URSULA GOODENOUGH: A BIOLOGIST LINKING THE SPIRITUAL AND THE AESTHETIC

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In this paper, I would like to investigate how it may be possible to construct a link between science and art through the spiritual. I will do this by an examination of the ideas that Ursula Goodenough presents in her book, *The Sacred Depths of Nature*. Goodenough, who is a distinguished cell biologist at Washington University in St. Louis, argues that the study of the natural world can lead to an awe of nature which can, in turn, be translated into a spiritual view of the living world. She contends that the beauty of nature visible to the naked eye is only a small portion of what makes nature awesome, and that a greater appreciation for this beauty is possible through a closer study of nature and its mechanisms. Rather than increased knowledge leading to a destruction of an awe of nature, Goodenough sees it as leading to an increased reverence, respect, and sense of wonder, which she interprets as a spiritual experience, though others might consider it as an aesthetic response. The terms she uses to describe her spiritual experiences of organisms, at levels from the molecular to the ecological, are very similar to terms used to describe aesthetic responses to art works, and I will explore how the art/science/spirituality connection can be made.

I would like to begin by placing Goodenough’s work within the larger context of the different ways that science and religion interact with each other. I realize that the religious and the spiritual are two different realms, but I think that they are so often conflated that in order to appreciate Goodenough’s position, some examination of this interaction is useful. Very often, the relationship between religion and science is seen as an adversarial one, and this is not surprising in today’s world in light of the many court cases and legislative debates over teaching creationism. The debate over evolution has become so much a part of our culture that there is a tacit assumption that science and religion, by their very natures, have to be at odds with each other. But in reality this is a relatively recent view, born out of the evolution debates of the 19th century and solidified by two books written at the end of the nineteenth century on the history of the conflicts between science and religion (Draper, 1874; White, 1895). While such conflicts go back at least as far as the time of Galileo (Sobel, 1999), Lynn White Jr. (1968, 1978, 1979) argues that during the late Middle Ages the thinking and attitudes of the medieval church were pivotal to the development of modern science. The church encouraged, both explicitly and implicitly, the study of the natural world. Also, the value that the scholastics placed on rational thought was important in creating a scientific mindset. And there was, until Darwin’s time, a widely held view, called natural theology, that science supported religion by providing evidence of the splendors of God’s creation. But the idea of science and religion as being mutually nurturing has almost vanished from the intellectual landscape today. Even those who do not see them as necessarily in conflict, see them as operating at a distance from each other in mutually exclusive spheres. This is the approach of Stephen Jay Gould (1999) calls “NOMA” or Non-Overlapping Magisteria. He uses the word “magisteria” to denote domains of authority...
in teaching, and he sees the domain of science as covering the empirical realm, while the
domain of religion “extends over questions of ultimate meaning and moral value” (p. 6). The
important thing for Gould is that these domains are mutually exclusive; they do not overlap,
which means that they do not interfere with each other. This is a nice, neat solution to the
problem of the relationship between science and religion, a problem that seems to be centered
in the late-20th century United States on the issue of teaching about creationism as an
alternative to or replacement for evolution. By arguing for NOMA, Gould is saying in effect that
creationism has no place in the science classroom because it does not belong to the empirical
realm.

Like most biologists I agree with Gould, but I think the argument that science and religion are
two totally separated fields of human endeavor is unrealistic. It goes against the basic unity of
human experience, where everything is linked at least in some subtle ways. Yes, science and
religion are different ways of knowing, but I am not sure that they are also different ways of
being. I will argue here that one of these links is through the spiritual.

Attempts to find explicit links between science and religion date back at least since the time of
the rise of modern science. As science became a more powerful force in the culture, and in
many spheres supplanted religion, there have been attempts to reverse this course, or at least to
show that religion is not opposed to science, that the two do not have to be mutually exclusive.
Right now, such attempts have become more pronounced. Frederick Crews (2001a,b) just had a
two-part essay review in The New York Review of Books on some of the latest additions to the
literature. He focused particularly on books dealing with evolution and proceeded to
methodically criticize their arguments. Basically, he took the NOMA position and, in fact, at the
end of the second review, discusses Gould’s book in praiseworthy terms. In other words, Crews
takes the position that all attempts to reconcile, to link, science and religion through the
concept of evolution are seriously flawed.

Some of the books he deals with are by theologians, who use rational argument to argue for
their views. Others, like Finding Darwin’s God by Kenneth Miller (1999) are by biologists who
do not want to accept that their religious beliefs can’t in some way be reconciled with their
science. But all of them deal with theology, with rational argument. None of them get at
religion from the opposite road, from that of spirituality. This is what makes Goodenough’s The
Sacred Depths of Nature so interesting. She is not trying to show how the two ways of knowing,
science and religion are reconciled by rational argument, but by emotional experience. She
completely ignores the kinds of arguments that Miller, John Haught (1999), and others use.
She is not interested in them. She is not interested in theology at all, or even in organized
religion, instead, she focuses on the spiritual.

At this point, it makes sense to look at Goodenough’s background which helps to explain her
viewpoint and which she discusses in the book’s introductory material. Goodenough’s father,
Erwin, was a Methodist minister who became a professor of the history of religion at Yale, so
she was steeped in a religious tradition growing up, but also in a highly intellectual
environment. She writes affectionately of dinner table conversations she participated in with
her father and his friends. Coincidentally, I had come across her father’s name in a very
different context. I was doing research on Homer Smith, a physiologist at the NYU School of
Medicine, who had written a book in 1952 on the history of religion with the central argument
that science has supplanted religion as the major force in human experience: as science became more important religion became less essential until the point that today there is no need for religion. Smith’s book got quite a bit of attention when it was published and among the letters he received in response to the book was one from Erwin Goodenough. It was a beautifully written two-page discourse, in which Goodenough said that he agreed with a great deal of what Smith said and praised the way he said it. But he wanted to remind Smith that even in a world dominated by science, there was still a place for religion, there was still a need for religion in the human experience because there were parts of human experience with which religion, and not science, can deal. Goodenough was taking the position that there was room for both in modern life, and that is essentially the argument which his daughter also makes.

In the Preface, she begins by describing her affection and respect for her father, but then tells of rejecting religion in her youth and becoming fascinated with the living world. This led her to a career as a researcher in cell biology. Eventually however, she began to miss the religious aspect in her life and over a decade ago again became a church-goer, a member of a Presbyterian congregation. But Goodenough is not a very orthodox Protestant since she considers herself, a “non-theist,” someone who does not believe in a personal god. She labels her form of religious belief as religious naturalism and grounds it in her experiences of wonder, mystery, awe, and reverence for the natural world.

Goodenough’s is hardly a new approach to religion. It has elements of several long-standing religious traditions. In some ways it smacks of pantheism since Goodenough feels a real connection with the living world. And like natural theology, religious naturalism looks to the natural world for a glimpse of the sacred, as a mirror of the divine. What makes Goodenough’s approach different from that of others who would like to link a study of nature with spirituality, Goodenough does much deeper into the workings of nature to find religious links. She argues that while the beauty of the living world is indeed awe-inspiring, the hidden workings of that world can also elicit religious impulses.

It is important to keep in mind that Goodenough is a cell biologist. She is used to working with the parts of the living world that aren’t directly accessible to the senses, that can only be viewed and studied with the help of instruments. The whole concept of the cell was impossible until the development of the microscope, and the molecular world is even less accessible. But Goodenough argues that even though it takes more work to become familiar with this world, this doesn’t mean that it cannot also be an avenue to the spiritual. This world of cells and molecules is the one that Goodenough knows intimately, it is the one she loves, and the one that has provided her with a glimpse of the mystery of life, which she equates with spirituality. She wants to open this world to others so that they too can not only appreciate its intellectual wonders, but also come to a feeling of awe and reverence for the complexity, intricacy, and beauty of what is going on there. Goodenough’s book is less than 200 pages in length, but it provides a wonderful introduction to the living world, from the molecular to the ecological level. Each chapter introduces, with a rich use of metaphor, an important biological concept, and each chapter ends with a section called “Reflection” in which she shows how this concept serves her as a vehicle for religious experience. This is a very interesting structure. It means that each chapter, while showing the link between science and religion also honors the fact that they are separate ways of knowing.
Goodenough, not surprisingly, starts at the molecular level. This is the world she knows best, but there is also another reason for this approach: this organization also mirrors that found in most biology textbooks. This organization is a tacit acceptance of the idea that the best way to learn about the living world is to start with the building blocks from which it is made. This means that the most conceptually difficult material is presented up front, but Goodenough handles this problem with extremely clear writing. Also, she doesn’t do what so many expositors do, which is to overload the presentation with too much information. Her writing is extremely graceful and clear, and she sticks to the basics of the story all through the book. The Reflections sections are equally clear in that each one deals with one aspect of Goodenough’s spiritual life. While the rest of the chapter is science writing at its best, the Reflections are much more personal. She is not afraid to use the word “I” and to describe her religious experience as a way of explaining what she means by religious naturalism.

The basis of religious naturalism is that a person can come to a religious experience through a study of natural world. For Goodenough, there is no need for miracles; the mysteries of life, as explored by science, are wonderful enough without having to evoke anything supernatural. Early in the book, when she discusses the origin of life, she relates the emergence of life to a sense of mystery and responds to it not with a search for purpose or design, but “with outrageous celebration that it occurred at all” (pp. 10-11). She takes the concept of miracle and uses it not as a manifestation of divine intervention but as “astonishing property of emergence” (p. 29). By emergence she means essentially that the whole is more than the sum of its parts, that living systems display the property of self-organization, with a cell having properties that the molecules that make it up do not themselves possess.

After dealing with the basics of macromolecules and cells, Goodenough then goes on to discuss evolution and the emergence of multicellular life. From there she moves off in two directions. First to a celebration of the diversity of life, which allows her to touch upon a central theme of her book that she takes up again later, and this is that religious naturalism should develop in us such a reverence for life that it should impel us to try to preserve life in all its variety. This is how Goodenough links a spiritual experience to the ethical.

The second path Goodenough explores after dealing with multicellularity is looking at how multicellular organisms reproduce. This brings up the issues of sex, and paradoxically, of death, because sexual reproduction involves specialized sex cells, and these are the only part of an organism that are passed on to the next generation. The rest of an organism dies, and with the idea of death can come an increased reverence and enthusiasm for life. With multicellularity also comes specialization, with the cells of an organism having different functions.

In this spare volume, Goodenough limits her exploration of this specialization to one system, the one most important to her central theme, and this is the nervous system, the system responsible for the emotions and thoughts she is dealing with. She writes of how the nervous system is the seat of the mental experiences which we label as religious. As a non-theist, she explains the experiences of religious feeling and of some Other, some God, as “wondrous mental phenomena,” and then adds, “in the end it doesn’t matter” whether we see these experiences as supernatural or natural in origin because “all of us are transformed by their
power.” She writes that when she is “invaded by Immanence, most often in the presence of beauty or love or relief” (p. 102), her response is to open herself to its blessing, rather than to worry about whence it came.

In the next chapter, Goodenough notes that our capacity to understand the meaning and the emotion embedded in symbols endows us with the capacity for empathy. And once there is empathy, there can be compassion. So here again, the ethical sense grows out of the natural, the biological. She argues that the neuronal circuits that are adapted to parental instincts are at the heart of this feeling of compassion. In other words, here as elsewhere in the book, Goodenough attempts to show that the feelings and ideas that many label spiritual can be derived from human biology. This is an idea that many would find offensive in its materialism, but it is a viewpoint that many biologists would be comfortable with, though not all of them would label the experience as spiritual.

It is difficult to study the living world and not be in awe of its complexity, diversity, and ingenuity. It is, indeed, wonder-filled, but what Goodenough calls a spiritual experience could easily be seen by others as aesthetic. When she writes of awe and mystery and wonder she is using terms that some would use to describe the sublime. Her spiritual experience is another’s aesthetic experience.

For some time, I’ve been interested in the aesthetics of biology, in what is considered beautiful about the living world and about studying the living world, because I would contend that the experience of doing science is indeed an aesthetic experience. When I read Goodenough’s book, what struck me was that with a slight change in terminology, what she labeled as spiritual another could label as aesthetic. And since some students of aesthetics argue for a link between aesthetics and ethics, a case could be made that from aesthetics you could arrive at the same place that Goodenough arrives at—that aesthetic experience emerging from a study of the living world can also lead to a respect for that world and a desire to preserve it. Indeed, such a case has been made by Edward O. Wilson (1984) in writing of biophilia, which he describes as an innate desire to associate with other species. Wilson argues that learning about the living world and spending time with living things nurtures biophilia, and that this aesthetic experience can lead to a desire to preserve nature.

By looking at Goodenough’s ideas from the viewpoint of aesthetics I am not trying to denigrate them or to argue against them. My view is perhaps even broader than hers. While she sees religious naturalism as not supplanting other religious forms but rather as compatible with them all, I would argue that religious naturalism is also compatible with biophilia, an aesthetic view of the experience of nature which has no religious overtones at all. I see the experience of religious naturalism as almost the same, or at least very similar to, an aesthetic experience of the living world. And since this experience is also very similar, if not identical to the aesthetic experience of art, I am arguing for a view that links spirituality to an appreciation of art and nature. So while Goodenough is attempting to link science and religion, I am attempting a further link, between these two and art. This may seem an extreme position but I think it grows out of one of Goodenough’s basic premises: that the experience of religious naturalism is seated in the structure of the nervous system is a product of the evolution of the brain. If this is the case, then it makes sense that the feeling of awe which we experience whether we are dealing
with art or nature or the ineffable would be essentially the same. The advantage of this viewpoint is that it helps to get beyond the dichotomies that have plagued human experience, slowed our intellectual development, and led to all kinds of useless resentments: the dichotomies of art versus science and science versus religion. I would agree with Goodenough that by examining fundamental experience we can find peace, wonder, and a sense of rightness.

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The early nineteenth century marked the high point of the romantic movement, which was a revolt against both post-Renaissance classicism and the Enlightenment of the eighteenth century. The classicists believed that the ancient Greeks and Romans had discovered eternally valid aesthetic rules, rules which were subsequently reaffirmed by the Enlightenment’s stress on rationality, order, and restraint. The romantic movement, which emerged in the last third of the eighteenth century represented a rejection of these aesthetic values. While expressions of romanticism could be found throughout Europe, the movement was especially strong in Germany. The romantic period after 1800 in Germany was one of remarkable cultural flowering; the romantic achievements in German music, philosophy, and literature were immediately recognized and are still venerated today. But this was not the case with the visual arts. The achievements of romantic artists were briefly noted and then overlooked, at least until the early twentieth century. It was not until after World War II that art historians began to appreciate fully the accomplishments of German romantic painting. Yet developments in German art in the romantic period had a marked impact on the development of Northern European art for the next century. This was primarily because much of German romantic art laid a special emphasis on the spiritual, an emphasis that seemed to be very congenial to later northern artists. In fact, and this is the main theme of my paper, much of this interest in spirituality was created by a single artist, Caspar David Friedrich.

There were several ways, it was felt, that this spirituality could be transmitted from artist to viewer. One means, according to critics such as the Schlegel brothers, was to create images of medieval faith. Others, however, urged that a new response to nature could achieve the development of a deeper sense of spirituality. These romantics did not view nature, as had enlightened theorists, as a repository of natural laws. Rather, they viewed nature as possessing a strong mystical element; it was now the repository of spirituality. Hence landscape paintings

A number of art and literary critics published material around 1800 that prepared the way for Friedrich’s art. Among the theorists who set the stage for the romantic painters’ emphasis on the spiritual, perhaps the most important was Wilhelm Wackenroder, who died in 1798 at the age of twenty-five. His *Outpourings from the Heart of an Art-Loving Monk* (1797) had a great influence on future German critics and artists, such as the Nazarenes. For Wackenroder, aesthetic experience was a matter of the heart, a spiritual elation rather than the application of rules of good taste. Artistic creations should reflect, he argued, a deeply felt and divinely inspired spirit in the artist which he then communicated to the world through his art. “Picture galleries,” wrote Wackenroder, “should be temples where . . . one may admire great artists as the most noble of mortals, where long contemplation of their works [produces] the most enchanting thoughts and emotions. I compare the enjoyment of the noblest works of art with prayer.” Masterpieces of art, he continued, are those “used beneficially for the welfare of your soul.”
took on a far greater significance than ever before. Prior to romanticism, landscapes were tolerated since they provided a stage for heroic human actions and for the depiction of historical and mythical events or they served as backgrounds for the depiction of a golden age in the idyllic ancient world. With romanticism, landscapes became the main subject; human figures were placed in them primarily to alert the viewer that something crucial and awe-inspiring resided in nature, to point to the painting's moral.

One of the first and certainly the greatest painter to adopt this new program of landscape painting was Caspar David Friedrich (1774-1840). As Catherine Johnson noted in an exhibition catalogue (Baltic Light): “one of the obvious paradoxes of the period [is] that behind the apparent realism [of the art] may hide an ideal concept.” Certainly Friedrich, a non-practicing Protestant, had a spiritual feeling for nature that went far beyond that which is seen. In Fog for example, one of his first oil paintings (c. 1807), a ship is barely perceptible through the fog; it is clearly there but is quite difficult to make out. In the picture, the viewer's eye is inexorably drawn from what is tangible in the foreground to what is merely hinted at in the fog in the distance beyond the ship. This murkiness creates in the viewer the belief that nature holds much more than we are allowed to easily see.

Friedrich conceived of nature as a divine revelation, which if correctly interpreted, could lead to the individual's spiritual regeneration. It was the artist's task to decode for the viewer the symbolic language hidden in nature. Or as Friedrich put it in his advice to other artists: “Close your physical eye, so that you can first see your picture with your spiritual eye. Then bring up what you have seen in the darkness so that it reacts upon others from the outside to the inside.” In his Morning Mist in the Mountain (1808) the theme of the painting is light, which comes from above and permeates the painting. Nature appears filled with light, with a divine spirit. However, as his art matured, Friedrich became much more explicit in his use of symbolism in his landscapes and seascapes. In Evening (1817), he depicts a boat which has entered a bay or inlet and is heading toward the shore, on which a massive anchor has been placed. A ship's anchor was an old and well-established Christian symbol of hope and faith. The painting raises the question: are the men on the boat completing their journey through life and because of their faith, represented by the anchor, are now being rewarded with a safe haven?

Even more explicit in their symbolism are paintings such as his Churchyard in the Snow (1825) and his famous Winter Landscape with Church (1811). In neither painting has Friedrich depicted anything approaching a supernatural event. Like the praying pilgrim in the latter work, the figures in his art are ordinary people. As such they become images of a spiritual yearning common to all humans. This sense of yearning also produces an element of melancholy in many of Friedrich's paintings. This melancholy certainly reflects his personality. When he was thirteen, he saw his brother drown while (according to the often-repeated story) he was trying to rescue Friedrich himself. At least until his late marriage, Friedrich was not a particularly happy man; he once noted that “In order not to hate people, I must avoid their company.”

Later in his career, Friedrich developed a definite pantheistic attitude toward nature. He once remarked that one should “seek the Divine in everything.” However, this pantheism was
expressed rather subtly and he still continued to rely on the more obvious symbolism of his earlier work. As we see in this painting, Friedrich regarded the spruce tree as a symbol of Christian hope and life. In Willow Bush under a Setting Sun (c. 1835 and one of his last oil paintings), the tree stump is an omen of death, and it is flanked by dying willows. It is the sun that offers hope. But Friedrich’s symbolism was never overpowering. I will just mention two other examples of his subtlety. In Chasseur in the Forest (painted in 1813 at the height of the Napoleonic Wars) Friedrich reveals his German nationalism by depicting a lone French soldier wandering through a deserted forest to a certain death, which is signaled by the raven poised on a stump in the foreground. Man’s helpless before the forces of nature are captured in his Arctic Shipwreck (1824) where a ship is crushed beneath a mountainous iceberg.

There are many paintings by Friedrich that reflect this theme of spirituality, but I will stop with just a few more. His On the Sailboat (1818/19) was painted just after his late marriage in his mid-forties. In it, the couple on the boat look toward their destination, a large city with many churches. They are turned toward each other, symbolizing their shared common journey through life. Their clothing might be puzzling, but medieval clothing was often used by Friedrich to express his democratic rejection of the conservative policies of the various German governments then under the influence of Metternich. More importantly, like nearly all of Friedrich’s figures, they are motionless. His completely motionless figures were yet another allegory of yearning and of communion with nature, which as we have seen, the romantics saw as a crucial manifestation of the spiritual.

The most famous of these “motionless figures before nature” paintings are his three “Moonwatcher” pictures, which are currently together at an exhibition at the Metropolitan Museum of Art: Two Men Contemplating the Moon (1819, Dresden), Man and Woman Contemplating the Moon (c. 1824, Berlin), and Two Men Contemplating the Moon (c. 1830, Metropolitan Museum of Art). The first couple is usually regarded to be Friedrich and a student; note their medieval clothing. The second is widely thought to be Friedrich and his wife; note the missing walking stick. The third copies the first. We view all three couples from the back. Notice that aside from the moon and the morning star, we cannot see what the couples are contemplating. Below them is a landscape hidden from us by the high angle of the foreground. This creates in the viewer the feeling that the couples are contemplating infinity. As we look over the shoulders of the figures, Friedrich obviously hoped we would share their spiritual yearning, their contemplative mood. It should be noted that his love of moonlight is evident in over a dozen of his paintings. It is yet another reflection of his Christian world view: he apparently regarded the moon, which reflects the light of the sun, as a symbol of Jesus, the son of God, who can lead man to God’s divine light.

Even though he died in poverty, it is impossible to over stress the influence Friedrich had on later Northern painting. We find his themes of spirituality in the art of others throughout the century. Here are some examples, in chronological order: Carl Gustav Carus’s View of Dresden at Sunset (1822) on the theme of a motionless couple contemplating nature; Johan Christian Dahl’s Mother and Child by the Sea (1830) on the theme of a boat returning safely to shore with an anchor in the foreground; Martinus Rorbye’s View of the Roman Campagna (1835) on the theme of a motionless figure contemplating nature (note the fence in the shape of a cross); Christian Kobke’s Autume Morning (1838); Johan Thomas Lundbye’s Dolmen (1839)
connecting death and nature; Carl Larsson’s *The Old Man and the New Trees* (1883); Laurits Andersen Ring’s *Evening, Old Woman and Death* (1887); Anders Zorn’s *Our Daily Bread* (1886); and Albert Edelfelt’s *Kaukola Ridge at Sunset* (1889). All, some more directly than others, are drawing on the romantic theme of spirituality we find in Friedrich’s *Evening Landscape with Two Men* (1833).

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