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Post-Materialist Integral Ecology

Experiments in the Peruvian High Amazon

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Abstract

This essay is an example of a post-materialist science in the work of molecular biologist Candace Pert. Post-materialist science supersedes materialist-reductionist science and integrates spirituality with materiality. This discussion is motivated by the author's experience as an academic in a New England institution. Integral ecology is entangled with post-material science as in the work of cosmologist Brian Swimme, Thomas Berry and Mary-Evelyn Tucker. The last part discusses the author's creation of a non-profit organization in the Peruvian Upper Amazon. The work of her center is a response to requests by the local indigenous leadership for an alternative to their slash and burn form of agriculture. The alternative is the regeneration of a pre-Columbian anthropogenic Amazonian soil known as Terra Preta do Indio (black earth of the Indians) in Brazil, which integrates materiality and spirituality and offers the possibility of food security and sovereignty as well as climate mitigation.

Keywords

post-materialist science – integral ecology – spirituality – Peruvian Upper Amazon – indigenous agroforestry – slash and burn agriculture – terra preta – anthropogenic soils

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Post-materialist science does not reject the empirical observations and great value of scientific achievements realized up until now. It seeks to expand the human capacity to better understand the wonders of nature, and in the process, rediscover the importance of mind and spirit as being part of the core fabric of the universe. Post-materialism is inclusive of matter, which is seen as a basic constituent of the universe.

MARIO BEAUREGARD, LARRY DOSSEY & LISA MILLER¹

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The [Papal Encyclical, *Laudato Si* of June 2015] encouraged the moral forces of concern for both the environment and people to be joined in “integral ecology”. “The cry of the Earth and the cry of the poor” are now linked as was not fully visible before.

MARY EVELYN TUCKER and JOHN GRIM²

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1 Introduction

Both Post-Materialist Science and Integral Ecology have been central themes in my writings and my teachings for a long time. What is new for me are these two labels: Post-Materialist Science and Integral Ecology but not the themes they refer to, themes I have been grappling with for a very long time. In this essay, I join them together for the first time since I realized that each of them separately left out some crucial dimensions in my work, experiences and concerns. The newest dimension is the one conveyed by the label ‘post-materialist science’, a label given by a group of scientists at a meeting in 2014 in the US.³ In my teachings and writings, I had been avidly reading the work of scientists that question the Classical Cartesian-Newtonian Scientific Paradigm of an insentient mechanical world and suggested that some immaterial factor

1 Paragraph 16 of the Manifesto for a Post-Materialist Science.

2 “The Movement of Religion and Ecology: Emerging Field and Dynamic Force” introduction to *Routledge Handbook of Religion and Ecology*; 2016:3

3 <http://opensciences.org/about/manifesto-for-a-post-materialist-science>.

such as mind and/or spirit, and/or consciousness were neither epiphenomena of brain activity nor exclusive human capacities but rather were abroad in the universe. When I read Lisa Miller's 2015 book *The Spiritual Child*, I came upon with great delight and excitement her term 'post-materialist science' which then led to finding the 2014 manifesto for a Post-Materialist Science online.⁴ Labels are magical things; they at once gather together heretofore dispersed ideas or realities and also inaugurate—I would even dare to say 'create'—a field of discourse and reality that did not exist previously.

The joining together of the terms post-materialist science and integral ecology seemed for me to powerfully enable at once the recognition of the crucial spiritual dimension of the discourse on 'integral ecology' and simultaneously extricate it from any one particular religious tradition and with that remove it from the increasingly loud and violent religious conflicts of today. Furthermore it immediately signals that spirituality may not be a non-material or "supernatural" phenomenon excluded from scientific consideration ever since Robert Boyle's invention of the scientific experimental method in mid-17th century. Post-materialist science rather sees that materiality and spirituality may be entirely entangled.

Central to the discourse of integral ecology, especially in the manner in which Pope Francis wields it, is the idea that the natural and the cultural—i.e. the ecology and the human-made—are also inextricably intertwined.⁵ The 'cry of the earth', namely 'the natural', and 'the cry of the poor', an aspect of the cultural, are forcefully brought together as being of one concern, one reality. In this version of integral ecology nests the long-pedigreed work of especially feminist scholars who have criticized and rejected the exclusive dichotomy—or dualism—between nature and culture.⁶ Those scholars, and especially the Australian philosopher and ecofeminist Val Plumwood, have highlighted the colonizing dynamic inherent in such a dualism.

In what follows I present first my interest in the works of some post-materialist scientists as issuing from my experience in academia. I follow this by presenting the work of some post-materialist scientists and end with my own

4 For this actual finding I am gratefully indebted to my friend Jacques Mabit, MD who after a recent long conversation between us where I conveyed my enthusiasm for this category, went online and sent me the link.

5 For an excellent and thorough presentation of the history and philosophy of the terms 'integral ecology' see Sam Mickey's 2014 book: *On the Verge of a Planetary Civilization: A Pilosophy of Integral Ecology*.

6 Some names that immediately come to mind are the works of Marilyn Strathern, Donna Haraway, Judith Butler, Val Plumwood, Karen Barad among many others.

experiments in post-materialist integral ecology in a non-profit center I created in the Peruvian Upper Amazon. The creation of this center was intimately connected to the reasons for my retiring rather early from my academic career in anthropology in an elite New England institution.

2 Tensions in My Experience of Academia

For me the imperative of our times is the need to heal ourselves, help heal our youth and our ravaged earth, in other words the need for integral ecological healing, healing the split between nature and culture, between mind and body, mind and heart and spirit and matter. We also need to recognize that spirituality is at the very core of such an endeavor. The following anecdote reported by the Columbia University psychologist Lisa Miller, Director of the Clinical Psychology Program at Columbia University Teacher College, could have happened in my own institution, Smith College, where I taught anthropology for 26 years:

A few months into her first year at an all-women's college, [Marin] knew she was no longer unique. Her initial visit to the campus health clinic resulted in a brief chat, followed by a diagnosis of depression and an immediate prescription for an antidepressant; there were no offers for extended conversation beyond management of the medication. Her inner experience was not the topic at hand. Developmental depression wasn't mentioned. Her depression was viewed strictly as an illness.⁷

During my academic career at Smith, many students came to me with similar stories. I remember vividly being told by deans at orientation workshops for faculty that we are never to engage students about their personal lives. We are teachers, not psychologists or psychotherapists. Education is not to transform the youth but to educate them with the accumulated knowledge housed in print and other media under the motto of "knowledge for knowledge's sake".⁸ However, what finally drove me to retire early and create a life more whole for myself and for students was the feeling that spirituality was taboo as a personal experience, although totally acceptable on week-ends in church or

7 Lisa Miller *The Spiritual Child: The New Science on Parenting for Health and Lifelong Thriving*. 2015:301.

8 For a much more thorough critique of this motto see my introduction to my 1998 book *The Spirit of Regeneration*. Edited with PRATEC.

temple or mosque, outside of academia. Anthropologists of course study the spiritual traditions of other folks, but to be personally touched, inspired or God forbid even transformed by those, is a strictly enforced taboo among the tribe of anthropologists. We study *about* other folks' customs and practices just like classical natural scientists study *about* this mindless, inert, soulless mechanical nature.

Today, however, a new kind of science is showing us that it is impossible to remain outside of what we observe and learn *about*. What we learn is about ourselves as part of what we observe/measure. This impossibility is brilliantly explained in Karen Barad's 2007 book *Meeting the Universe Halfway* that both expounds as well as extends Niels Bohr's work in Quantum Mechanics. With the post-materialist manifesto, the inclusion of mind and spirit in what scientists are finding and investigating explicitly heals the dualism between spirituality and materiality we have inherited from the scientific revolution and the enlightenment.

For most of anthropology, the encounter with humans different from ourselves is not primarily and not importantly one of reciprocal sharing and learning with and from each other, making oneself vulnerable to perhaps experiencing and knowing the world and yourself in a completely different way than the one you were taught, finding these lessons valuable and enriching and adopting some of them. The latter is labelled 'going native' and strongly advised against in our anthropological training.⁹

As the cosmologist Brian Swimme puts it in an earlier book of his: "by depriving ourselves and our children of direct contact with the numinous powers that fill the universe, we are choosing a diminished existence". (1997:46) The lack of spirituality in my academic life led me to a severely diminished existence. It was my experiences in my first two periods of ethnographic fieldwork in Odisha, India that opened up for me those numinous powers of the universe. It changed me profoundly and for good. But I had to perform a split between my heart/soul and my head-knowing that is so common in the way we are raised and educated in modernity. I lived for many years a sort of split existence between my academic self and my spiritual self. It eventually induced in me a pervasive form of depression. Having to stick things out at Smith at least until the youngest child was out of college, I decided to take action and created together with a physicist colleague at Amherst College a Five Colleges Faculty Seminar

9 I recognize that things have changed greatly in the field lately; however, anthropology remains on the whole a discipline dedicated to "representing" other worlds, a posture I have argued in my book *Subversive Spiritualities* to be a direct descendant of the colonial anthropology that created the field.

we named “New Epistemologies and Contemplation” dedicated to healing that split.¹⁰ What became obvious for me then is that by the late 1990’s any faculty member could be out of any imaginable sexual closet but not out of the spirituality closet. We tried to change things in this Five Colleges forum but were not successful in institutionalizing this space and giving it academic legitimacy and continuity even though we had the strong support of the then chancellor of the University of Massachusetts. It all came to nothing in the end but this seminar enabled me to get out of my depression and face academic life with more equanimity. When my youngest child graduated from college in 2006 I decided to retire the next year and create an alternative space with an alternative pedagogy and an emphasis on what I now call post-materialist integral ecology and then named ‘biocultural regeneration’.

So here at the field campus of my non-profit organization in Lamas in the Peruvian Upper Amazon where I am writing these lines, I have tried to create a space where this split can be healed. Before turning to my experiments in this center in the Upper Peruvian Amazon, let me first introduce some examples of post-materialist science.

3 An Example of Post-Materialist Science

Taking a quick pulse of the situation in the world today, I would suggest that the dualistic Cartesian/Boylean/Newtonian paradigm—also referred to as the Classical Scientific paradigm in science studies—radically separating mind/psyche/spirit from world is still dominant in academia and all the other institutions of the Nation State, as well as in the modern media and culture in general. This situation is what has led me to feel the need to introduce students at my field campus in the Peruvian Upper Amazon to the new kind of post-materialist science that is emerging.

The findings of some recent scientific research open for us through strictly empirical means completely new vistas. Such research we know is carried out entirely outside the bounds of anything remotely religious or spiritual and therefore its findings cannot be accused of being a covert means of spreading any particular faith tradition. I will come back later in this essay to the necessity of making visible the numinosity of such post-secular and post-materialist

10 The Five Colleges in this area of western Massachusetts are: The University of Massachusetts at Amherst, Smith College, Amherst College, Hampshire College and Mount Holyoke College. An organization called The Five Colleges Inc. administers a series of shared academic activities and students in any of those can take courses in any of them.

findings. I will also argue for the necessity to embody and enact those new vistas since a purely cerebral, analytical knowledge is not enough to generate actions that can bring changes in the world.¹¹ In this latter endeavor it will be necessary to have recourse to ancient, ancestral rituals and other forms of expressions.

I have chosen the research of a biochemist, a very mainstream hard-working scientist completely dedicated to her assays in the lab at Georgetown University, working feverishly and in her own words, “accountable only to members of our highly exclusive club”. What is remarkable in this researcher is that the results of her painstaking work completely transformed her in a way she could not and did not ever imagine possible. Even more unusually, the transformation she underwent as a result of her findings in the lab propelled her to share what she had learned as widely as possible, beyond the usual fora of scientific conferences, meetings and publications. For that I am deeply grateful since I lack the specialized scientific training that would allow me to readily understand—should I locate them—her and her co-researchers’ scientific communications. She has also been willing to ponder the wider cultural and philosophical implications of her work, something that is totally discouraged in younger scientists by their mentors and colleagues and very much derided. Candace Pert published her findings for a wide general audience only some 14 years after her breakthroughs in the lab and of course after having established a rock solid scientific reputation in her field.¹² I would not be surprised at all if the publication of her widely read book did not put a serious dent in her reputation as a first rate biochemist, especially since it contains a foreword by Deepak Chopra, an MD who openly uses eastern spirituality in his writings, anathema to most academics and an excuse to dismiss his work.

In her study of peptide molecules and their receptors she discovered that all the systems of the body—the neurological, the endocrine, the immunological and the gastrointestinal—were joined together by the actions of discrete messenger molecules. All the different systems of the human body communicated with each other through those messenger molecules and their receptors. For example, the immune system can communicate with the brain or nervous system through peptides issuing from immune cells that could affect the brain through their action on peptide receptors in the brain’s blood vessels, on surrounding membranes or even on neurons. (Pert 1997:172) The nervous and the

11 This is the lesson from both Varela, Thompson & Rosch’s work as well as Brian Swimme’s 1996 book.

12 Candace Pert *Molecules of Emotion: The Science Behind Mind-Body Medicine*, Scribner, 1997.

immune system were shown to be clearly in communication with each other. Peptide molecules squirted by one system could travel to any other system and through their attachment to a peptide receptor in that other system, convey information between those two systems. However, due to the silo nature of academic knowledge where the specialization of immunology and that of neuroscience or endocrinology or gastroenterology for example prevented easy communication between them, the implications of this discovery took a decade to have an impact on those fields. Pert and her co-researcher Michael Ruff published their findings in *Science* but the difficulty just mentioned resulted in it being ignored for a decade.

The work however found interest in a field emerging mostly from psychiatry and psychology labelled Psychoneuroimmunology or PNI. "By providing PNI with a clear scientific language, that of neuropeptides and their receptors, we helped legitimize it" (Ibid: 176) However Pert and Ruff's own term for this new field was different: psychoimmunoendocrine system, feeling that the term 'psycho' and 'neuro' were redundant since for them the psyche and the neurological system/brain are both of the same kind: namely mind, emotions, psyche (Greek for soul).

Crucially it seems to me, Ruff asked of Pert why use the prefix 'neuro' to speak of the same peptide found in the gut or immune or endocrine systems? Why also speak of neuroreceptors if those too are found in those different body systems? Pert agreed and when they shifted to using the terms 'peptides' or 'information substances' it became more obvious to them that they were describing a body-wide communication system sharing information across cellular barriers between different systems of the body. Because the part of the brain where peptides and receptors are most abundant are also the parts of the brain involved in the expression of emotions, they were led to conclude in their joint 1985 article in the *Journal of Immunology* that those peptides and their receptors "thus join the brain, glands and immune system in a network of communication between brain and body, probably representing the biochemical substrate of emotion."

However, in her book Pert modulates this single emphasis on emotion. She states that what she and Ruff have been talking about all along is *information*. She speculates that the mind is the flow of information as it moves among the cells, organs and systems of the body. Although the mind as humans experience it is immaterial, it also has a physical substrate: the body and the brain as well as the immaterial flow of information. She writes the following on page 185:

The mind then, is that which holds the network together, often acting below our consciousness, linking and coordinating the major systems and their organs and cells in an intelligently orchestrated symphony of life.

Thus, we might refer to the whole system as a psychosomatic information network, linking *psyche*, which comprises all that is of an ostensibly nonmaterial nature, such as mind, emotion, and soul, to *soma*, which is the material world of molecules, cells, and organs. Mind and body, psyche and soma.

Her work and that of her co-researchers, totally empirical, totally based on endless series of carefully prepared lab assays, ends up with results that upend one of the most tenacious of modernity's dualism, that between mind and body. Since the body is part of the material external world, part of Descartes' *res extensa*, her work has far wider implications about supposedly soulless, mindless purely material nature.

Pert's answer to the following question from skeptical reductionist colleagues opens up a truly paradigm shifting horizon. "Doesn't the flow of peptide *change* the physiologic responses, which then create the feelings we experience? Doesn't the chemical release of endorphins *cause* the feeling of pain relief?" She does not deny that this is true but points out that it is only half of the truth. What she has discovered and verified biochemically is that changes in rate and depth of breathing bring about changes in the quantity and kind of peptides released from the brain stem and vice versa. (Ibid: 312) Since many of the peptides are endorphins which are the body's natural opiates, our conscious, willed changes in breathing pattern bring about a diminishing of pain through the release of endorphins via peptide messenger molecules. Another consciously willed practice that is similar is that of biofeedback that is able to control pain, heart rate, blood circulation, tension, and relaxation for example. Such discoveries lead her to the following extraordinary statement:

We can no longer think of emotions as having less validity than physical, material substance, but instead must see them as cellular signals that are involved in the process of translating information into physical reality, literally transforming mind into matter. Emotions are the nexus between matter and mind, going back and forth between the two and influencing both.

Ibid: 189

Thus, the peptides and receptors amount to a process of information exchange, of two-way conversations between all the systems of the body, going on below the threshold of consciousness. The peptides and their receptors also amount to conversations between our conscious mind and will and those processes

inside the body. This two-way information process takes us out of the Newtonian billiard ball paradigm with one-way pushes from behind.

Another profound realization came to Pert via a friend, Dr. Robert Gottesman. Gottesman brings the conversation around the concept of information and quotes Gregory Bateson's definition of information as 'the difference that makes a difference'.¹³ It is crucial to realize that the perception of a difference that makes a difference can only originate in a particular observer or perceiver, it is only *so to the observer*. In this way of understanding, or new metaphor, the observer is an active part in defining reality since the difference that makes a difference is so only to the observer.¹⁴

Toward the end of her book Pert comes to the conclusion that this psychosomatic network she has discovered and described is run by an intelligence not of the individual but shared among all humanity and *all life*. Recent research has shown intelligence in mycelium, in trees and their root system, possibly in all plant life, in animals. Humans are only nodal points in a vast shared network made up not only of humans but of the non-human world as well. She states that:

It is this shared connection that gives us our most profound sense of spirituality, making us feel connected, whole To think otherwise is to suffer, to experience the stresses of separation from our source, from our true union. And what is it that flows between us all, linking and communicating, coordinating and integrating our many points? The emotions! ... I believe that the receptors on our cells even vibrate in response to extra corporeal peptide reaching, a phenomenon that is analogous to the strings of a resting violin responding when another violin's strings are played ... The oneness of all life is based on this simple reality: Our molecules of emotion are all vibrating together.

Ibid: 312

This dedicated biochemist, through patient detailed and sustained research well insulated from religion or spirituality has come to a view powerfully evok-

13 See Bateson *Steps to an Ecology of Mind*, 1972.

14 This is what Neils Bohr's quantum physics showed also. For a brilliant exposition and extension of Bohr's work see Karen Barad *Meeting the Universe Half Way*, 2007. In both a jointly written 2017 book and my 2011 book I have used extensively Barad's work on Bohr. I would consider Bohr and Barad's work as being examples of post-materialist science and offering a radically new paradigm to replace the Classical Scientific one.

ing indigenous and other worldviews without ever mentioning any particular religious or other spiritual traditions. History or theology are not fields that biochemists typically frequent. That is precisely why the spirituality that Pert discovers and articulates at the end of her book qualifies as deserving the label of a post-secular and post-materialist spirituality. It has its roots ironically enough in empirical research carefully insulated from anything remotely spiritual. The findings do not spring from any one particular religion or spiritual tradition and thus cannot be perceived as attempting to find wanting and subtly try to undermine one's own religious or spiritual tradition. It is difficult to accuse it of "unbelief" since belief nowhere plays a part in it. Furthermore, the spirituality Pert invokes is general and vague enough to be interpreted in other traditions' languages. In today's world where religious strife is once again front and center in the news, this is welcome news indeed.

The following example I think makes my point rather forcefully. Pope Francis's encyclical hopefully will be widely read, shared and taken to heart. However, I doubt that those who think that their religion is the only true one will bother with this text. In fact, surfing recently on the internet, I came upon a series of short videos showing Pope Francis visiting and reaching out to many leaders of other faiths and of other Christian traditions. The last video totally took me by surprise. It turned out that this whole series was created by a Christian fundamentalist group that in the last video portrayed Pope Francis as the anti-Christ, as satanic, and the fount of all calamities befalling the world today, due to his efforts to reach out to other Christian churches and to non-Christians of many other religious traditions.

4 **Cosmology, Spirituality, and Lessons from the Drug Epidemic**

Cosmologist Brian Swimme shares a revealing personal story about cosmological discoveries and attempts to communicate them. When describing his feelings when entering into the new scientific cosmological findings and orientation, people often asked him if he used drugs. His initial reaction was to somewhat angrily reject such a suggestion which he associated with his listener's equating the feelings cosmological scientific discoveries induced in him with tripping and all the negative consequences that came with drug addiction. However, upon reflection Swimme came to very different views. He concluded that alcohol and drugs are an intrinsic feature of consumerism, necessary for its sustainability. Consumerism is based on the basic assumption of the modern world view, namely that the world is made of dead, inert objects. These objects are in Swimme's ironic words mostly 'unmanufactured consumer goods'. The

deliriously abundant glory of the natural world, of the cosmos, is reduced to an inert mechanism there for humans' exclusive use.

Humans are of this world, created from and with it, and this western modern paradigm cuts us off from the extraordinary expressiveness of this living, sensuous, numinous world. We are left alone among our kind, bereft of this numinous and exuberantly varied part of ourselves. The non-human world, the cosmos has agency, sentience and more. Candace Pert writes that like information, emotions travel between two realms: mind and body; the peptides and their receptors in the physical, body realm and the emotions in the non-material mind realm. Information belongs to neither of these realms but touches both, occupying a non-material realm called by information theorists the 'inforealm'. She concludes that "[i]nformation theory releases us from the trap of reductionism, positivism, determinism and objectivism. Information theory is a rich language of relatedness, cooperation, interdependence and synergy." (Pert: 1997:261).

These and other such findings among several post-materialist scientists have barely percolated within academia, let alone the wider society and culture. All the major institutions of modern society are still based on the old Classical Scientific worldview, one that gives certainty and power over the non-human world and all those humans perceived as being closer to it.¹⁵ So all those institutions are not going to welcome with open arms the kind of news some scientists are bringing us lately. The reaction is what the neo-Jungian psychologist James Hillman calls 'collective ego-defenses' of the repressed unconscious of modernity.¹⁶ Modernity is still overwhelmingly in the grip of this dead world which is also a deadening, pathological world. Swimme thinks that "hoping for a consumer society without drug abuse is as pointless as hoping for a car without axle grease." In what follows he explains why:

When humans find themselves surrounded by nothing but objects, the response is always one of loneliness ... But isolation and alienation are profoundly false states of mind. We were born out of the Earth Community and its infinite creativity and delight and adventure. Our natural genetic inheritance presents us with the possibility of forming deeply bonded relationships throughout all ten million species of life as well as

15 Bruno Latour calls this "The Modern Constitution" in *We Have Never Been Modern*; HUP 1993. See also Val Plumwood on the dominating, colonizing nature of this worldview, especially *Feminism and the Mastery of Nature*. London: Routledge, 1993.

16 James Hillman *The Thought of the Heart & the Soul of the World*; 1992:93.

throughout the nonliving components of the universe. Any ultimate separation from this larger and enveloping community is impossible, and any ideology that proposes that the universe is nothing but a collection of pre-consumer items is going to be maintained only at a terrible price.

1996:33-34

Today this ten million species has been severely diminished with the largest extinction of species since the disappearance of the dinosaurs, and one caused by humans, giving our geologic era the label of the 'anthropocene'.¹⁷ We are all in deep mourning, depressed and bereft whether we are aware of it, or of its deep lying causes or whether we have repressed all of this to our collective unconscious.

In terrible synchronicity, after writing these words, I opened my online New York Times and in it on January 6, 2017, I find an article on the devastating drug addiction epidemic throughout the 50 US states titled "Inside a Killer Epidemic: A Look at America's Opioid Crisis" detailing with precise figures the 'terrible price' consumer society pays:

Opioid addiction is America's 50-state epidemic. It courses along interstate highways in the form of cheap smuggled heroin, and flows out of 'pill mill' clinics where pain medicine is handed out like candy. It has ripped through New England towns, where people overdose in the aisles of dollar stores, and it has ravaged coal country, where addicts speed-dial the sole doctor in town licensed to prescribe a medication.

Public health officials have called the current opioid epidemic the worst drug crisis in American history, killing more than 33,000 people in 2015. Overdose deaths were nearly equal to the number of deaths from car crashes. In 2015, for the first time, deaths from heroin alone surpassed gun homicides.

And there's no sign it's letting up, a team of New York Time reporters found as they examined the epidemic on the ground in states across the country. From New England to "safe injection" areas in the Pacific Northwest, communities are searching for a way out of a problem that can feel inescapable.

Well, the problem will continue to be inescapable as long as our collective ego defenses repress the depth source of our murder some 400 years ago in

17 See Elizabeth Kolbert *The Sixth Extinction: An Unnatural History*. 2014.

Western Europe of the experience and celebration of this numinous world from which we sprang and of which we are made. This murder was necessary to the emergence of this consumer society where just about everything is a commodity and thus for sale. That world was then called *Anima Mundi*, The Soul of the World and is extraordinarily reminiscent of Amazonian and other indigenous worldviews.

Meanwhile, there is hopeful news from Lisa Miller. In her 2015 book *The Spiritual Child* she marshals an impressive amount of scientific psychological research showing unambiguously that the *only* thing that can protect up to 40% adolescents and young adults from drug addiction, 60% protect them from depression and 80% protect them from risky sex is spirituality. She echoes the words of Jacques Mabit MD, founder and director of Center Takiwasi in Tarapoto, Peru that with remarkable success treats drug addiction combining western psychotherapy with indigenous ancestral plant medicine and shamanism.¹⁸ Miller states that the escape and connection teens experience with drug use “needs to be understood as a spiritual quest, inherently good and important.” (2015:43) Such a view is also shared by Swimme who writes that:

It is simply not human finally to live a life sealed off from all conscious contact with those powers at work throughout the Earth and universe and within every one of our cells. So intolerable is this sense of being out of it, of being left out, of being without central meaning for the world, we will resort to any route to ease the pain. And the quick and mindless way ... is to ingest mind-altering chemicals that dissolve the thin veneer of consumer culture ... spiritually desiccated ... [and] out of touch with the numinous powers pervading each being in the universe ... Thus, if only for a moment, and sometimes at a horrible cost ... one can be at home again in the great flood of beauty.

1997:35

Miller's book focuses its energies on bringing to parents the results of rigorous and multiple scientific studies that all amount to showing that lived spirituality is the only preventive measure that works. She does not spend her energies on tracing the depth collective roots of the drug epidemic in modern consumer society, although she repeatedly points to the problem with a misplaced

18 My own non-profit center, Sachamama Center for Biocultural Regeneration (SCBR), a half hour drive from Takiwasi, has for years had a collaborative relationship with that center.

emphasis on material science. She emphasizes the split that occurs early in children's development between "logic-based learning and direct experience and inner heart knowing" (Ibid: 169) She stresses modern culture's, particularly American culture's, lack of value given especially to children and adolescents' inner voices and inner wisdom as "not real, ... not scientific". (2015:74)

Educational institutions from K through PhD overwhelmingly emphasize the rational, analytical mind, leaving to the arts such concerns pertaining to the creative imagination but not to 'reality'. She calls this inner wisdom 'heart knowing' and adds that "[d]ue to socialization in our current society, heart knowing is often blocked, denied, or disintegrated. This leads to enormous suffering, as we can become cut off from other people, our higher selves, and even our transcendent relationship." (Ibid: 78)

Miller refers to a new kind of scientific research, a new generation of empirically based *post-material* scientific research. Although she makes no direct reference to Candace Pert's research or the new cosmology of Swimme and others, those would certainly qualify for her label of *post-material* scientific research. According to Miller children are born with a natural sense of being related to everything:

Children are entranced by nature ... All things in nature are assumed part of the family. This natural curiosity is human, and the sense of a caring relationship with all living beings is spiritual. Children have a natural spiritual attunement with the world around them: they relate to animals, trees

The young child is born with this assumed relationship with all of nature, from goslings to galaxies.

Ibid: 125–126

Miller bases these assertions on several scientific studies of twins, both identical and non-identical, that show unambiguously that we are inherently, genetically spiritual.¹⁹ She refers especially to a landmark 1997 twin study focusing on inner personal spirituality by Kenneth Kendler. The terminology used in this study—and others—speaks of spirituality as varieties of *transcendent* relationship. It is clear that the word 'transcendent' is used in these studies differently than referring to something supernatural. It does not refer particularly to a dualist notion of the ultimate, or God, as being outside of creation. To my

19 See specially Miller 2015:54–64.

ears this use of the term ‘transcendent’ is almost synonymous with either the term ‘numinous’ or ‘sacred’. Since this essay is centrally concerned with post-materialist science and integral ecology and the deep roots in modernity of the current integral—ecological and social—crises my choice of terms is guided by that. Miller’s central focus is guiding parents toward helping the development of a lived spiritual reality in their children as the most and seemingly only effective prevention against the most devastating epidemics of addiction, mental illness and other destructive behaviors.

One very important distinction she makes in her own laboratory study of adolescent *individuation* is that between lived reality and borrowed reality. In their individuation process during the decade from 14—the age of puberty—and 25—early adulthood—teens and young adults develop their natural, genetic, spirituality and learn to distinguish it from the one received from their immediate social context and culture. Such a process takes a great deal of both emotional investment as well as hard intellectual work. Puberty not only unlocks the process of sexual maturity but also is a time of “a biologically primed tidal surge in natural spirituality” (Ibid: 64).

She seems to conclude from her and others’ studies that for spiritual individuation to successfully protect against the most destructive of behaviors, this process of individuating our natural spirituality must be successful in the sense that it eventuates in a lived, embodied, experienced spirituality highly meaningful to the adolescent or young adult. In the process, she and her co-researchers found that *nobody has talked to them [the adolescents/young adults] about this experience*. “Without supported and guided spiritual awakening in adolescence, out teens are left to fend for themselves. The cost is high.” (Ibid. 71) She is also clear that a successful process of spiritual individuation may or may not include the family received religion. The process may replace the received family religious tradition with the young person’s own lived spirituality or a mix of both of these. However, Miller is clear that for a successful process of individuation to take place it has to go through a personally lived experience where the spirituality is embodied and intensely felt, whatever its characteristics might end up being. Such a process should be impregnated with what she calls *heart knowing*, a kind of knowing not cultivated in modernity.

Similarly Brian Swimme points out that the dry, rational, abstract language pervading Classical Science—and hopefully less so post-materialist science—cannot lead us to change our everyday behaviors: “Facts by themselves are not enough; what is needed is embodiment ... What we need is just the simple recognition that as we deprive ourselves and our children of direct contact with the numinous powers that fill the universe, we are choosing a diminished existence.” (1996:45–46)

It is precisely this need for embodiment and experiential learning that has led me to develop the following experiments in post-materialist integral ecology in my non-profit center in the Peruvian Upper Amazon.

5 Experiments in the Peruvian Upper Amazon

We are in the midst of vast destruction, but it is simultaneously a moment of profound creativity ... Our human role is to deepen our consciousness in resonance with the dynamics of the fourteen-billion-year creative event in which we found ourselves. Our challenge now is to construct livable cities and to cultivate healthy foods in ways congruent with Earth's patterns. Our role is to provide the hands and hearts that will enable the universe's energies to come forth in a new order of well-being. Our destiny is to bring forth a planetary civilization that is both culturally diverse and locally vibrant, a multiform civilization that will enable life and humanity to flourish.

BRIAN SWIMME and MARY EVELYN TUCKER²⁰

In the year 2011, I was issued a challenge by several Kichwa—the largest indigenous group in this region—leaders: a request to provide an alternative to their swidden agriculture—also known as slash and burn agriculture—which is gravely endangered by receding forest cover. The then president of one of the largest Kichwa indigenous organizations said the following to a group of University students from the US I had brought to his community:²¹

Our custom is to open *chacras*[food field] in the forest, cutting the trees, not uprooting them, and then burning the branches. After 3 to 4 years we let the forest regenerate during some 8, 10, 15 years and then we cut the trees again. We are three brothers and our widowed mother. Together we own 18 hectares and we are no longer able to open big food gardens. We can only make small *chacras*. We can no longer cut down the forest and more and more land is becoming degraded. How are we going to survive if we cut down the little forest that remains for us? We will have to migrate and we do not want to do that. We hope that your center can help us to learn another manner of growing food that does not require cutting down the forest.

²⁰ *Journey of the Universe*, 2011:116–117.

²¹ I taped this speech delivered in July of 2011.

Knowing that slash and burn agriculture was one of the main causes of deforestation in the Amazon basin as well as being the 3rd cause of climate warming in the region, I also knew that this challenge would resonate deeply with the students from US and Canadian Universities I regularly brought to my center. It would also be the right vehicle to create an experiential as well as intellectual pedagogy of the kind I could not implement at my own institution, Smith College; the right vehicle for enacting a post-materialist integral ecology at my center.

The answer to this indigenous Kichwa leader's request was to regenerate *terra preta do indio* [black earth of the Indians]—the millennially fertile and sustainable pre-Columbian Amazonian anthropogenic soil—for the Kichwa communities.²² This is the main project we have been doing in my center for the past seven years. It has a double purpose: 1. To achieve food security for the smallest farmers both indigenous and mestizo, to reforest, to contribute to solving the climate crisis as well as make visible the spiritual core of such soil making.²³ 2. To introduce students from the North experientially and intellectually to a post-materialist integral ecology. We involve students from educational institutions in the US and Canada in not only learning about this amazing soil but in actually helping make it with their hands, their hearts and their souls. I bring the students both to the schools with whom we work as well as to stay for a few days in an indigenous community to learn firsthand from them.

It is necessary at this point to present in more depth what this soil represents and why it is so important. The existence of this soil has been known to a variety of specialists since at least the middle of the 20th century.²⁴ However, it is really since the 1990's that archaeological investigations in the Brazilian Amazon have accumulated irrefutable evidence of the anthropogenic—namely human-made—nature of those ancient black soils full of broken ceramics. Those black soils, long associated with pre-Columbian settlements, are now revolutionizing our received knowledge of the pre-Columbian history of the Amazon basin.

When I was in graduate school pursuing a doctorate in cultural anthropology in the 1970's, the reigning paradigm about the Amazon basin was dominated by the theory of archaeologist Betty Meggers as articulated in her book *Amazonia*:

22 Later I also signed an agreement with the local provincial school board to create ecological learning gardens in several high schools and primary school, with this technique.

23 On this work see our 2017 book: Robert Tindal, F. Apffel-Marglin and David Shearer *Sacred Soil: Biochar and the Regeneration of the Earth*, North Atlantic Books.

24 Although initial tentative reports began in 1870 but were known to only a very restricted group of specialists.

Man and Culture in a Counterfeit Paradise (1971). Meggers argued that the harsh environment of the rain forest and the very poor Amazonian soils put absolute constraints on the type of agriculture—and therefore culture—humans could develop there. In her view, Amazonian agriculture could not rise above the unproductive slash and burn, semi-nomadic style of cultivation characteristic of the peasant and indigenous settlements in much of the Amazon basin today.

That old paradigm is now in the dustbin. Archaeologists have discovered that, indeed, this human-made pre-Columbian black soil gave rise to a highly productive permanent agriculture which in turn enabled the rise of complex and populous civilizations. Cities along the course of rivers include complex ceremonial centers and go on for as long as 30 kilometers. There are found all the hallmarks of civilization. Experts have calculated that terra preta do indio—the Portuguese name given to this soil by Brazilian farmers—was able to support a population of about the same size as the population of the Amazon basin today. This is an extraordinary claim, revising all of our received wisdom which once consigned the entire pre-Columbian Amazon basin to a scant population of primitive, wandering tribes.²⁵

Yet, even in the heyday of the Spanish empire, the first eyewitness account of the Amazon by the friar of the rebel Francisco de Orellana who first went down the Amazon in 1541–1542, named Gaspar de Carvajal, was consigned to the realm of pure invention, or worse, politically-motivated mendacity. Subsequent Spanish expeditions, several decades later in the 16th century, reported only small, scattered settlements amid very dense rain forest. No large cities, no sign of high civilizations. Yet thanks to the demographic research of Henry Dobyns,²⁶ we now know that between 95% and 99% of the indigenous population succumbed to European diseases, for which they lacked immunity, as well as to their enslavement and brutal treatment at the hands of the Spaniards. It is indubitably clear now that Carvajal's account has been vindicated by scientific investigations.

It was not, then, a virgin rain forest through which Orellana journeyed but a fertile garden.²⁷ The long white cities, great plazas, human made mounds and

25 For a review article on these archaeological findings see Heckenberger et al. "Amazonia 1492: Pristine Forest or Cultural Parkland?", 2003:1710–1714.

26 This research—and a lot more besides—has been made available to a wide public through the work of a journalist writer, Charles Mann: 1491: *New Revelations of the Americas before Columbus*. 2005.

27 The myth of the Virgin Amazonian Rain Forest has been laid to rest by the combined scholarship of William Cronon (1996), William Balée (2013), Susanna Hecht (2014), Michael Heckenberger (2003) among many others.

ceremonial centers, wide causeways reaching far inland, canals and intensely fertile agricultural fields melted into thin air, their remains swallowed up by dense tropical forest and shifting rivers.

These archaeological discoveries have not only revolutionized our knowledge of the history of the pre-Columbian Amazon basin, but have brought in their wake the interest of soil scientists and other experts. Professor Johannes Lehmann, now of the Soil Sciences department at Cornell University, was working in Manaus, Brazil before coming to Cornell, and became intrigued by the black earth that archaeologists were excavating. He noticed that this soil was highly fertile and proceeded to analyze it with the thought that such knowledge might make its reproduction feasible. Following in the footsteps of an earlier scientist, Wim Sombroek, he realized that if such an amazingly fertile soil could be re-created, it would be a boon for farmers not only in the Amazon basin but worldwide. What Lehmann found not only confirmed the reports of local farmers using this black soil of the Indians but he discovered the presence of a special type of charcoal in it which later was named *biochar*.

This special ingredient turned out to be a miraculous one. Biochar is porous and, in human terms, never decomposes: the oldest strata of this soil have been dated to be 8500 years old and the biochar in it persists!²⁸ Its porosity and its durability mean that nutrients attach to it forever and are not washed away by the torrential Amazonian rains, thus explaining the truly astounding longevity of the productivity of these soils. But this is not all; more amazing still, Lehmann found that biochar has a powerful drawdown effect on carbon dioxide, whether emitted by rotting vegetation in the soil or by burning fuel and forests, among other things. Biochar not only sequesters CO₂ from the atmosphere, it keeps the CO₂ from escaping once it is back in the soil again.

This revolutionary discovery means that we now can potentially create vast sinks for greenhouse gases while simultaneously creating an extremely fertile soil that needs no chemical fertilizers. Lehmann, in short, showed that this soil, named *terra preta do indio* [black earth of the Indians] in Brazil—is much more fertile than other soils in the Amazon basin, can produce a greater quantity of food on smaller land surfaces, and sequesters greenhouse gases by fixing them in the soil and absorbing them from the atmosphere.

Biochar organic agriculture sequesters some 20% of CO₂ from the atmosphere. Additionally, since this type of permanent agriculture obviates the need to cut down the forest to make a food garden using slash and burn technique, and does not burn the trees, the overall effect is a powerful manner of neutraliz-

28 Website of Prof. Lehmann: <http://www.css.cornell.edu/faculty/lehmann/>.

ing green-house gass emissions. According to scientist turned biochar agriculture entrepreneur, David Shearer, biochar agriculture can sequester and store in the soil an astounding 4 GT of GHG.²⁹

The focus on climate mitigation has been mostly on reducing emissions. As the series of international meetings on the climate crisis have shown, the international community has had great difficulty in agreeing on rules to curb greenhouse gas emissions, rules that were finally agreed upon at the Paris COP 21 in December 2015 even though they amount to only a fraction of what is needed. The discovery of terra preta and biochar make it possible to start right now spreading this form of agriculture that simultaneously can solve the food security issue for the world's small farmers while also sequestering greenhouse gases. In fact, this type of soil holds the promise of a chemical-free highly productive organic agriculture as an alternative to the fossil fuel intensive industrial agriculture dominant in the global North, as well as in many parts of the global South which is responsible for 24% of GHG emissions globally.³⁰

In the Amazon basin, where the overwhelming majority of small farmers use slash and burn agriculture, the need for terra preta is quite urgent. Slash and burn consists of making a clearing in the forest by cutting trees without uprooting them, a method only made possible by the steel axes and other such implements brought by the Spaniards.³¹ The fallen trees are then burnt in order to give some fertilizing phosphate to the very poor clayish Amazonian soil, allowing crops to be grown in the clearing for one to four years, depending on the initial fertility of the soil. In order for this method to be sustainable, it has been shown that an average size family must own 50 hectares of forest. Farmers are then able to give enough time for a robust regeneration of the forest cover before once more clearing the same parcel of land for another food garden.

29 See *Sacred Soil*, Chapter 6.

30 Information from the UNFCCC website on 4/1000 Regenerative Agriculture: <http://www.hummingbirdproject.org/the-hummingbird-project/cop21-the-41000-initiative/> consulted on January 12, 2016.

31 Steel axes make it possible to make clearings in the forest in record time compared with stone axes. On the experiments carried out to show that slash and burn agriculture was made possible by Spanish steel axes see William Denevan "Stone vs. Metal Axes: The ambiguity of shifting cultivation in pre-historical Amazonia" *Journal of the Steward Anthropological Society*, 1992:153–165 and Robert Carneiro "Tree felling with the stone axe: An experiment carried out with the Yanomamö Indians of Southern Venezuela" in C. Kramer ed. *Ethnoarchaeology: Implication of Ethnography for Archaeology*, Columbia U Pr. 1979:21–58.

Yet the pace of deforestation has accelerated to such a degree that there is no longer sufficient forest left to recuperate from slash and burn.

It is among these farmers with indigenous roots that my investigations into terra preta/biochar have taken place. Indeed, it is urgently needed there. The department of San Martin in the Peruvian High Amazon, where my center is located, has the dubious distinction of having the highest rate of deforestation in all of Peru. While farmers are urged by the government not to cut and burn the trees, without an affordable, technically simple alternative and one culturally appropriate, those small farmers have no option but to grow their food in the way they have done it ever since the arrival of the Spaniards some 500 years ago, when steel tools were introduced and knowledge of *terra preta* was mostly lost. The combination of those historical events established the prevalent contemporary practice of slash and burn, or swidden, agriculture.

Given the huge amount of deforestation due to timber exploitation, monoculture, oil exploration, ranching and mining, small farmers today have but a fraction of the necessary 50 hectares for swidden agriculture to be sustainable. In the department of San Martin, small farmers own between 3 to 10 hectares per family, a situation that leads to shorter and shorter periods for the regeneration of the forest cover after a food garden has been abandoned and the opening of a new food field. This has led to the alarming growth of degraded lands where the forest no longer regenerates and the soil has lost all fertility. Since the prospect of stopping the most invasive extractive operations in the Amazon basin are dim indeed, an affordable, simple and appropriate alternative to slash and burn agriculture for small farmers is a dire necessity. Furthermore, experts have established that slash and burn agriculture, with its immense release of CO₂ into the atmosphere, is the third cause of climate warming in the region. Even if it were possible to redistribute land so that small farmers owned the requisite 50 hectares for sustainable swidden agriculture, the current climate crisis makes such a vision of social justice not sufficient by itself.

The research of soil scientists on the composition of *terra preta* made it possible for us at SCBR to successfully regenerate it.³² One of the first things a quick perusal of this literature teaches is that the bulk of the organic components of this anthropogenic soil vary according to location. In other words, the pre-Columbian ancestors of today's indigenous and mestizo peoples used whatever

32 See especially Johannes Lehmann et al. 2003 publication: *Amazonian Dark Earths: Origin, Properties, Management* as well as: Williams Woods et al. 2009 publication: *Amazonian Dark Earths: Wim Sombroek's Vision*. J. Lehmann & S. Joseph eds. *Biochar for Environmental Management* (2009). For a very readable popular book see Albert Bates *The Biochar Solution*, 2010.

fertile organic matter was at hand. This was a crucial discovery because it meant that we could use what was locally at hand and freely available. It is clear that for this type of permanent agriculture to be adopted by small farmers locally it would have to be free—or at least extremely affordable.

Terra preta is also full of pieces of broken ceramics and these ceramics are found evenly distributed wherever terra preta has been found. In the literature on terra preta, the prevailing view is that they come from middens, household trash heaps, also from some burials and, most importantly, also from clay vessels for fermenting human excrement into humanure. Clay vessels of between 20 and 60 liter capacity with lids were found lined up in terra preta soil near houses. They contained fermented human excrement, a potent source of fertility.³³ As is well known pre-Columbian Amazonians did not have domesticated animals and thus animal sources of manure and they made intensive use of human manure—or humanure—to create terra preta. However, clay shards are found in all terra preta and not only in the large pre-Columbian Amazonian cities. What archaeologists report is that all terra preta is uniformly seeded with such ceramic pieces like raisins in a fruitcake. Certainly, a great portion of those ceramic shards came from humanure vessels, however it is highly likely that the shards found in terra preta fields further away from human settlements came from a different source.

A remarkable revelation that came my way from my indigenous collaborators is that some of these shards come from offerings to the spirits of the food field or *chacra*. I have to date found no trace of the use of clay vessels to collect and ferment human manure. Even today, the practice of offering ceramic shards to the spirits of the food field is found practiced by some elders among the indigenous Kichwa, but unfortunately it is succumbing to the negative gaze from the dominant mestizo society that views such practices as superstitious. Despite hundred years of oppression of their traditional ways, the indigenous communities with whom we collaborate are delighted to once more offer broken ceramics to the spirits of the *chacra* at the time of planting. They say that they know that their ancestors used to make such offerings, not only from memory but from the fact that when they make a new clearing on a very old *chacra* they find it full of ceramic shards.

Unsurprisingly the overwhelming language of the scholarship on terra preta remains classically scientific, that is quantitative, materialist, and devoid of attention to worldviews or spirituality. In fairness, it must be said that this piece of ethnographic information showing continuity between today's indigenous

33 See Ute Scheub *et al Terra Preta* (2016:42 & Ch. 6).

Kichwas of San Martin, Peru and their pre-Columbian ancestors in spiritual matters was not available previously. However, given anthropology's general adherence to the western modern worldview of an agency-less, insentient and mechanical nature/cosmos, it is highly likely that such information would be seen as a projection onto the non-human world of meanings created by humans.

The members of the native communities SCBR collaborates with are more than happy to re-enact these gestures of reciprocity between themselves and the spirits of their chacras during planting times. They also invite my students and me to participate in these gestures along with them and I suggest to my students to speak in their own words, from the heart if they so wish. In such ways, we not only learn about the Kichwas' worldview of a numinous, sentient and alive world populated with spirits that are all kin to the humans but also awaken what Lisa Miller has called our natural, genetically based spirituality.

To excise ritual gestures and the worldview those express amounts to an act of biopiracy.³⁴ For me it is precisely those gestures and the worldview they enact—one of a living, sentient and numinous earth/cosmos—that shows me that the most amazing soil in the world was *co-created* by the humans and the spirits of the earth/cosmos. It is not difficult to see the spirits of the earth/cosmos as embodying the agential, sentient nature of the earth/cosmos. It is for me perhaps the most crucial of all the elements in this terra preta because it gives us a living alternative to the dominant worldview of an agency-less, inert, mechanical earth/cosmos. This classical scientific worldview was the intellectual basis for the later industrial revolution. It legitimated it and made it possible.³⁵

Besides this I also try to open students' hearts to the numinosity of this earth and of the cosmos. We participate in weekly sharing evenings and other

34 We do not want to commit the bio-piratical practice of extracting indigenous knowledge or technologies while rendering invisible the worldview that gave them birth and not sharing the profits made from such behavior. Such acts have been critiqued as colonizing moves, where what has been appropriated not only enters the body of the devourer but disappears as a unique, different entity, a process that Rajiv Malhotra has called 'digestion.' Rajiv Malhotra *Being Different: An Indian Challenge to Western Universalism*. New Delhi; Harper & Collins. 2011.

35 I have argued this at greater depth and length in *Subversive Spiritualities*. See also James Curry *Ecological Ethics*, 2011. James Scott *Seeing Like a State* (1998) shows how the newly created Nation State, created after the treaty of Westphalia that put an end to the 30 years' war in 1648, based the revenue system of the Nation State on the then brand new materialist paradigm. With mercantilism and later capitalism all the other institutions of the Nation State were similarly based.

enactments that feel appropriate to the group to awaken our natural spirituality.³⁶ All of this and more I have labelled 'post-materialist integral pedagogical' practices where personal healing as well as embodied hands-on work with the earth and of course intellectual work, much of it introducing students to a post-materialist new science and ritual enactments combine to bring about healing, as well as a lived understanding of what a post-material integral ecological life might look and feel like.

Indigenous spirituality here in the Peruvian High Amazon is a union between ancestral shamanism and Catholicism. It seems to me that with Pope Francis's extraordinary ecological encyclical *Laudato Si* as well as his apology to indigenous peoples of the Americas, the horrendous history of the brutally enforced introduction of Catholicism here has been transformed into something more akin to a healing union. With this encyclical Catholicism has re-invested the non-human world with not only intrinsic value but also with numinosity. For the indigenous and mestizo curanderos here, Catholicism and ancestral indigenous spirituality are not experienced as antagonistic nor as separate. This is certainly one of the blessings of living in an oral milieu where this history has lost its horror through a memory blunted to the vanishing point.

6 Conclusion

Personally I was unable to accomplish for myself or for my students this integration of hands, heart, mind and spirit within academia. There are good reasons for this. However, I am convinced that others are able to create such spaces for themselves and their students within academia. My destiny has been to create an alternative space outside academia where a post-materialist integral ecology can be enacted where all of us can experience a lived spirituality. The indigenous and mestizo context in which we work at SCBR—where shamanism is vibrantly alive³⁷ and where thousands of medicinal plants grow—is particu-

36 On natural spirituality see the section on Spirituality: Lessons from the Drug Epidemic and the work of psychologist Lisa Miller.

37 I am well aware of the many pitfalls that has resulted from the enormous popularity of Amazonian shamanism giving rise to charlatans and hastily trained *curanderos* with all the dangers that this poses. However, this current troubling situation takes absolutely nothing away from those curandero(a)s who are genuine and responsible. Shamanic ceremonies and forest retreats using the thousands of Amazonian medicinal plants in any of the following categories: sacred, teacher, purgatives and household, all of which are non-addictive and extremely effective in providing deep and lasting lived spirituality

larly propitious for fostering both post-materialist integral ecology and also a lived, embodied spirituality.

I have created this space in order to try and approximate what Swimme and Tucker speak of in the epigraph to this last section of the essay: *Our role is to provide the hands and hearts that will enable the universe's energies to come forth in a new order of well-being. Our destiny is to bring forth a planetary civilization that is both culturally diverse and locally vibrant, a multiform civilization that will enable life and humanity to flourish.* It is a profoundly inspiring vision and also a very ambitious one. My center is a small step toward accomplishing this and it infuses me with hope and joy. In the last few years the participants in my summer programs seem to have shared in this hope and attest to their transformation and the opening for them of new inspiring horizons.

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experiences. They are also extremely efficacious in curing not only physical ailments but mental ones as well and especially drug addiction. See Mabit in Winkelman & Robert *Psychedelic Medicine*; Metzner *The Ayahuasca Experience*; Dennis McKenna in Op cit. Shultes, Hoffmann and Räthke *Food of the Gods* among others.

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