

Core Samples of the Sublime

On the Aesthetics of Dirt

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1. Digging for Beauty

Is it possible to marvel at grains of sand as we would fine brushstrokes, to listen to infiltrating rainwater as we would a symphony, or to read geologic processes as we would an epic novel? While art may communicate environmental concepts differently than soil science, it does not necessarily guarantee an aesthetic appreciation for subterranean environments *as such*. Art may serve to “offer soil a new, more up-to-date image in addition to its undisputed ecological significance” (Wessolek 2002), but should not exclude the aesthetic appreciation of soils in the absence of artistic intention. What aesthetic features or experiences do soils have to offer, and how do these correlate with or differ from other aesthetic experiences in nature? Do soil scientists consider different aesthetic criteria compared to artists or the general public? (See thought sketch Fig. 1) In light of a recent survey on the aesthetic and artistic prospects of soil science, carried out at the German Soil Science Society’s annual conference in 2007, we will consider several models of appreciation in the establishment of an “aesthetic of dirt,” and in so doing, make a conscious distinction between the appreciation of soil *as such*, and photographs, preserved monoliths, scientific models, artworks, and other representations thereof.



Figure 1: “Soil Criteria” painted by Gerd Wessolek, 2007.

To begin our task, we must first considerably readjust our guidelines for accepted beauty. After all, it is admittedly difficult for most people to sympathize or identify with a resource generally regarded as dirt. Appreciation of seascapes or mountain vistas seems entirely natural, but what about the underworld realms of loam, sand, and clay—environments which are not always visible for us to focus our gaze upon, let alone judge as breathtakingly beautiful?

We cannot watch the silent, seeping, leaching processes of one horizon melting into the next, in the same way that we can watch the setting sun in a spectacular rose colored sky. We cannot physically experience the slow-motion weathering of bedrock in the same way that we experience the pelting force of falling rain, even when it is that very force that helps transform rock into soil. Long-term processes, such as the development of new soil minerals or the displacement of calcium, iron, or other elements in the soil profile, are not usually observable within the short lifetime of a human being. While we are awed by the thundering roar of a waterfall, we do not usually register the silent power of groundwater. Few are aware of the life-giving upward soil water flux (capillary rise) from the groundwater table to the root zone, and few realize the effects of sinking groundwater levels, or the loss of peat soils due to over-drainage of the pore system. We do not usually appreciate annual changes in river discharge and its load of suspended, fertile sediment — though many live in fear of catastrophic floods. Our spatial-temporal frame of reference is that of another scale. We must accordingly dig a bit deeper if we are to formulate arguments for the aesthetic appreciation of soil.

2. Applied Models for the Aesthetic Appreciation of Soil

Although aesthetics has historically been equated with the philosophy of art, aesthetic experience, especially in the appreciation of nature, quite often takes place in the absence of artists and their artistic endeavors. Nature however, reaching back to the traditions of Kant and Hegel, has long been perceived and aesthetically judged as if it were art: landscape vistas judged on the same basis as landscape paintings, natural objects as sculptural objects, and so on. Yet nature's infinite scope and lack of authorship puts it into a completely different category of aesthetic appreciation that should be handled in its own right.

Inspired by Ronald Hepburn's essay, "Contemporary Aesthetics and the Neglect of Natural Beauty" (1966), a thriving discussion on environmental aesthetics has evolved, distinguishing appropriate attitudes towards nature, from those dealing with art. In the "Aesthetic Appreciation of Nature," Malcolm Budd (2002a, p. 110) summarizes Hepburn's original argument as follows:

First, there is the idea that, through being both in and a part of nature, our aesthetic involvement with nature is typically both as actors and spectators. Second... in contrast to works of art, natural things are not set apart from their environment as objects of aesthetic interest... they are “frameless.” Third... aesthetic experience of nature should not be restricted to the contemplation of uninterrupted shapes, colors, patterns, and movements. Finally... the imaginative realization of the forces or processes that are responsible for a natural thing’s appearance or that are active in a natural phenomenon is a principal activity in the aesthetic experience of nature.”

These initial ideas, especially the aspects of involvement and imagination, are interesting to consider with regard to the appreciation of soil. Indeed, it is nearly impossible to experience the earth under our feet without involving ourselves to some extent in the immediate environment, or at least getting our boots a bit muddy. Involvement, however, usually requires attention on many levels, making it improbable that our focus is always and only on the soil under our feet, and not also on the larger environment. Reflecting the tenets of ecology as the study of endless interactions between organisms and their environments, environmental aesthetics is similarly concerned with creating models of appreciation for whole ecosystems, rather than parts thereof.¹ How then, are we to establish an “aesthetics of dirt,” without in so doing, separating soil from the rest of the environment?

Soil is regarded here as an integrated part of an environmental whole, seen aesthetically as a fundamental part of “the larger picture.” Without attempting to fully decipher the theoretical models presented below, we intend to provide a set of ideas adapted from the field of environmental aesthetics, which will hopefully offer new ways of appreciating, understanding and protecting soil as a natural resource. While the proposed aesthetic framework does not necessarily reflect traditional land evaluation methods, it may offer new perspectives for conservation and educational strategies, and makes a case for pedogenetic beauty, independent of artistic intervention.

2.1 Rousing Scientific Imagination – Models of Cognitivism and Creativity

Of the major contributions to environmental aesthetics, Allen Carlson’s body of work, and in particular his natural environmental model, are of significance for us here. Carlson’s basic premise is that as we turn towards art historians, curators and museum directors to guide us in our understanding and appreciation of art, we must similarly turn towards scientific experts to clarify and enhance our experience of nature. As one’s experience of contemporary art is enriched by catalogue guides, exhibition tours or other expert publications, a walk through the woods may be enriched by field guides, educational trails and tours led by naturalists. Carlson (2000a, p. 6) outlines the science-based approach to the aesthetic appreciation of

nature:

“First... as in our appreciation of works of art, we must appreciate nature for what it is, that is as natural and as an environment. Second... we must appreciate nature in light of our knowledge of what it is, that is, in light of knowledge provided by the natural sciences, especially the environmental sciences such as geology, biology and ecology.”

This contention seems particularly applicable with regard to the complex world below the earth’s surface. To begin with, while many physical properties of soils may be considered aesthetically interesting, when exposed to the uninformed eye these features may also appear visually confusing. For instance, while most everyone understands what a sunset is and can therefore enjoy the colorful display at dusk, an accumulation of black flecks in a sandy profile could be taken as oxidized manganese deposits, the rotting remains of decomposed roots, or buried evidence of industrial contamination. Questions of how the black flecks came to be there, why they are arranged at a particular depth in the B horizon, and how they might change over time, appear as mysterious dark striations to the uninformed eye. Formally, but also ethically, in the possibility that the blackness does represent some kind of contamination, our observation is directly affected by the *knowledge* of what we are seeing. Thus, if we are digging for beauty in the moist soils of a hardwood forest, our expert guides to the subtle textures, often indistinguishable transitions in color and granulation, and teeming microbiotic universe of the epipedon, are soil scientists, agronomists, or other professionals who work with soil. With the help of such knowledgeable experts, the mysterious dark flecks in our theoretical B horizon then poignantly appear as the faded signature of a long-since departed oak, its quietly vanishing roots the only reminder of its former magnificence.

At the outset of this paper, we were curious to see if scientists could be active and willing partners in an aesthetic dialogue on soils, and how science-based appreciationⁱⁱ plays a role in the daily aspects of soil scientists’ work. As we see in Part 2, Under my feet – Soil presence and perspectives in the work of four contemporary artists (M. Boozer, L. Kriner, H. Jennes, M. Lafon), and in our companion chapter 4, “Merging Horizons - Soil Science and Soil Art” in this volume, artists have contributed a great deal to an aesthetic discussion on soils. As a counterpoint, we were also interested in the aesthetic perspectives of soil scientists. For, if they are to act as our specialized aesthetic guides to the enigmatic subterranean landscape, it would seem beneficial if they too approached the object of their research with a sense of beauty and awe. Who are these guides, and how are they equipped to direct and frame our aesthetic experience? Do they have aesthetic inclinations in their lab experiments, fieldwork and journal articles? Does such an underlying aesthetic attitude matter in their work? Soil ecologist David Wolfe, for example, seems to approach his work with a heightened sense of aesthetic appreciation. In the introduction to his book, “Tales from the Underground,” Wolfe (2001, p. 4) writes:

“knowledge of the incredible beauty, diversity, and activity of the subterranean world completely alters one’s perception

of the landscape. Gazing out over a barren plain becomes an experience similar to that of gazing out at a wide expanse of turquoise sea... I hope to serve as a subterranean “dive guide” of sorts... into a mysterious world we are just beginning to comprehend”.

In our search for other “subterranean dive guides,” we distributed a ten-question survey on the topic of soil, aesthetics and art at the German Soil Science Society’s 2007 annual conference in Dresden. The survey was completed by all 60 members of the audience during the session on “soil science in society and education.” The results were compelling, and provide us with incentive to continue the study within further academic circles.ⁱⁱⁱ We were first interested in finding out which major disciplines (environmental science, social science, aesthetics or combinations thereof), were most relevant for soil scientists. As expected, environmental science still plays the major role for soil scientists, but aesthetics was ranked in second place, and the combination of both natural science and aesthetics received slightly more votes, for example, than the combination of natural science and social science. (Table 1, Question 1)

Furthermore, although 36% answered that their work included no aesthetic aspects (with 49% answering *sometimes* and 16% *yes*), more than 80% admitted to personally collecting soil and mineral samples for aesthetic reasons. Which experiences or activities can be deemed as having aesthetic value? Nearly 50% shared the opinion that fieldwork is the central occasion for aesthetically experiencing soil. This was followed by viewing images of soil and encounters on nature walks or hikes, while 8% even identified laboratory activities as having aesthetic value. (Table 1, Question 2)

With our subterranean “dive guides” then seemingly in place to take part in an aesthetic dialogue on soils, we introduce our first challenge to the argument of scientific cognitivism. Although knowledge significantly enhances, and is sometimes necessary for the proper appreciation of soil, some have argued that it fails to provide sufficient criteria for *aesthetic* judgment. Emily Brady (1998, p. 158), for example, argues that scientific knowledge is “a good starting point,” but unnecessary for aesthetic appreciation:

“I can appreciate the perfect curve of a wave combined with the rushing white foam of the wave crashing on to sand without knowing how waves are caused. My judgment of the wave as spectacular and exhilarating can be dependent solely on an appreciation of perceptual qualities and any associations or feelings that give meaning to these qualities.”

Brady goes on to present the imagination-based model as an alternative to scientific cognitivism, arguing that an individual’s scientific knowledge can be extremely limited by educational opportunity and experience, while imagination is only limited by the mind of the observer. When scientific knowledge is unavailable, the observer must depend on her sensory perceptions and imagination to guide experience.

With regard to soils, however, we believe that a broader knowledge base equips the imagination with more possibilities for interpretation and appreciation. The more we know about geologic and pedogenetic processes and underlying factors such as climate, parent material and vegetation cover, the better we can imagine and thus appreciate the development of unique soil types. Indeed, the complexity of soil seems to demand at least some background knowledge for a richer aesthetic experience. A checklist of facts and features can guide our perceptual experience with cues to easily overlooked details, allowing us to arrive at judgments of beauty that we might otherwise miss. The “ah-ha” moment in the aesthetic appreciation of soils is often more subtle than aesthetic experiences of other natural environments, objects or events, such as in the wave example given above. In the continuation of the beach metaphor, Brady (1998, p. 163) does acknowledge how background information may enhance imagination to some extent:

“In contemplating the smoothness of a sea pebble, I visualize the relentless surging of the ocean as it has shaped the pebble into its worn form. I might also imagine how it looked before it became so smooth, this image contributing to my wonder and delight in the object. Merely thinking about the pebble is not sufficient for appreciating the silky smoothness, which is emphasized by contrasting its feel with an image of its pre-worn state.”

For the aesthetic appreciation of soil, we propose a combination of the imagination-based model with the argument for scientific cognitivism. While background information can aid imagination, imagination can conversely enhance scientific cognitivism. Indeed, imagination is sometimes necessary for the extension of sentience towards soils and their alien-like microscopic inhabitants. It is relatively easy to appreciate and thus protect rare flowers, songbirds, or other non-human beings that have features we can relate to and inhabit environments that are common to our own experience. Imagination can help stretch perceptions of the complex populations underground, and begins to dissolve what David Wolfe (2001, p. 3) has called “surface chauvinism.”

The capacity for imagination also involves the power of narrative. Soils unfold as a series of field stories, unearthed horizon for horizon, revealing the dramas of past ice ages, wars, settlements, global warming and drought. Educators should be encouraged to approach their curricula more creatively, and to tap the imagination by using narrative in their work to inform and inspire others. In addition to using abstract numerical models, by using descriptive language that triggers the imagination, multiple neurological pathways are opened and the educational effect is strengthened. The work of Daniel Hillel immediately comes to mind here, not because of his extensive contribution to soil physics, but for the way he has shared his knowledge with the world in books such as "The Natural History of the Bible" (Hillel 2006), and his integrated approach of mixing textbook soil science with historical and cultural anecdotes in *Environmental Soil Physics* (Hillel 1998).

2.2 Squishy, Gritty, Chocolate Brown – Arguments For and Against Aesthetic Formalism

What facts and features make soils beautiful and on which qualities do soil scientists base their aesthetic judgments? We were subsequently interested in learning what characteristics are relevant for the aesthetic appreciation of soils, and how these correspond to those described in other environmental aesthetic theories. To address these questions, we turn to another familiar discussion in environmental aesthetics – the debate over formalism.

“Concerning aesthetic appreciation, formalism holds that such appreciation is to be directed toward those aspects – textures, lines, colors and resultant shapes, patterns, and designs – that constitute the form of the object. Concerning aesthetic value, formalism holds that the formal qualities of an object, which it has in virtue of these aspects, are the only qualities relevant to the aesthetic value of that object. An object is aesthetically good in virtue of having formal qualities such as unity and balance... and aesthetically bad in virtue of having formal qualities such as disharmony or lack of integration” (Carlson 2000*b*, p. 28-29).

After briefly outlining the argument for environmental aesthetic formalism, Carlson goes on to brand this position the “scenery cult.” He first rejects formalism based on Hepburn’s original account of the frameless and interactive nature of experiencing the environment. Furthermore, by restricting our attention to the formal qualities of nature, we end up falsely interpreting environments as we would sculptural objects or landscape paintings, judging nature not for what it is, but only for how it appears, devoid of meaning, normal experience, or deeper understanding. Natural beauty is reduced to humanly perceived colors, textures and shapes, without consideration of the delicate interactions, complex biological and geological processes, and rich natural history embodied in every natural form or group of forms. Such appreciation is sometimes appropriate, as we cannot deny our senses the occasional indulgence of intense color and contrasting forms, but it is not sufficient. Carlson (2001, p. 96) warns that: “in landscape appreciation we cannot appreciate form without considering content.”

At first, Carlson’s claim seems legitimate with regard to the appreciation of soil. For one thing, soil features (such as color, texture, aggregate structure, and horizon boundaries) that are not usually visible are certainly difficult to judge. On the other hand, appreciation of formal features, when visible, seems completely natural. The stark glowing forms of shifting dunes or the cathartic texture of a crumbly, humus-enriched topsoil certainly provide opportunity for aesthetic appreciation. Are there any aspects of formalism that could support an “aesthetic of dirt?” In his argument for moderate formalism, Nick Zangwill (2001, p. 223), for example, criticizes the static position of Carlson’s “scenery cult,” asserting

that an active involvement or engagement with the environment does not cancel out aesthetic formalism in the appreciation of nature: “Being active and immersed in nature might be the best way to appreciate its three-dimensional formal aesthetic properties, just as the best way to appreciate such properties of works of sculpture or architecture might be to walk around such works.” Indeed, aesthetic experience of soils usually requires active participation to simply reveal the object of appreciation. We must often dig, scrape or hammer to first uncover the object of perception, which is usually followed by a hands-on examination of *e.g.*, texture between the fingers, color based on Munsell color charts and density based on probing the soil with a knife blade at different depths. While such characteristics are used for scientific surveys, they may simultaneously be regarded as an examination of formal aesthetic features, discerned by an active and involved observer.

In our questionnaire, we were curious to find out which formal properties intrigued soil scientists, and if such aesthetic preferences confirmed a formalist approach. More than 50% regarded color as the most significant feature, with horizon sequencing close behind, followed by soil structure, texture and smell. (Table 1, Question 3) Interestingly, soil structure received a higher aesthetic value than soil texture. The perceived differences between the sand, silt, and clay fractions of a soil paled in comparison to the highly organized and complex architecture^{iv} of structural soil aggregates. While soil monoliths may be seen as analogous to paintings in a formalist sense, the appreciation of soil in sculptural terms is also possible on many scales of observation, from microscopic aggregates to the hoodoos of Bryce Canyon. Our survey suggests that although the formalist model is perhaps superficial and inadequate for some, it is nevertheless an important form of aesthetic appreciation for others, especially those professionally close to the earth.

Furthermore, when asked to rate several typical northern European soil types, formal beauty dominated over scientific knowledge in aesthetic judgments. Despite being one of the poorest, nutrient-depleted soil types, the amazing color composition and beautiful horizon sequence of a podzol (Fig. 2) rendered it without a doubt the most attractive soil type, with not a single negative evaluation (see chapter by Fio Ugolini, “Soil Colors, Pigments and Clays in Paintings”, this volume). In all other cases we found both positive and negative reactions to each soil type. A chernozem, for example, was rated by about 15% as an attractive soil type while 10% did not agree. Gley soils had nearly the same amount of positive and negative reactions. In general, wet soils received more negative reactions than drier soils. (Table 1, Question 4)

These findings, from professionals who are supposedly equipped to guide our aesthetic experience with their knowledge, at first seem to conflict with the scientific cognitivist view described above. Shouldn't the

knowledge of a chernozem's fertility or the ecological significance of wetland soils sway our aesthetic reactions? Does framing the question in aesthetic terms change our overall judgment of a soil's worth? It would be interesting to see if the same relative proportion of laypeople would arrive at similar opinions, or to reformulate the question for scientists: "*Based on your knowledge* of the following soils, rate their aesthetic worth." On the other hand, formal appreciation of nature need not replace or detract from our knowledge of ecological interactions and the aesthetic values we attribute to them. We can find a salt marsh soil, for example, formally boring but simultaneously beautiful on account of our knowledge of its unique role in a wetland ecosystem.

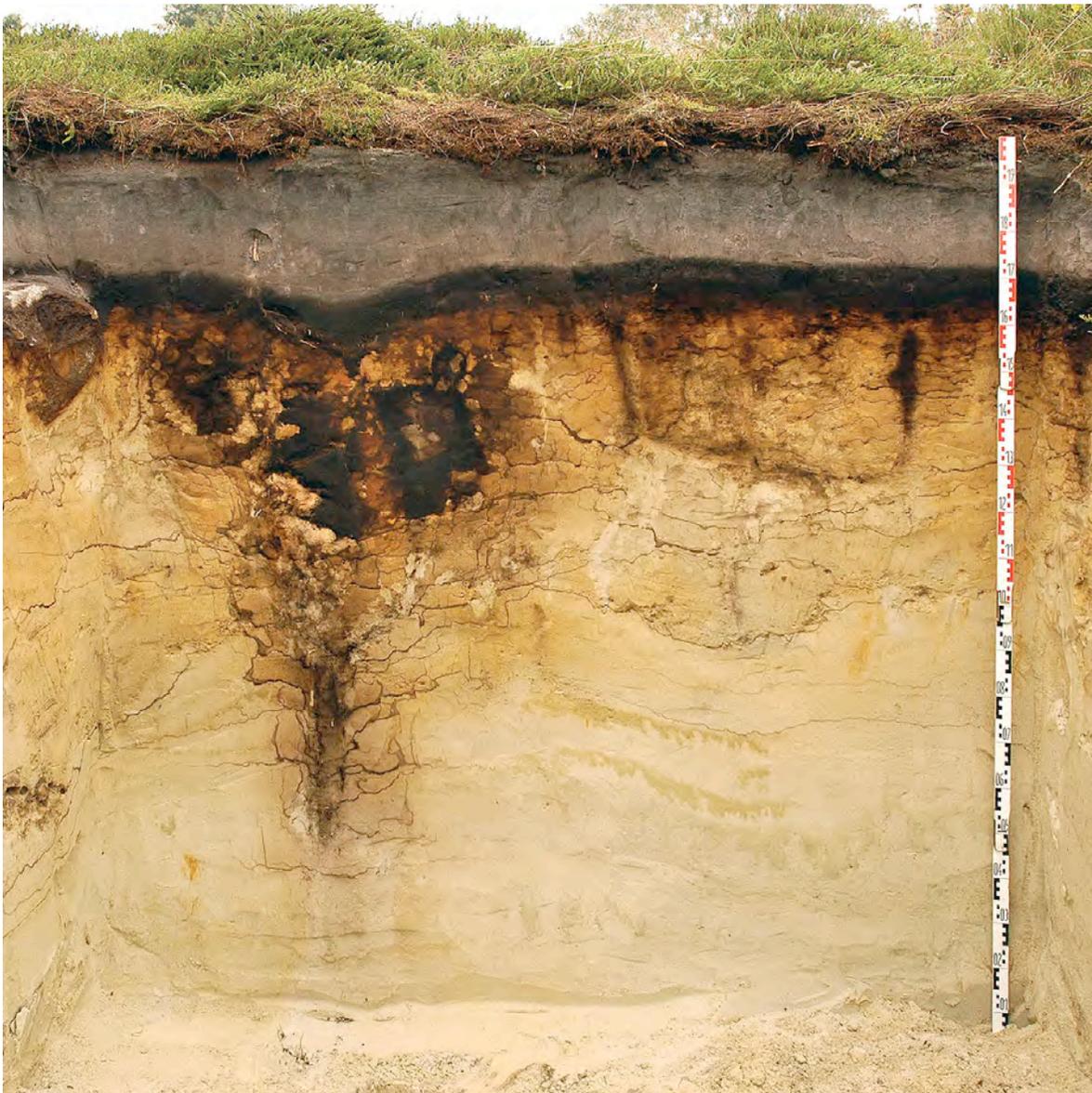


Figure 2: "*Heidepodsol*" Soil of the Year 2007, Pietrzok, BGR.

Such formal judgments can also serve to offer a new set of values, in addition to those determined by existing ecological assessments of soils. Even Carlson (2002*b*, p. 29), who seems to maintain that all formalist models of appreciation are inadequate, alludes to proponents of geography, forest management, recreation planning and landscape architecture, who employ the tenets of formalism in attempts to quantify scenic values for the sake of environmental protection. In this sense, the value of scenic beauty and classic “Photo-Op” moments has led to consequential legal protection of vast areas of national forests and coastlines. And while soil is generally hidden from sight, and thus devoid of the same kind of “scenic beauty” so integral to the appreciation and protection of other environments, we have seen that formal features do play a role for soil scientists, and may thus be used as additional values in conservation efforts.

Carlson (2002*b*, p. 28) also notes that “there is a marked emphasis on formal qualities in much of the current non-theoretical research in environmental aesthetics,” citing the U.S. Forest Service in their efforts to preserve the “character of the landscape.” Comparable to representatives from the Forest Service, most soil scientists could also be associated with Carlson’s “non-theoretical branch of environmental aesthetic research.” On the other hand, many soil scientists do spend a significant amount of time in the field probing for characteristic and unique formal features in diverse landscapes. Core samples of the sublime? Soil profiles are indeed used as ideal framing mechanisms in the identification and categorization of dominant soil types (or groups), while the process of excavation is also an act of decisive aesthetic execution, carried out with regard to the scale and dimensions of the trench and the formal composition of the profile wall. In this sense, scientific reference standards are partially based on formal aesthetic properties such as color, texture, density, shape, contrast, pattern and uniformity. If soil types may be internationally identified, categorized, and mapped out on account of formal aesthetic features, then perhaps the use of aesthetic formalism as an argument for soil protection is not far behind. If spectacular sand dunes or fossil beds may be listed as natural monuments and given certain environmental protection status, then why not specific soil groups on account of their aesthetic uniformity or uniqueness?

Although formalism plays a significant role in aesthetic judgment and sometimes conservation, it is nevertheless problematic in the appreciation of both art and the environment. There are a couple classical examples in art history that illustrate the weakness of aesthetic formalism. For example, the intricacy and attention to detail in Richard Dadd’s Victorian masterpiece, *The Fairy Feller’s Master-Stroke* (1855-1864), becomes complicated when the viewer discovers that that the painter was actually a murderous madman. Similarly, Leni Riefenstahl’s Nazi era films, documenting the rise of the Third Reich and the 1936 Olympics, are usually met with moral criticism despite the groundbreaking cinematic accomplishments of

the filmmaker. With regard to environmental art, formalism is also a double-edged sword. Whereas the elegance of Andy Goldsworthy's fleeting compositions with leaves, icicles and stones demonstrates a harmonious interdependence of natural beauty and human design, the raw aesthetic formalism of many of the earlier land art works is immediately compromised when knowledge of environmental degradation arises. The initial awe of such monumental earth works as Michael Heizer's 'Double Negative' (1969-70), Christo and Jean Claude's 'Wrapped Islands' (1980-1983), or Robert Smithson's 'Spiral Jetty' (1970) is challenged by the knowledge of negative consequences to the local ecosystems in which the works were executed.

Nature, though free from the burden of artistic intention, is also inevitably subject to moral judgment. Just as the overall beauty of a work of art may be diminished by aspects of ambiguous moral, ethical or ecological integrity, the beauty of a landscape may also be diminished by evidence of pollution, degradation, disproportionate development, or discordant features such as mobile phone towers or nuclear power plants. A fascinating result of our survey is the fact that anthropogenic soils were overwhelmingly rated as aesthetically negative (Table 1, Question 5). To the question, "*Do anthropogenic factors change a soil aesthetic value?*" more than 50% answered that human alteration of soils *decreases* aesthetic value. Here, we again encounter the dilemma of aesthetic formalism. Though some anthrosols and technosols^v have wildly varying horizon sequences and fabulous coloration, our judgment, like the vision laid bare before us, is polluted by our knowledge of ecological degradation.

Beyond the moral dilemma of aesthetic judgment, which we will address in the following section, lies a more obvious objection to formalism. While aesthetic formalism is mainly concerned with visual perception, the appreciation of soil is often more than just visual. Emily Brady's wonderful essay on "the aesthetics of smells and tastes" may shed new light on the appreciation of soil. Brady (2005, p. 177) writes, "Sniffing and savoring constitute not only a fundamental route to sensory awareness of our environment, but they also contribute to defining the quality and character of people, places and events... despite their significance in our lives, however, smells and tastes are a neglected part of aesthetics..." Brady goes on to attribute this deficiency to the "predominance of the visual in aesthetics and more widely in human experience."

Despite the fact that smell was rated last on our scale of aesthetic properties (Table 1, Question 3), the incredible potential of smell and taste in the appreciation of soils should not go unmentioned. Aside from those who are lucky enough to witness the "scenic beauty" of an excavated soil profile, an exposed relief, or a freshly eroded outcropping on the side of a mountain road, most are left unaware of the visual

magnificence hidden below ground. With no immediate view to fix our vision on, we are forced to experience the beauty of soils with other sense organs, to rely on smell, taste, touch and intuition to guide our aesthetic experience. It is no surprise that the “perfume of the earth” has been the subject of recent investigation. A group of chemists at Brown University recently identified the enzyme responsible for geosmin, the substance responsible for the unmistakable smell of fresh soil (see Jiaoyang et al. 2006). It turns out that the presence of geosmin, literally “the smell of the earth,” is also a criterion of soil quality checklists, such as those created by the Illinois Soil Quality Initiative (ISQI) for farmer-based soil screening tests (Wander et al. 2002). In this sense, the common human experience of smell links aesthetic judgments such as a soil’s sweet, putrid, pleasant or unpleasant, musty, acrid, or comforting odor with established scientific methods for soil quality assessments.

The appreciation of soil is also similarly linked to our experience of food and drink, and our non-formal aesthetic judgments thereof. This is the essence of the *terroir* concept (see chapter 28 by van Leeuwen, *this volume*). Indeed, all epicurean delights stem from the earth. The savored taste of yellow Boletus mushrooms in late August, for example, or the comforting flavor of a hearty beet soup, or the delicate flavors of a good Bordeaux, clearly point to hidden qualities of soil that escape the capacity of sight and transcend the bounds of formal appreciation.

Beyond taste and smell, the feel of soil represents another important aspect of appreciation. Soil texture and structure, for example, are determined by touch. Handling soil is an important step in soil quality assessments and represents a first aesthetic encounter with soil. While the sand, silt, and clay content of a soil sample can be estimated by trying to form a thimble-sized amount into a ball or pencil-thick roll with the fingers, the quality of soil aggregation is easily seen and felt as blocky, platy, granular, or prismatic chunks in a handful of soil. Such determinations are also aesthetic in nature, surely relevant to potters, sculptors and other artists and builders who use earth materials. Certainly the soft velvety squish of fine sediment between the toes at low tide, or the cool, moist soil of a wheat field on a hot summer day can also be aesthetically appealing, so much so that this experience is abstracted and commodified in the form of peat-baths at health spas or the sale of mud-masks, sand-scrubbles, or other earth-based body products. Subsequently, the grit of windblown silt or fine sand on the skin, mouth or eyes, denotes a decidedly negative aesthetic experience.

For the purposes of our discussion here, we neither fully endorse aesthetic formalism, nor completely reject it as Carlson and Hepburn do. We accept particular aspects of formalism, especially as they are embraced by those who use them for scientific inquiry, agricultural productivity, or environmental

protection. However, we adopt a more comprehensive approach in the search for criteria in the aesthetic appreciation of soils. In addition to formal visual qualities such as color, texture, tilth, and horizon sequencing, other sensory perceptions such as touch, taste, and smell are to be included in aesthetic judgment.

2.3 The Good Earth – A Sliding Scale in Positive Aesthetics

A further tenet promoted by Carlson, among others, is that of positive aesthetics, or the notion that nature, or at least pristine nature, is inherently good: “All virgin nature... is essentially aesthetically good. The appropriate or correct aesthetic appreciation of the natural world is basically positive and negative aesthetic judgments have little or no place.” (Carlson 2000c, p. 72)

As scientific progress gave credibility to attitudes of aesthetic distance, what was previously regarded as gruesome was magically transformed into the sublime. Once abhorred as black, infernal matter by the god-fearing communities of pre-enlightened western culture, soil came to be eventually celebrated as the womb of life. Regarding the changing perceptions of the pedosphere, this is perhaps most memorably captured in Darwin’s final and most controversial book, “The Formation of the Vegetable Mould Through the Action of Worms,” (1881) and the waves of mixed reaction that followed. Renaissance painter Giuseppe Arcimboldo’s depiction of *The Four Seasons* (1573) also represents an early intimation with nature as subject, in a time where religious themes dominated artistic content. In *Winter*, (Fig. 3) a human figure is represented with tree roots, mushrooms and dead leaves. As scientific progress justified aesthetic attitudes towards nature, what was previously regarded as gruesome was over time transformed into something sublime.

Carlson traces aesthetic positivism back to the eighteenth century concept of the sublime, and later to the nineteenth century naturalist movement, which was critical of the negative effects inflicted on nature by industrial and technological progress. As expected, Carlson (2000c, p. 90) also links positive aesthetics to scientific cognitivism: “the natural world must appear aesthetically good when it is perceived in its correct categories, those given and informed by natural science.” We extract the following simple wisdom from Carlson’s argument – scientific progress reflects and supports advancements in environmental aesthetics, and thus also in environmental protection. In other words, what we can understand we can appreciate, what we appreciate must also be good, and what is good is worth protecting.



Figure 3: “Winter” oil painting from the series “*The Four Seasons*” by Giuseppe Arcimboldo, 1573.

But how can literally *everything* in nature be aesthetically good (regardless of our scientific understanding of it)? Heavy sand storms, resulting in the desertification of agricultural land, mudslides, and flash floods may be all considered sublime under the guise of aesthetic distance,^{vi} but are not usually positively appreciated by those who have suffered personally under the arbitrary force of nature. Pathogens, parasites and disease can hardly be regarded as sublime from any account of aesthetic distance. Maggots and mold cannot possibly compete for the same affection as birds and butterflies. And even in this day and age, many people are still revolted by earthworms and their multi-legged, invertebrate cohorts. Budd (2002*b*, p. 104), however, argues that such “negative” aspects must be seen as necessary parts of a more beautiful whole:

“Although an ecosystem will contain objects and events that, in themselves, possess a negative aesthetic value, when these are seen in the context of the recycling of resources intrinsic to the system, which issues in the perceptual re-creation of life (much of which is beautiful)... the system, considered as the temporal unfolding of those processes, is itself beautiful (or sublime).”

Soil could be considered the poster child for Budd’s point here. While erosion, to some extent, is immediately accounted for, so too is the rather unsavory process of decomposition. With its uncanny ability to immobilize toxic particles before they enter the ground water system, soil recycles or safely stores the rotting refuse of the earth, turning the ugliness of decay into a symphony of necessity. Like the human body, with its kidneys, lungs, intestines and skin, soil also possesses a unique ability to dutifully cleanse itself of the world’s filth and transform incoming (organic) substances into vital nutrients. The beauty of the soil carbon cycle is that despite the death and disease welcomed into the upper horizons of the underworld, the transformative nature of soil creates new humic substances out of fallen ghosts, feeding once primary producers (generally plants) and consumers (generally animals) to hungry swarms of decomposers (macrofauna such as earthworms and isopods, and microorganisms such as bacteria and fungi) (Toland 2007). While decay is not usually considered formally beautiful, it finds unbiased acceptance within the arguments of aesthetic positivism.

Other critiques of aesthetic positivism, however, claim that such quality judgments are not aesthetic but ecological, or even *ethical* in character. Robert Elliot (1982), for example, argues that because nature has no author, judgments of goodness associated with positive aesthetics are inappropriate for nature, and best reserved for human activity, behavior, and creations (such as art). While we have already touched on the fact that moral or ethical judgments inevitably affect aesthetic experience with regard to formalism, the dilemma of human influence is still not easily resolved. Aesthetic positivism seems to preclude the appreciation of humanly altered or artificial environments. “Pristine nature” seems to set a standard of goodness and beauty unattainable by most landscapes.

Let us take another look at the question of whether human alteration changes the aesthetic quality of a soil. In our survey, anthrosols were predominantly rated as negative. Despite their unique formal beauty, they may also sometimes be seen to demonstrate great human ingenuity or archival value. Aesthetic appreciation of anthropogenic soils must also take remediation of past degradation into account. And while remediation would not be necessary in cases where human activity had not damaged natural soils in the first place, the visible and chemical effects of such measures may still be seen as aesthetically positive, if not (ethically) heroic. Environmental artist Mel Chin’s “Revival Field” (1990 – 1993) at the Pig’s Eye Landfill in Minnesota and regional remediation projects such as “AMD&ART” (1994 – 2005) in

Vintondale, Pennsylvania celebrate this kind of human reversal of fortune, rendering their art examples of “reclamation aesthetics.” (Spaid 2002, p. 109) This concept could be similarly attributed to such remediation projects as the efforts to restore wetlands off the Gulf Coast of the United States, or the recultivation of former mining areas or other highly disturbed terrains – *e.g.*, the slag-heaps around mining sites in Germany’s Ruhr Valley, or the artificial mountains of rubble created after World War II in Europe.^{vii} Such artificial structures may sometimes be positively regarded, as they create new topographies, outlook vistas, ecological niches and recreational opportunities in otherwise geologically flat landscapes.

The overwhelmingly negative aesthetic reaction to anthrosols, however, suggests that aesthetic positivism is in most cases an appropriate attitude in the appreciation of soil. Natural soils, regardless of their positive or “negative” formal aesthetic characteristics, are usually judged as inherently good, whereas humanly altered soils are not (Table 1, Question 5). Despite this overwhelmingly negative aesthetic reaction to anthropogenic soils, agreement was not unanimous. A handful of people still rated anthrosols positively. More than 30% found human influence on soils to actually *increase* its aesthetic value, and 15% concluded that “it depends on the situation.” This discrepancy clearly points to a sliding scale in positivism.

Stephanie Ross (2006) argues that human influence is not the only factor for negative judgment, and that such judgment is relative. Human alteration of nature must be seen in degrees of positive or negative influence:

“Let us grant, then, that nature and culture interpenetrate and that naturalness comes in degrees. We can and do make judgments about the degree of naturalness of particular cases. A human walking across a pristine beach and leaving footprints is quite different from a developer constructing condos all along that same beach” (Ross 2006, section 3).

A weaker version of aesthetic positivism can thus be applied to the appreciation of soil. Certainly problems associated with urban sprawl, contamination, deforestation, acidification, salinization and non-sustainable forms of agriculture are to be negatively judged from an ecological, ethical and aesthetic perspective. But human influence is also to be judged in degrees, so that the positive appreciation of archeologically or culturally significant soils, as well as cases of soil remediation, recultivation, sustainable agriculture, and other examples of “best practice” may be included in our aesthetic evaluations.

3. A Shift in Values

As of 2008, more than half of the earth's population lives in cities. Increasingly fewer individuals in industrialized countries depend on soil for their own personal subsistence, while many families in developing nations cultivate small plots of urban soil for their food supply, regardless of potential contamination. In a time of on-line supermarkets, genetic patenting and questionable agroindustrial standards for nutrition, agricultural policy has become all but obscured from conventional wisdom and far removed from the daily undertakings of most citizens. With the bounty of Wal-Mart and other mega-stores at our disposal, centuries of rural folk knowledge have been consigned to the yellowing pages of farmers' almanacs. New valuation systems are needed if conservation efforts and sustainable food production strategies are to succeed on a wider scale, particularly in heavily populated areas.

How can aesthetics contribute to a much-needed shift in values? Following the wisdom of Aldo Leopold's "Conservation Esthetic" (1949), some have suggested the integration of aesthetics into environmental education. Arnold Berleant (2005, p. 57), for example, writes:

"Experiencing environments aesthetically is, in fact, an embodied argument for the importance of environmental values. Furthermore, an aesthetic encounter is a way to approach environmental education by helping to cultivate feelings of care and responsibility for the earth. Each environment provides an opportunity for a distinctive aesthetic experience."

In his essay "What is the Correct Curriculum for Landscape," Allen Carlson (2001) compares the landscape to a text, which we may study and learn from, and out of which interpret multiple different readings, depending on our cultural and historical backgrounds. This position allows for multiple layers of meaning and educational value, such as "form, common knowledge, science, history, contemporary use, myth, symbol and art." (Carlson 2001, p. 105) In this sense, "aesthetic encounters" with soils are certainly not exclusive to soil scientists, farmers, gardeners, surveyors, environmental engineers or miners, but are available to virtually all who care to turn their gaze earthward. Carlson's curriculum for environmental appreciation and the kind of aesthetic awareness of environments that Arnold Berleant suggests above is applicable to an "aesthetic of dirt," generally – for the communication of soil aesthetic values to a wider public, and specifically – for soil scientists in various educational and conservation efforts. This kind of awareness is strengthened by the introduction of models of appreciation such as those described in this chapter: scientific cognitivism, moderate aesthetic formalism, imagination, positivism, and the qualitative use of touch, taste and smell in soil assessment. ^{viii}

But what does this imply for the field of soil science? The combined results of our survey indicate that

although aesthetic interest seems to be an important aspect of the field, the obvious questions must be asked: *Why don't soil science societies and their members talk more about the aesthetics of soil? How can aesthetic judgment be employed as a tool for examining alternative meaning, understanding, and experience of soil?* While more than half of those interviewed confirmed enjoying moments of aesthetic experience during fieldwork, less than 5% of aesthetic experience could be attributed to engaged discussion with colleagues or friends (even less than in the lab!) (Table 1, Question 2) If aesthetics is a relevant concern to soil scientists, why isn't it discussed more openly and more often?

Furthermore, if soil scientists are to act as specialized guides in the aesthetic appreciation of soils (in addition to their many other pursuits), then aestheticians should perhaps be prepared to “guide the guides” through the epistemological labyrinth of environmental aesthetics. Interdisciplinary dialogue is strongly needed, if an “aesthetics of dirt” is to be developed further. While soil scientists could do much to inform aestheticians of their progress in ecological research, professors of environmental aesthetics could be invited to contribute to soil science journals or conferences. Without active participation on both ends of the dialogue, scientists will remain on what Carlson (2000b, p. 28) describes as the “non-theoretical side of environmental aesthetic research,” uninformed of how their knowledge could benefit other academic fields, and how knowledge of aesthetics could strengthen soil protection efforts. Only in collaboration can a comprehensive curriculum for environmental appreciation be established, or the “aesthetics of dirt” developed further.

Finally, we advocate the integration of aesthetic values into already existing soil evaluation and protection contexts in order to better serve conservation and land use strategies. Where scientific assessments are not sufficiently adequate to address aspects of the picturesque, sublime, or other emotionally moving experiences in nature, especially regarding soils, objective aesthetic arguments could be employed. In a new era of sustainability, we might ask – *how* can beauty help save the earth?

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Figures

Title Image:

Figure 1: “*Soil Criteria*” painted by Gerd Wessolek, 2007. *Reproduced here by permission of the author*

Figure 2: “*Heidepodsol*” Soil of the Year 2007, Pietrzok, BGR. Photograph for the official “Soil of the Year” Poster. *Reproduced here by permission of the Kuratorium Boden des Jahres*

Figure 3: “*Winter*” oil painting from the series “*The Four Seasons*” by Giuseppe Arcimboldo, 1573.

Tables

Table 1: Selected questions from a survey on the aesthetic and artistic prospects of soil science, carried out at the German Soil Science Society's annual conference in Dresden, 2007

Questions	Answers (%)				
	1. Which allied disciplines are relevant for soil science?	Natural Science (41%)	Aesthetics (28%)	Social science (24%)	Combinations of the above (7%)
2. When do you notice aesthetic values of soils?	Field work (51%)	Viewing pictures (32%)	Walking (24%)	Lab work (10%)	Discussions (3%)
3. Which soil properties have high aesthetic values?	Colors (52%)	Horizons (46%)	Structures (26%)	Texture (19%)	Smell (9%)
4. Which soil types do you find aesthetic and which ones not?	Gley 50% Positive 50% Negative	Podzol 100% positive	Anthrosoils 12% Positive 88% Negative	Chernozem 65% positive 35%negative	Marsh 21% positive 89% negative
5. Do anthropogenic factors change the aesthetic value of a soil?	Anthr. factors <i>decrease</i> aesthetic value. (54%)	Anthr. factors <i>increase</i> aesthetic value. (31%)	Yes, but it depends on the situation. (15%)		

Endnotes

ⁱ Resource-specific contributions include, for example, Arnold Berleant's (2005) "The World from the Water," Yuriko Saito's (2005) "The Aesthetics of Weather," Holmes Rolston's (1998) "Aesthetic Experience in Forests," and most recently Arnold Berleant's "The Soft Side of Stone: Notes for a Phenomenology of Stone," presented at the 6th International Conference on Environmental Aesthetics, in June 2007 in Finland.

ⁱⁱ Glenn Parsons (2007) also refers to science-based appreciation as "scientific cognitivism," in "The Aesthetics of Nature."

ⁱⁱⁱ Since the writing of this paper, our survey was subsequently carried at the SUITMA Conference in China, where about 150 replied, and at colloquiums in Sidney and Palmeston North, New Zealand. These results have not been included here as the follow-up study is still in progress.

^{iv} 'Soil architecture' is the wonderful term introduced by Benno Warkentin (2006) in "The Changing Understanding of Physical Properties of Soils: Water Flow and Soil Architecture."

^v Anthrosoles are soils that have been formed or profoundly modified through long-term human activities, such as addition of organic materials or household wastes, irrigation or cultivation.

Technosols are soils whose properties and formation circumstances are dominated by their technical origin or other profound human influence such as transportation. They are proposed to better accommodate urban, industrial, traffic-impacted, and military soils (referred to collectively as 'urban soils') [definitions here modified slightly from those given by Spargen (2005) for the ISRIC – World Soil Information]

A comprehensive discussion, definition, and classification of technosols within the WRB is also found in the "Proposal for a new reference group for the World Reference Base for Soil Resources (WRB) 2006: the Technosols," 2nd revised draft (Rossiter, December 2, 2005).

^{vi} “Distance” as a psychological condition for properly appreciating art or other objects of aesthetic judgement was most notably argued by Edward Bullough in the article "'Psychical Distance' as a Factor in Art and as an Aesthetic Principle," published in 1912 by the British Journal of Psychology, followed by multiple works by Jerome Stolnitz.

^{vii} A typical example for such an urban geotope is the Teufelsberg (Devil’s Mountain) in Berlin, with a height of 114.7 m. It boasts one of Berlin’s best lookout points and its parent material is rubble from World War II. Today it is used for bikers, and even sometimes for international skiing events.

^{viii} Ned Hettinger’s (2008) concept of "aesthetic protectionism” should also be mentioned here as an acceptable guideline for the “aesthetics of dirt.”