New Organs of Perception: Goethean Science as a Cultural Therapeutics

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Johann Wolfgang von Goethe's approach to science is a radical departure from the Cartesian-Newtonian scientific framework and offers contemporary science a pathway toward the cultivation of an alternative approach to the study of the natural world. This paper argues that the Cartesian-Newtonian pathway is pathological because it has as its premise humanity's alienation from the natural world, which sets up a host of consequences that terminate in nihilism. As an alternative approach to science, Goethe's "delicate empiricism" begins with the premise that humanity is fundamentally at home in the world: a notion which forms the basis for a Goethean science that gives primacy to perception, offers a more organic and holistic conception of the universe, and has as its goal the cultivation of aesthetic appreciation and morally responsive obligation to the observed. As an antidote to nihilism and as the basis for a more fulfilling and morally responsive science, Goethean science may serve as a kind of cultural therapeutics, a project which is necessarily interdisciplinary since it requires the integration of multiple ways of seeing from the natural sciences, the human sciences, and the humanities.

> The human beings knows himself only insofar as he knows the world; he perceives the world only in himself, and himself only in the world. Every new object, clearly seen, opens up a new organ of perception in us.
>
> —Johann Wolfgang von Goethe

Most of us are familiar with Goethe the poet, but Goethe's approach to natural science is far less known. His work has nevertheless been the subject of some serious scholarship in the history and philosophy of science. Among those who have commented on Goethe's scientific endeavors, there are various opinions about how his method of science relates to the project of "modern science." According to Amrine & Zucker (1987), there are generally three assessments of Goethe's science: (1) a few scholars argue that it is not a genuine scientific approach to the investigation of nature; (2) others assert that it was indeed a modern scientific enterprise, which generated legitimate and important interpretations of natural phenomena; and, finally, (3) there are those scholars—in fact, the majority of Goethe scholars—who argue that Goethe's way of science provides a model for a viable alternative to modern science. I join with the scholars in the latter category. I believe Goethe's science is an approach to natural phenomena

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that addresses many of the problems raised in contemporary philosophy of science. I go a few steps farther in saying that Goethe's approach to the study of nature provides a method for what I will call a "cultural therapeutics." As a method for a "cultural therapeutics," I shall argue, Goethe's method provides a bridge between the natural sciences, the human sciences, and the humanities.

Cultural Therapeutics

The term "cultural therapeutics" is one I have borrowed from Robert Romanyshyn (1985) and Michael Sipiora (1999), both of whom were inspired by J.H. van den Berg's (1961) historical phenomenology (metabletics). According to Sipiora (1999), the aim of a cultural therapeutics is to own up to our obligations to that which is unconscious yet continues to claim us in our technological world. It is a matter of making explicit those responses to the world that are covered over or concealed by layers of culture, but which nevertheless continue to call us and which remain accessible only through careful, critically engaged description of phenomena. The process of owning up to our obligations is one that can be a healing process, a process of coming home to ourselves; hence it is "therapeutic."

Goethe's method of science is a form of "cultural therapeutics" because, arguably, it offers not only a different approach to science than modern science, it offers a style of understanding nature that is *therapeutic*. When I say that Goethe offers a "therapeutic" approach to nature, I mean that his process of studying nature is one that is potentially *transformative* for the scientist. It is a *therapeutic* process because it is one that may potentially restore to health and wholeness those who practice it. It is a *cultural* therapeutics because, if it were taken up as a cultural practice and as a cultural worldview, it might be curative and restorative for our entire culture.

Goethe is quite clear about his belief that science should be transformative of the scientist: "The human being knows himself only insofar as he knows the world; he perceives the world only in himself, and himself only in the world. Every new object, clearly seen, opens up a new organ of perception in us" (Goethe, 1988, p. 39). There is no question that, for Goethe, observation has as its aim the development of the observer, who in the process of careful and clear description of the object under investigation, is in the process of schooling his or her faculties of observation (See also:

Amrine, 1998). Quite literally, he or she is engaged in a process of realizing nascent possibilities for seeing the world anew.

Modern Science and Substantive Rationality

Goethe's approach to science, with its emphasis on the metamorphosis of the scientist, stands in stark contrast to conventional images of science as a means to gain mastery and control over the natural world. The origins of modern science can be traced back at least to Francis Bacon, who asserted that "the secrets of nature reveal themselves more readily under the vexations of art [i.e., artisanry, technology] than when they go their own way" (Bacon, 1955, Aphorism XCVIII). Bacon implies that nature is best understood in conditions when humans attempt to master and control it (See also: Berman, 1981). Descartes (1961) was more explicit when he asserted that, through his practical philosophy as a basis for the sciences, "we could make ourselves the masters and possessors of nature" (p. 37). Newton's physics—which was the prime target of Goethe's criticisms—was founded on Cartesian principles, including Descartes' project of utilizing the sciences for the purpose of prediction and control.

The problem with the "modern science" of Descartes and Newton is not simply their use of prediction and control. The problem is that they set up a science in which prediction and control become ends in themselves. The sociologist Max Weber (1978) pointed out that modern society is characterized by the collapse of "substantive rationality" into "formal rationality." Formal rationality refers to "the calculability of means and procedures," whereas substantive rationality refers to "the value (from some explicitly defined standpoint) of ends or results" (Burbraker, 1991, p. 36). In other words, modernity can, in part, be characterized by the reduction of all values or ends to those that serve the purpose of calculating nature. The means of calculation and procedure becomes *ends in themselves* rather than a *means to* an extrinsic "good." When prediction and control become ends in themselves rather than means to some other purpose or goal, this means substantive rationality has collapsed into formal rationality. When science loses sight of the purpose of its calculations, and when calculations become an end in itself, then science becomes monstrous. It begets the atom bomb and ecological catastrophe. In general, we get an unsustainable technological culture which becomes highly efficient at destroying the earth—and ourselves along with it—in a very short time period.

The Alien in the Machine

The worldview of Descartes and Newton, moreover, is one based on a variety of assumptions that largely remain with us today. Arguably, the most important of these assumptions is the Cartesian view of the universe as a machine separate from the souls of humans, who Descartes thought were distinct from the mechanisms of the world. Descartes' mechanistic view depicts a world in which the human is alien rather than a participant. The universe, like a machine, is understood in an atomistic fashion, through the breakdown of its various parts and through an understanding of the relationship among these parts. Also, the Cartesian-Newtonian view understands the world through a veil of mathematics. The world of human perception is understood to be largely untrustworthy. The truth of the world is discovered not by the qualitative experience of the human, but through the quantitative analysis of phenomena in artificial, experimental conditions that are designed to isolate variables in order to determine cause and effect relations. The identification of these cause and effect relations, again, serve the purpose of prediction and control.

The discoveries of Newton's science have come to 'rape the senses,' so that the world that it produces is one that is largely at odds with the world we live as humans. The abstractions of Newton's physics come to replace the concrete experience of our immediate contact with the world. The experience of color, for example, comes to be understood as epiphenomenal—a mere product of the human mind—while the abstract concept of light waves, which we do not directly experience, comes to be the scientific "truth" of color. When there are protests that the modern sciences fail to do justice to immediate experience of the world, the modern scientist asserts that our immediate experience of the world is illusory—that, in effect, it fails to predict and control—and re-asserts the value of the Cartesian-Netwonian paradigm as one that produces "truth" in the from of utility. It performs in other words what philosophers have come to call "reductionism": it comes to explain the world of human experience by 'reducing' its meaning to causal events 'behind' the phenomena. For example, what you see are colors, but, in reality, there are 'nothing but' waves of light. Reductionism, in this sense, is the disease of 'nothing-but-ness." "Nothing-but-ness" is another term for nihilism (Frankl, 1997).

The project of modern science is one that claims it is seeking to discover the truth of a human-independent or human-transcendent world, an "objective" world that exists outside of "subjective" human concerns. Yet,

in fact, the worldview of modern science is not "objective," but a peculiar, historically contingent style of seeing the world (See: Berman, 1981; Romanyshyn, 2001, 1990). It is a world that comes to be increasingly disclosed through a veil of abstractions. For example, content analysis of scientific journals has found that the only variable that distinguishes the supposedly "hard" sciences from the "soft" sciences is the relatively more frequent use of graphs in "hard" science journals (Smith, Best, Stubbs, Archibald & Roberson-Nay, 2002). What is remarkable about this trend is the fact that the observation of graphic depictions of a quantified nature have come to replace the direct and immediate observation of the phenomena of nature itself. The map has become increasingly confused with the countryside. As Werner Heisenberg (1979) noted, " . . . science sacrifices more and more the possibility of making 'living' the phenomena immediately perceptible to our senses . . . . [W]e must admit that a blind man may learn and understand the whole of optics and yet he will have not the faintest knowledge of real light" (pp. 36-37). Of course, if we look closely at what the products of modern science depict, they of course depict graphic representations of the causal relationships between objectified and reified units of natural phenomena. In other words, they serve in the project of prediction and control.

Modern psychological science belongs in the tradition of Newton's physics. Like Newton's view of nature, it tends to depict the human being as a mechanism determined by causal forces both within and outside of its organism. In contrast to Descartes, who saw the human soul as distinct from the mechanics of nature, modern psychology rejects the notion of an immaterial soul and injects the human into the Cartesian machine. Thus, when psychologists speak of human values, such as morality or aesthetics, these values are understood to be epiphenomenal—that is, "nothing but" the product of external or internal causal forces. As phenomenologists such as Husserl and Merleau-Ponty have noted, this deterministic view of modern psychology is philosophically untenable, because such a position undermines its own foundations: the very assertion of determinism would not be a reason for human behavior but rather the result of causal forces indifferent to human concerns, including concerns about the reasons for human behavior (Merleau-Ponty, 1964). If we start from such a deterministic position, the inevitable result is the problem Weber announced: the reduction of the ends of science (substantive rationality) to mere means (formal or instrumental rationality): Prediction and control for the sake of prediction and control, with no extrinsic meaning or purpose.

Goethe's Antidote

Goethe's approach to science is an antidote to the resultant nihilism of modern science. The horizon of Goethe's method is one of a participatory stance with regard to nature. His science begins with the assumption that the human being is fundamentally at home in the world. The cosmos is a space of belonging. Goethe's worldview, in this sense, shares an affinity to the contemporary movement of Deep Ecology, where the self is "experienced as integrated with the whole of nature" (Deval & Sessions, 1984, p. 302-303). The self is acknowledged as the "the world knowing itself." As Joanna Macy (1991) celebrates: "We can relinquish our separateness. We can come home again—and participate in our world in a richer, more responsible and poignantly beautiful way" (p. 14; see also: Gottlieb, 1994). As a participatory approach to nature, Goethe's method stresses that the process of scientific investigation should be a matter of becoming increasingly "at home" with the phenomena (Seamon, 1998, p. 3).

Goethe's participatory approach to nature is one that is rooted in a sense of nature as sacred. By "sacred," I join with Reason (1993) in his description of sacred inquiry as one that is "based on reverance, in awe and love for creation, valuing it for its own sake, in its own right as a living presence" (p. 276). Sacred inquiry, according to Reason, involves four aspects: 1) giving primacy to experience as sacred, 2) using representations of that experience in such a way that it brings beauty, 3) developing understandings of that experience that are not alienated, and 4) initiating action and forms of engagement that heal ourselves and our planet. Goethe's approach to science includes each of these aspects and so can be considered a form of sacred inquiry. Goethe affirms his perspective of nature as sacred when he asserts that: "Natural objects should be sought and investigated as they are and not to suit observers, but respectfully as if they were divine beings" (Goethe, 1971, p. 57).

Goethe calls his style of sacred inquiry a "delicate empiricism" (*zarte Empirie*), which he contrasts with "the gloom of the empirico-mechanico-dogmatic torture chamber" of Newton's science (Goethe, quoted in Heller, 1952, p. 18). There are at least two aspects to Goethe's notion of a "delicate empiricism." First, it is an "empiricism" in the sense that it gives primacy to perception. Secondly, Goethe's empiricism is "delicate" to the extent that it gives itself over to an ethically responsive obligation to the observed.

The Primacy of Perception

Goethe's science grants a "primacy to perception" in the same sense as phenomenology (Hensel, 1998). As Merleau-Ponty (1962) wrote, "All consciousness is perceptual . . . . The perceived world is the always presupposed foundation of all rationality, all value and all existence" (p. 13). Consciousness, in this sense, is not an interior realm of meaning, but rather the life-world that surrounds us and sustains us. Consciousness, from the phenomenological perspective, is always "turned primarily toward the world, turned toward things; it is above all a relation to the world" (Merleau-Ponty, 1962, pp. 116-117). As Gurwitsch (1970) notes, "We do not, so to speak, move within a self-contained domain of interiority" (p. 243); rather, "It is the thing itself that presents itself . . . and with which we are in contact" (p. 366). These sentiments of Merleau-Ponty and Gurwitsch repeat a theme of Goethe's: that, in essence, human perception is not an impediment to scientific investigation but always already presupposed in every empirical observation. There is no such science capable of rendering nature separate from it's own intentionality, that is, it's constructions. And, yet, we are not locked in upon ourselves as solipsism would have it; rather, we are in direct, fleshy contact with the things of this world and, indeed, have our being only through our intertwining relations with other beings, each of us sustained by the founding soil of the earth.

Because we become who we are in our essence through our relations with the surrounding world and its beings—and, indeed, because our bodies are formed of and by this encompassing earth—our organs can be understood to be the flesh of the world emerging into consciousness of itself, like an infant examining for the first time the back of her own hand and gaining sudden insight that the flailing limb is her own. And so in a certain manner of speaking the beauties of nature which appear through perception—the colors of the rainbow, the pungent scent of the forest after a Spring rain, awe before natural disasters, and the endless expanse of darkness receding infinitely into the depths of the night sky—are not merely 'subjective' phenomena; they are of nature because we are of nature, and they exist only in a relation between the vacancy of consciousnesss and the plenitude of being. They are gifts of the natural world to itself. And they may even be gratuitious gifts, without reason or purpose beyond the immediate enjoyment and inspiration they engender (Robbins, 2003). Indeed, these meanings cannot be reduced to simpler or more fundamental phenomena—say atoms or genes—without

losing their essence as relational phenomena, constituted in the intertwining of nature upon nature in the coming to awareness of itself.

In the investigation of color, we do violence to the meaning of color when we consider it epiphenomenal and reduce its ontological meaning to the by-product of something behind the phenomena. "The blue of the sky reveals to us the basic law of color," writes Goethe (1971). "Search nothing beyond the phenomena, they themselves are the theory" (p. 76). When I see the color green, the meaning of the color green is immediate to my perception, and any conceptualization of the color green beyond that perception is not that color precisely *as* it appears within my life-world. Thus, Goethe asserts, in a variety of ways, that science must be based upon a fundamental faith in experience. "The human being himself, to the extent that he makes use of his senses," writes Goethe (1988), "is the most exact physical apparatus that can exist" (p. 311). Elsewhere, he asserts that, "We are adequately equipped for all our genuine earthly needs if we will trust our senses, and develop them in such a way that they continue to prove worthy of our confidence" (Goethe, quoted in Amrine, 1998, p. 45). The senses do not deceive us, he argued, judgement does (Hensel, 1998, p. 74).

To say that Goethe's "delicate empiricism" gives primacy to perception is not to say, however, that the object of investigation will give itself over to us all at once.

For Goethe, nature is always in the process of becoming (*natura naturans*) and never a finished product (*natura naturata*) (Amrine & Zucker, 1987, p. 382). Yet the becoming of nature is a process that cannot be reached only through ideas or mathematical abstractions; it can only be reached by careful observation and, in particular, observation that utilizes what Goethe termed "exact sensorial imagination." The method of "exact sensorial imagination" when observing a phenomenon is a matter of retaining past forms of the phenomenon while anticipating the forms the phenomenon will likely take as it unfolds into the future. It is, in other words, a matter of grasping the temporal structure of the phenomena. Indeed, the method of "exact sensorial imagination" is actually a refinement of the natural process of perception, which is always already infused with memory and the imaginative projection of future possibilities. As Arnheim (1986a) noted, "Perception turns out to be not a mechanical recording of the stimuli imposed by the physical world upon the receptor organs of man and animal, but the eminently active and creative grasping of structure" (p. x). By refining our natural predilection for sensorial imagination, Goethe makes it an *exact* sensorial imagination,

a move which elevates his "delicate empiricism" to the precision necessary for it to be a science.

The structure grasped by the "exact sensorial imagination" leads eventually to an insight into the essential structure of the phenomenon, which Goethe called *the Ur-phenomenon*: "an ultimate which can not itself be explained, which is in fact not in need of explanation, but from which all that we observe can be made intelligible" (Lehrs, 1958, p. 125). When Goethe studied plants, for example, he would examine the plants from the time they were a seedling until they matured. He would also examine them in different contexts. Taking each of these perspectives into consideration, he aimed to disclose the *archetype* of the plant. Grasping the archetype of a plant, as Goethe did in his examination of plant morphology, is not unlike grasping the essential structure of a musical score. A musical score can be produced with great variation: it can be played upon different instruments, at soft or loud volumes, in different settings with different acoustics, introducing various forms of reverberation and echo, and so forth. Yet, amongst all these variations, the musical composition maintains a certain structural necessity, a necessity that would be disturbed if notes were omitted, added or rearranged. Likewise, a plant can be introduced into various environments, but the temporal unfolding of the plant maintains a certain structural necessity—a structure that can only be grasped through careful, meticulous observation of the plant over time and in different environmental conditions.

Goethe's notion of the *Ur-phenomenon* challenges one of the earliest and most fundamental claims of Western metaphysics, namely, Aristotle's claim that actuality is metaphysically prior to possibility. Aristotle's metaphysics, when retained within and incorporated into the context of Newton's science, projects nature as a standing presence, composed of discrete, isolated and determinate objects. However, as in the existential-phenomenological philosophy of Heidegger (1962), Goethe's *Ur-phenomenon* implies that the phenomenon is an event or happening, a process of becoming, in which actuality and possibility are fused and gathered by the thing as it is revealed to the perceiver within the context of the life-world.

The Cartesian-Newtonian worldview is completely closed off to the experience of the *Ur-phenomenon*. Instead, it remains fixated upon a world abstractly conceived to be composed of discrete, extrinsically related objects, the meaning of which are reducible to the determining forces of prior causal effects. Beginning with such a conception of the world forecloses the possibility of grasping the essential structure of the phenomenon. Such

conception relies upon a kind of 'judgment' which has distanced itself from the phenomena as they appear in their most immediate contact with us through our participatory engagement with them. Yet, when we attend to the phenomena with a fidelity to their giveness to us in our most immediate contact with them, they appear fundamentally as a process of unfolding; a temporal, emergent event that we can honor best through our imaginative capacity to retain past forms and project them into the future. At the best of times such a close attunement to the fidelity of things, and our relation with them, can produce in us a kind of genuine, deeply felt pleasure—the kind of experience common to encounters with the aesthetic and perhaps most appropriately named 'joy' (Robbins, 2005).

For the Goethe, the disclosure of the primordial archetype of the phenomenon is fundamentally an aesthetic experience. As Goethe writes:

> The archetypal plant shall be the most marvelous creature in the world, and nature shall envy me for it. With this model and the key to it one can invent plants *ad infinitum* that must be consistent, i.e. that could exist even if they do not in fact, are not just picturesque shadows, but have instead an inner truth and necessity. (Goethe, quoted in Amrine, 1998, pp. 39-40).

In this passage, Goethe expresses his experience of the archetype's profound beauty. The beauty of the archetypal phenomenon can be understood in light of Rudolf Arnheim's theory of aesthetics. The perception of beauty, for Arnheim (1986b), is the result of the interaction of two tendencies in the perception of form: on the one hand, a "tendency toward tension-increasing articulation" and, on the other, a "countertendency toward equilibration" (p. 822). The experience of beauty occurs when the meaning of a phenomenon is revealed so that there is a perfect balance between tension reduction and tension enhancement (p. 823). The Goethian *Ur-phenomenon* is the ideal of beauty in that it reduces tension through its depiction of the essential, harmonious simplicity of a phenomenon as pure possibility while enhancing tension by virtue of its rootedness in the actual, concrete and conditioned nature of the phenomenon in all its particular manifestations. For example, the archetypal plant is the essential structure of all possible plants, and yet this essential structure can only ever be realized in the concrete, individual form of any given plant.

The scientist is transformed through the process of disclosing the

archetypal structure of the phenomenon. Indeed, as Amrine (1998) notes, the process of Goethian science "is more important than the end result. Experiments must be concentrated, ongoing experiences through which one learns new ways of seeing" (p. 42). Indeed, we are given "new organs of perception." In this sense, Goethian science is closer to the humanities than to Netwonian science. Whereas the Newtonian worldview attempts to "empower what we already are," Goethe provides a means of investigation which permits us to "grow beyond ourselves" (Brady, 1998, p. 109).

Ethically Responsive Obligation to the Observed

When we open ourselves to become transformed by the phenomenon, then we also enact the second aspect of Goethe's "delicate empiricism." We develop the capacity to become *ethically responsive* to our obligations to the observed. As Shotter (2000) has asserted:

> To ignore our own, initial, responsive relations to living phenomena in our inquiries into their nature is to cut ourselves off from the very spontaneous calls and invitations they exert upon us in *their* way of coming-into-being—and thus to deny ourselves the kind of knowledge we need if we are to answer their calls in ways that 'they can understand,' that are appropriate to *their* nature. (p. 242)

Shotter refers to Goethe's method as a "relationally-responsive understanding," which he contrasts with the "referential-representational understanding" of Descartes and Newton. With a "referential-representational" approach to phenomena, we act as if we are separate from the world, as if we are not called or claimed by the objects of our study, and as if we were not therefore obligated to the phenomena under our investigation. With a "relationally-responsive" attitude, on the contrary, we stay closely attuned to the way the phenomena claim us. When we allow ourselves to be claimed by phenomena, we open ourselves to feel our relational obligation to them. In other words, we become morally engaged with them. Indeed, when we spend time in deep contemplation of the structure of a plant, for instance, we come to appreciate the plant as an end in itself rather than a mere means. We come to better understand ways that we can live harmoniously with the plant. We sensitive ourselves to actions that may violate the value of the plant. And through the wisdom we gain, we create a space not only to

improve our own lot, but also ways to improve the plant, which we come to understand as an extension of our own existence, indeed, as part of the ground of being that sustains us.

Goethean Science as a Cultural Therapeutics

Clearly, Goethe has given us a powerful method to carry out what I defined above as a "cultural therapeutics." Whether we realize it or not, we continue to be claimed by the natural world around us, but for a variety of reasons these claims often remain unconscious. To the extent they remain unconscious, we run the risk of failing to respond to our obligations to the natural world. In our technological world, the call of the natural world can get drowned out by the abstract theoretical concepts that have increasingly come to replace our receptivity to the concrete claims of the phenomena that compose our life-world. Through formal education, we learn to ignore our immediate perception of the world, and we come to forget how to remain relationally-responsive to things. Yet, Goethe provides us with a concrete practice for cultivating the "organs of perception" we will need in order to heal ourselves and the planet.

In contrast to the Cartesian-Newtonian worldview, arguably a symptom of our cultural illness, Goethe offers a viable alternative. In place of an alienated consciousness, he grants us a vision of ourselves "at home" and belonging with the things of the natural world. In contrast to an approach to science that creates a chasm between the world of our conceptions and the world of our perceptions, Goethe offers us a science that gives a primacy to the meaningful world given to our senses. In place of a universe conceptualized abstractly as a vast machine, Goethe offers a more intuitively satisfying description of the world as a vast organism which is constantly in the process of becoming, a process in which we participate and disclose through our careful observation. Through that careful observation, we also come to understand a world composed of beauty which obliges us to moral action to protect and care for it. And, finally, Goethe offers us a way out of the implicit nihilism that results from the collapse of substantive rationality into instrumental rationality. Goethe's method aims not merely to predict and control, but has its end, rather, in the aesthetic and morally responsive obligation to the observed.

These aspects of Goethian science close the gap between natural science and the humanities since both come to share the tasks of schooling our

faculties of observation and cultivating wisdom. The natural sciences and the human sciences become united in Goethian science because the observation of nature is always also a process of self-discovery. Through that process of self-discovery, we may come to better realize more sustainable practices of living with nature and with each other. As a cultural therapeutics, Goethian science is an interdisciplinary affair.

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