, *The GMO Deception: What You Need to Know about the Food, Corporations, and Government Agencies Putting Our Families and Our Environment at Risk*. (Edited by Sheldon Krinsky and Jeremy Gruber; New York: Sky Horse Publishing, \$24.95, 357 pages.) To read a review of the book by our outreach director, Colleen Cordes, go to: http://natureinstitute.org/nontarget/misc/gmo_deception.php.

Also, a new book has appeared with a chapter about Craig. For details, see “A Dialogue with the World” on p. 14.

Still Ahead

Will you be within trekking distance of any of these events?

Developing a Qualitative Understanding of Nature: Animals, Humanity, and Evolution (At The Nature Institute). A course offered February 8-13, 2015, in collaboration with Hawthorne Valley Farm and the Biodynamic Association of North America.

Science rooted in experience (Sebastopol, California). In late February, Craig and Henrike will be in California attending a conference for middle and high school teachers, “From Phenomena to Insight.” The event is sponsored by the Center for Contextual Studies at the Summerfield Waldorf School in Sebastopol. Craig will give four presentations about the foundations of phenomenology and experience-based science. He will also give a workshop for biology teachers at the conference, which runs February 17-21, 2015.

Geometry and plants (Los Angeles). February 27 to March 1, Henrike and Craig will lead a public workshop sponsored by the Pasadena branch of the Anthroposophical Society on “Developing Living Thinking: Projective Geometry and Plant Study.”

Mathematics Alive! – The Platonic Solids (At the Nature Institute). The weekend of April 10-12, 2015, Henrike Holdrege and Marisha Plotnik will explore the geometry of the five Platonic solids and their relevance for the adolescent student from a variety of points of view. Hands-on work and movement, drawing, imagination exercises, and collegial exchange will all be part of the weekend.

International teacher training (Kassel, Germany). In early spring Craig will teach a five-day course to high school teachers and high school teacher trainees at the International Refresher Week of the Institute for Waldorf Education. The program is attended by teachers from around the globe. His topic is “Evolution as Metamorphosis.” He will also give a talk for all conference participants entitled “Does the Giraffe Have a Long Neck? The Challenges of Holistic Biology.”

Adventure in learning (On site in the Amazon Basin). Let your imagination embrace what you may never have considered before. Could the wonders of the Amazon River basin be in your future? See p. 10.

Welcome to our New Colleague

In October Bruno Follador joined The Nature Institute as a full-time colleague. A Brazilian, Bruno is deeply connected to the Goethean approach to science and is passionate about cultivating healthier interactions with nature in agriculture. He studied geography in Brazil and has trained in biodynamic farming. He recently worked for three years in Germany in farm-scale biodynamic composting. He has extensive experience as a farm consultant and is expert in qualitative methods for assessing soil and compost quality. His approach is rooted in the work of Ehrenfried Pfeiffer, a biochemist and agronomist who pioneered organic and biodynamic farming methods.

Bruno will develop and direct a new project we are calling *Living Soils*. Its broad intent is to stimulate holistic ways of perceiving and working with the farm as a dynamic organism and, more specifically, to integrate the development of high-quality composting into the life of the farm to improve soil fertility. Bruno will be working with farmers locally, regionally, nationally, and internationally. He will also hold workshops and continue research in holistic methods of assessing quality.

We welcome Bruno. You will be hearing more in the future about his work.

A Dialogue with the World

Michael Riordon, author of An Unauthorized Biography of the World and Eating Fire, has written a new book entitled Bold Scientists: Dispatches from the Battle for Honest Science. The book includes a chapter with the above title, featuring interviews with Nature Institute director Craig Holdrege and reflections upon his work. Here are some excerpts from the chapter:

“There was a time in the past when science actually meant more open inquiry, the search for knowledge,” Craig continues, “but now it’s become a very specific method you have to follow. And if you don’t, it’s not science. I don’t see that as a higher standard, but a greatly reduced one. And a real problem.”

We’re sitting at a wooden table in the library/meeting room, sipping water from the institute’s well. Through open windows I hear birdsong. But my brain is working hard here; I can almost feel it sweating. Although I’m accustomed to thinking and questioning, I don’t know enough yet to fully fathom what Craig is talking about, but clearly it depends on learning to see—that is, to use our senses to find our way in the world—in a fundamentally new way. So I learn the way I usually learn, by asking more questions.

Craig spoke earlier about “the traps we fall into with our abstractions and theoretical constructs.” What does he mean?

“I’ll give you an example,” he says. “If you look at biology in the twentieth century, it’s been dominated by genes and genetics, the search for the ultimate cause of why organisms operate the way they do. Genetic science has been very successful in using reductionist methodology to find a substance, DNA, that plays a very important role in the lives of organisms.” Reductionism is the belief that complex systems are nothing but the sum of their parts, and that to understand the whole, we need only understand the parts.

“But then there’s been this overwhelming temptation to regard DNA as the ultimate cause,” says Craig. “Think of the Human Genome Project: when we figure it all out, we will have basically deciphered the book of life. This is a very narrow view. Knowing the DNA sequence is only the beginning. We don’t know how it’s embedded in the nucleus within the cell, the cell within the tissue, and so on. Context gives meaning to genes. Finally in the past ten, fifteen years, geneticists are beginning to talk about this—the importance of context, the fact that genes need the whole to function. The new term is epigenetics.”

A new term for an old new idea, apparently. Teaching biology classes in Germany and here at the Hawthorne Valley school, Craig would introduce the topic of genetics by talking about the plasticity of organisms. “If you take the seed of any plant, it can develop in many different ways, depending on context: the food it gets, light, soil, temperature, timing,

all kinds of influences. If this process is plastic, meaning flexible, then it’s not predetermined. There is no such thing as the leaf form. It arises over time, within a dynamic context. Of course there’s a usual pattern for an oak leaf, different from the usual pattern of a maple leaf, but the pattern of each is quite fluid within boundaries. So then it becomes clear that the concept of the gene as a fixed entity is a high-level abstraction, not a biological reality.”

Why is it a trap? At this point Craig introduces me to Kurt Goldstein (1878–1965), a German pioneer in neuropsychology. Goldstein argued that a central flaw in modern science is the tendency to ignore the problem of isolation.

“If you come to knowledge by isolating things—let’s say the different components of a cell—you take them out of their natural environment, put them under a microscope, and you fundamentally change the conditions of their normal existence,” he explains. “Kurt Goldstein said the problem with this is not that we do it, but that we forget we’ve done it. We abstracted the part from the whole, the larger reality, then we assume that what we learn from the process is in itself the actual reality. It’s not.

“So this is the trap I see in abstraction. Human beings have this great ability to abstract, to stand back from things and explain them. This can be a gift, but when we substitute our abstractions for the real things, it becomes a problem. It’s tempting to say that this is the cause of that. But then you have to ask, but within which context is it true? In one context it may be true, in another not. Goethe was keenly aware of this. He always wanted our perceptions to arise from a kind of dialogue with the world. From this perspective, knowledge is an organic process, less arrogant, more modest. It requires a certain amount of humility.”

Not the best route to a Nobel Prize, I suspect, but it makes good sense in a world we’re frantically breaking down into saleable parts, without anyone having a clue how to put it back together.

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“The point is,” says Craig, “we need to enter into conversation with other organisms to understand how each speaks from its own characteristics and the way it’s related to the larger environment. Out of that we can weigh how our decisions are going to affect or interact with these animals or plants. I’m not saying we have to go back into the forest and live only from wild plants. We are manipulators in the world, we use our hands and brains to do things, and we interact whether we know it or not. Even if we ignore something, that’s another way of interacting. So really it comes down to a question of being fully aware of what we’re doing, and being fully responsible for it. I only

wish these kinds of questions were part of science training, so students could learn to think about the consequences of what they're doing. Then at least they couldn't claim their approach is the only one they could take. It's tragic when they only encounter one way of seeing the world."

Bold Scientists was released this year by the Toronto publisher, Between the Lines. To find out more about the book and how to order, visit the publisher's website, <http://btlbooks.com/book/bold-scientists>.

