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Scientific Knowledge and the Aesthetic Appreciation of Nature

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In assessing the aesthetic value of nature, two issues loom large. From the point of view of some contemporary aestheticians, there is the question of whether, aesthetically speaking, nature offers anything like the depth, complexity, and meaningfulness of art. From the point of view of environmental philosophers, aesthetic value may be seen as a source of value that contributes to the overall value of nature, and as a further reason for its preservation. But aesthetic value can also be the enemy of the environmentalist: often decisions made on aesthetic grounds conflict with decisions made on preservationist grounds. Aesthetic considerations often favor preserving parts of nature that strike the eye, places like the Grand Canyon that might be described as grand or majestic, as opposed to areas with more mundane-looking views and features. Yet, the latter may be equally or more environmentally important.

One way out of both difficulties is to accept a cognitive account of the appreciation of nature such as the one proposed by Allen Carlson. Carlson argues that scientific knowledge is necessary to correctly determine what categories objects of nature fall into. Drawing on Kendall Walton's well-known "Categories of Art," he argues that just as aesthetically appreciating art requires knowledge of artistic traditions and styles that allow us to perceive works in categories, aesthetically appreciating nature requires knowledge of the different environments of nature and of its systems and elements.¹ Carlson describes the relevant knowledge as that of natural science, ecology, natural history, and common sense.² Scientific knowledge is required for the correct appreciation of objects insofar as appreciation involves an element of knowledge, but in categorizing nature, science also focuses

our attention on relevant aspects of nature for appreciation.³

The importance of Carlson's cognitive model is clear, because it offers a response to the central worries raised above. Our aesthetic assessments take into consideration not only formal elements such as color and design, but also the role that an object plays within a system of nature. Thus the account allows for a complex, deep, and meaningful aesthetic appreciation of nature. Further, with this deeper appreciation of nature, the seemingly mundane may become interesting, and facts about the environmental impact of certain species (for example) can affect our aesthetic appreciation. In this way, our aesthetic and ethical assessments of what ought to be preserved in nature may be more harmonious than previously thought.

Carlson's model, while promising, has some seemingly obvious difficulties that have not been adequately addressed. First, there are criticisms that aim at showing that scientific knowledge is not required for the appreciation of (at least some) nature. People frequently appreciate nature without scientific knowledge, and, according to some, there is nothing wrong with these judgments. In other words, it does not take a rocket scientist to find a sunset beautiful.⁴ Another way of putting this is that even when scientific knowledge does enhance our aesthetic appreciation of nature, there are other valid aesthetic judgments that we can make about an object sans the scientific knowledge.⁵ In some cases, we may even be mistaken about the correct scientific category that an object falls into, and still appreciate correctly. Noël Carroll argues that we can appreciate the grandeur of an animal without knowing whether it is a whale or a fish.⁶ Further, empirical evidence shows that

even after learning some scientific fact about an object that ought to make us evaluate it differently, we still find the object to have the same aesthetic value. The sunset is no less beautiful when we learn that its colors are enhanced by pollution. Suppose we accept, however, that scientific knowledge is required for the correct aesthetic appreciation of nature. There is vast scientific knowledge, and it is not clear which of it is relevant for aesthetic appreciation.⁷ And, unlike art history and theory, science does not offer aesthetic standards for evaluating nature. Finally, insofar as the view implies that all nature has positive aesthetic value, or that everything in nature is equally aesthetically valuable on account of its role in the system of nature revealed by science, the view is false. Everything in nature is simply not equally aesthetically valuable.⁸

I shall defend a version of the cognitive account against these charges. These are not all the charges that have been brought against the account, but they have in common that they can be answered by looking more closely at the way in which knowledge functions in the perception and appreciation of nature. The charges can be answered by sticking more closely to the original analogy that Carlson draws between categories of art and scientific knowledge, rather than diverging from the view, as one might expect. My strategy will be to begin with Carlson's view, as briefly stated above, and extend it as needed to address objections. While I begin with Carlson, the final view that I defend is not consistent with some of the details of his position as worked out in a number of different articles. And I shall leave it an open question whether my new extended account is entirely satisfactory. But given the potential of this kind of position, it is important to see that it can be defended against recent objections that challenge it.

Carlson's central claim is that scientific categories function like art categories: they are required in order to correctly appreciate nature, and they focus our attention on relevant aspects of nature for appreciation. Carlson further clarifies the position in response to an objection raised by Noël Carroll. Carroll argues that we can aesthetically appreciate nature by being emotionally moved by it, without having specific scientific knowledge of nature. For example, we can be moved by the power of a waterfall without having scientific knowledge of the wa-

terfall.⁹ Carlson's response to this criticism is to argue that the knowledge that a waterfall is falling water is the sort of knowledge he has in mind, namely, knowledge "provided by the natural sciences and their common sense predecessors and analogues."¹⁰ Carlson appears to use "scientific knowledge" broadly, and, in fact, is more interested that we have empirical *knowledge* of the object, whether it is of the common or scientific variety. For Carlson, scientific knowledge of the natural world is "only a finer grained and theoretically richer version of our common, everyday knowledge of it, and not something different in kind."¹¹ Except in cases in which Carlson refers specifically to scientific knowledge, I shall speak of the relevance of empirical knowledge, with the assumption that it covers the broader range of knowledge that Carlson considers.

While broadening the range of knowledge that is required for aesthetic judgment may allow for a response to Carroll's objection (and I shall return to that objection below), it makes matters worse on another front. Robert Stecker questions whether scientific knowledge can help us locate what is aesthetically relevant about nature.¹² In the case of art, knowledge of the type or genre of art guides us in locating the relevant appreciable features: in painting, we know to attend to variations in color, but not weight. There is vast scientific knowledge relative to any given aspect of nature that we might approach. But we do not have guidelines indicating which features uncovered by science are relevant, nor does science itself offer any rules for appreciation. So, given all the natural sciences, which is relevant to aesthetically appreciating a flower: physics, botany, ecology, chemistry? Each tells us something true, but is it relevant to our appreciation? And is one piece of information more relevant than another? The problem is further exacerbated when we learn that the range of knowledge that is to guide our appreciation is not limited to scientific knowledge, but includes its common sense predecessors and analogues, as well. So, given that the model Carlson proposes appeals to a quite broad range of empirical knowledge, is there a way to narrow that knowledge?

I argue that empirical knowledge does not tell us what is aesthetically valuable about an object, but by allowing us to perceive normal states of objects, empirical knowledge helps to reveal

aesthetic properties and aesthetic value. A closer look at Walton's view helps make the case. Walton argues that the aesthetic properties a work has depend on the category under which a work is perceived. Categories must be perceptually distinguishable, and include things such as "painting," "Cubist painting," and "in the style of Picasso." As Walton puts it, "To perceive a work in a certain category is to perceive the *Gestalt* of that category in the work."¹³ In other words, we see a work as a Cubist painting, or as being in the style of Picasso. We do not merely see the work and know, additionally, that it is a Cubist painting in the style of Picasso. Categories determine what the object is, and in virtue of this, they allow us to perceive which properties are standard, contra-standard, and variable for that category.¹⁴ This then affects what aesthetic properties the object has. For example, Walton tells us that if we see Picasso's *Guernica* as a painting, it will appear dynamic, in part because flatness is standard. But if *Guernica* is seen within a category of objects done in various bas-relief dimensions, that is, works in which flatness is variable, it will appear restful.¹⁵ Walton goes on to argue that knowledge of art history and tradition is relevant for aesthetic appreciation insofar as it helps us perceive an artwork within the correct category.

Categories guide us by providing norms that direct the way we see. Sometimes these norms merely indicate what we should expect and what we ought to pay attention to, without indicating the particular value that a feature has. So, for example, in painting, the particular color is variable, so we know to pay attention to the use of color. But the category "painting" need not specify a further standard that tells us that certain colors or combinations of color will have special aesthetic value. On the other hand, some categories may include goals. So, if the category is representational painting, then failure to represent adequately or realistically will generally count against the aesthetic value of the painting.

Compare this to the way in which empirical knowledge functions to place objects in categories. Carlson claims that science reveals what to appreciate and how to appreciate nature. Empirical knowledge tells us what the object is. It can suggest and affirm some categories as appropriate for perceiving the object and reject others. Insofar as part of our aesthetic appreciation of

an object involves knowledge about an object, the relevance of empirical knowledge is clear. But which of the many appropriate empirical or scientific categories do we choose? And once we have a category, does it really guide us in focusing on aesthetically relevant properties?

There is a way to limit the number of relevant scientific, and, more broadly, empirical categories, and such categories do reveal an aesthetic focus. To show this, distinguish two models of appreciating nature aesthetically, both of which require empirical knowledge. Consider, first, a *linguistic* model. On this model, we "read" nature. The color of an egg tells a story about the evolution of birds and their nesting patterns. Although the biologist does not perceive the egg's color or associated aesthetic properties any differently than the average person, she connects the color with a range of knowledge. The biologist knows or suspects that the golden plover's eggs are colored for camouflage, and that most ducks have uncamouflaged eggs because the nests are hidden in dense vegetation and the females who cover them are already camouflaged.¹⁶ On this model, what counts aesthetically is not the look of the eggs but the evolutionary story they tell, just as in a novel, what counts is not the shape of the letters, but the story they tell.

Compare this to a *perceptual* model in which our aesthetic appreciation is directly based on what we perceive. On this model, our knowledge of the object functions as a category under which we perceive the object. In this way, having knowledge about the object can change the aesthetic properties perceived. Suppose our biologist is interested in parasitism, the practice of leaving one's egg in another bird's nest, and how birds protect themselves from this practice. Our biologist knows that parasitism is successful when the foreign egg is similar in color to the home eggs. A bird can avoid parasitism if her eggs are distinctively different from those in nests that the parasite typically uses. This means that we should expect a variety of colors or markings of eggs among different species of birds, but uniformity within the individual clutches.¹⁷ A biologist who views a clutch of similarly marked eggs will see the importance of the uniformity, and a clutch of differently colored eggs will appear strange, amazing, or artificial. Even a single, slightly different egg in an otherwise uniform

clutch may look striking or mysterious, as if the viewer is in on a secret. Biologist Bernd Heinrich expresses the general point this way:

The coloration of birds' eggs reflects a long interplay of evolutionary forces, in the face of randomness and chance. This, in turn, "colors" the mind as well as the eye, and gives eggs an additional beauty that no person's brush could ever impart.¹⁸

Heinrich's point, simply put, is that the knowledge of evolutionary forces affects how we see, and, hence, affects the aesthetic properties of eggs.

As is evident, the linguistic and perceptual models are not unrelated. The evolutionary story about the egg may become part of the category under which we perceive the egg—it may affect our perception of the egg, rather than merely being associated with the egg.

To answer Stecker's original question about how to limit relevant empirical knowledge, it will help to see why the perceptual model of aesthetically appreciating nature is like Walton's model of art appreciation. Walton's original concern is to argue against Monroe Beardsley's claim that an artist's intentions and the causal history of a work are not relevant to the aesthetic assessment of that work. Beardsley's main point is that a work should be judged on the basis of what can be perceived in it. Walton's tactic is to show how the artist's intentions and the causal history of a piece can affect the very way an object is perceived by partially determining the category that the object falls under. The category under which the object is perceived then affects the way the object is perceived, and thus affects its aesthetic properties. So Walton can claim that aesthetic properties turn on what is perceived in the work, but what is perceived depends on a base of knowledge and experience that extends beyond the work proper, as Beardsley conceives of it.

The same general point is true of nature. Suppose one were to say that we should simply aesthetically appreciate what we perceive in nature—that scientific knowledge does not matter, except tangentially insofar as it draws our attention to further objects or aspects of appreciation. One could then reply, à la Walton, that because our knowledge can affect how we perceive objects, there is no such simple perception. If we

think that there is a correct appreciation of nature, it should start with correct perception based in empirical fact. However, if certain scientific or empirical categories do not affect the way we perceive the object, then we no longer have a basis for insisting on their relevance to aesthetic appreciation.

It is important to keep in mind, then, that on the sort of view to which Carlson appeals, the point of making use of empirical knowledge is to perceive objects under categories, not simply to have information about objects. So it seems fair to limit empirical knowledge to that knowledge that can serve as a category for the perception of nature.¹⁹

More specifically, the sort of knowledge we are interested in is knowledge that will give us perceptual norms, i.e., indicate which features are standard, contrastandard, and variable. The above example from biology illustrates this point. Uniformity in the color or markings of a clutch is standard, and variety in color is contrastandard. Further, knowledge of these norms can affect the aesthetic properties of eggs. But there are also plenty of examples that arise from our everyday, empirical knowledge of nature. Seeing something as a certain kind of tree, and being familiar with the range of kinds of trees and how they compare with other plant life, will help us to see certain features of the tree as standard, contrastandard, or variable. For example, the sizes (and ages) of live oaks vary, and so a comparably large tree may appear grand or majestic, particularly in comparison with the other plant life that it towers over. That leaves on trees are normally green will make an orange- and red-leaved tree striking. Most trees flower when they have leaves, so an oriental magnolia, with its large blossoms on bare branches, appears enchanting, and the later state of the tree, in which it is blossomless and full of leaves, is dramatically different from its former state. On the other hand, under ordinary perceptual circumstances, the chemical composition of the tree bark will not contribute to perceptual norms and therefore is not relevant. Norms may also include the object's context—its relationship to the rest of the environment. The main point I want to emphasize is that there is a way to delimit relevant empirical knowledge on this model.

Interestingly, one might argue that this is the same way that artistic knowledge is delimited.

Consider again painting. We have said that flatness is standard for painting; it is a feature in virtue of which works belong in that category. Because flatness is standard, representations in paintings appear flat or to have depth in virtue of some other feature, rather than the physical flatness of the painting itself. But the flatness of paintings can contribute to the sense of normalcy or order in the work. Likewise, the particular color used in a painting is variable, and should contribute to a wealth of aesthetic properties: whether the painting is dynamic, dull, luminous, etc. Compare these to other features that might qualify as standard or variable. There is a range of chemical compositions of paint in oil painting that is typical. Is chemical composition, then, a standard feature that guides our perception of the painting? The answer seems to be, only if knowledge of chemical composition affects our perception. The weight of paintings varies, but it is not a factor that typically directly affects the aesthetic properties perceived in the work. In painting, the relevant standard, contrastandard, and variable properties are those that directly affect the way in which we perceive the work (and in the case of painting, the way we visually perceive the work with the naked eye). The range of empirical knowledge that is relevant to aesthetic perception is limited, then, in the same way that the range of knowledge relevant to aesthetic appreciation in art is limited: in both cases, the features must be ones that directly affect how we perceive the work.

Even if we are able to limit the relevant empirical knowledge, one might still argue that much of even the relevant knowledge can be ignored for simple, but valid, aesthetic appreciation of an object. We can further explain, and deal with, this objection by drawing another distinction. There are two ways to envision how the cognitive perceptual model works with respect to nature. On the *enhancement* model, we distinguish between what is often described as "thin" and "thick" conceptions of nature. A thin conception of nature focuses on surface qualities; a thick conception adds levels of knowledge that help to perceive additional properties of the object. Stecker makes use of an enhancement perceptual model (although he combines it with features of the linguistic model): "... some knowledge of nature can enhance, or 'thicken', one's appreciation of nature, by enabling one to

think and perceive nature in more complex ways."²⁰ He compares the thin surface qualities of a flower to the thick/enhanced appreciation that occurs when one knows that the flower indicates a certain stage of spring. We can know "that it indicates things to come, as blossoms indicate fruit, or that it stands in some intricate relation to other things in the environment."²¹ Stecker seems to assume that having further knowledge about an object is like throwing on layers of clothes: the new layers do not change the old layers, although as a sum total they may together give more warmth. But insofar as the outer layers do not change the inner layers, they are optional. In enhancing our appreciation with knowledge, we add to what we appreciate, but do not change the original aesthetic properties perceived. With a thicker conception, we now aesthetically appreciate the same surface qualities in the flower and that the blossoms indicate fruit. On this way of thinking, new knowledge about nature fills in gaps left open by our thinner conception, thus enhancing our aesthetic appreciation.

On a second *pure* perceptual model, we do not simply fill in gaps in our knowledge, because many of those gaps were not left open in the first place. Let me explain by considering the difference between *thinking* with concepts and *perceiving* under concepts. When we think with concepts, we distinguish which aspects of the concept are clear or known, and which are unknown. I may know that a live oak is an evergreen typically covered with Spanish moss, but know nothing of its size, shape, the size of its leaves, or the density of its foliage. I simply leave these gaps in my knowledge of live oaks to be filled in at a later date. But when we *perceive* under a concept, many gaps get filled in automatically. For example, suppose I perceive a live oak under the thin concept provided above. Despite not having the relevant knowledge, I may perceive it as large or small, sparse or full. Now, it seems that I could not perceive it in these ways if I did not have some subjective norms guiding my perception, whether or not they were correct. The point is, when I perceive under a concept, even when that concept is incomplete, there are perceptual norms at work. I do not refrain from perceiving certain aspects of the tree, in the way that I refrain from thinking of them. If this is the case, then perceiving with

a thicker conception of an object can change the way we perceive the object under the thinner conception. The live oak that once looked sparse now appears normal. The live oak that appeared of average size now seems small. These differences in the way that we perceive then affect our aesthetic judgments: the tree we once perceived as grand or majestic is now youthful. The once abnormally small leaves now appear just right for the tree. Foliage that once seemed sparse may later seem elegant.

The problem with the enhancement model is that a thicker concept may change the norms perceived under a thinner conception, and this, in turn, changes the aesthetic properties. Sometimes our aesthetic experience is merely enhanced by new knowledge, but other times the knowledge helps to correct what aesthetic properties we believed the object to have. Additional knowledge provides not only for a richer aesthetic appreciation of the object, but also a more accurate one, because it is based on more accurate perceptual norms. If we accept the perceptual model, and we agree with Carlson that there are correct and incorrect aesthetic judgments about nature, then the empirical knowledge that makes up the thicker conception is required either for correct appreciation or to confirm that our original appreciation is correct.

With this in mind, we can now see where part of Stecker's criticism of the relevance of scientific knowledge goes wrong. Stecker wonders why appreciating partial representations of a tidal basin—a tidal basin as part of a beach, or a tidal basin as part of a seabed—would be aesthetically less correct than a full representation of a tidal basin that involves both. After all, none of the representations is malfounded.²² In other words, why would we need to know that the tidal basin is both part of a beach and part of a seabed? The example Stecker raises originally comes from Ronald Hepburn. To answer Stecker's objection, it will help to take a closer look at the example:

Suppose I am walking over a wide expanse of sand and mud. The quality of the scene is perhaps that of wild, glad emptiness. But suppose that I bring to bear upon the scene my knowledge that this is a tidal basin, the tide being out. The realization is not aesthetically irrelevant. I see myself now as walking on what is for

half the day sea-bed. The wild, glad emptiness may be tempered by a disturbing weirdness.²³

When we see a tidal basin as a part of a beach (and no more than that), we do not simply leave the gap in our knowledge unfilled. The assumption behind our perception is (presumably) that this is a normal part of a beach—the sort that is not a seabed part of the time. For that reason, we experience wild, glad emptiness. In fact, what we are walking over is a seabed part of the time. When we realize this, our experience is not the same wild, glad emptiness together with a disturbing weirdness that is independent of the former. Rather, the wild, glad emptiness is tempered by the disturbing weirdness. In other words, the disturbing weirdness *changes*, not merely adds to, the wild, glad emptiness. In fact, one might perceive the emptiness as desolate rather than glad.

On my account, the partial representations of the tidal basin are arguably inadequate if they mislead us in our perception of the normal state of the tidal basin. If we only know part of the truth, as when we see the basin simply as part of a beach, we rely on hidden assumptions that may be false, and false in a way that distorts the aesthetic properties perceived. There may be cases where a thicker conception of nature merely enhances what we perceive, but as the example shows, this is not always the case.

We can also now see why, even given additional scientific knowledge that ought to change our aesthetic judgment about an object, we often still make the same aesthetic judgment. An example is the case of invidious exotic plants. Marcia Eaton has drawn our attention to the abundance of purple loosestrife that has invaded Minnesota. Often, even when people are told about the extreme destructiveness of the plant to the ecosystem, they still find the fields of purple beautiful.²⁴ If the perceptual model that I defend is correct, how is it possible that we can have scientific knowledge that ought to change our aesthetic view of an object, yet it does not?

They key here, again, is that the perceptual model requires that one perceive the object under the scientific category, not simply have the knowledge in question. Perceiving under a concept takes time and experience. We have to learn to see the loosestrife, in certain contexts, as harmful. When we see, and not just think, the

loosestrife as harmful, our aesthetic perception will change. One might object that we can see the loosestrife as harmful and beautiful at the same time.²⁵ After all, there is no inherent inconsistency in seeing the flower in both ways. In this case, I would think that even if one still found the loosestrife beautiful (in its destructive context), then at least the quality of the beauty would change.

Another example will help make the point. Suppose a victim of child abuse has a large, multicolored bruise on her face. Taken out of context, or without knowledge of the significance of the color variation, we might find the mark beautiful, just as we find color variation in other species beautiful. But for those who see the bruise as a sign of abuse, it takes on an entirely different aesthetic character. The bruise may no longer be seen as beautiful at all, or it might be seen as a sad or tortured beauty. It is not just that the bruise is viewed as both sad and beautiful, but the sadness pervades the beauty and changes its aesthetic quality. The same sort of phenomenon may happen with the purple loosestrife.

Another important point about the perceptual model is that there is no a priori connection between specific empirical knowledge and the aesthetic properties of the object. We cannot derive specific aesthetic properties simply from what we know about the category of the object. We perceive the object in the category and then discover what aesthetic properties it has. Further, there is no one-to-one correlation between empirical facts and aesthetic properties.

This point helps to defend the cognitive model against the objection that we can appreciate objects while getting the category wrong. If this is the case, then scientific knowledge is at least sometimes irrelevant in establishing aesthetic features. Noël Carroll argues that we can appreciate the grandeur of a blue whale and be moved by "its size, its force, the amount of water it displaces" without knowing whether it is a whale or a fish.²⁶ Part of Carlson's reply to this objection is that the appreciation is not fully appropriate if it involves the mistaken belief that the creature is a fish. Further, he suggests that if perceived as a fish, "it would appear more lumbering, somewhat oafish, perhaps even a bit clumsy."²⁷ But there is another way to respond to this criticism. Not every bit of information

will be relevant to every aesthetic property that a creature has, and different kinds of information can combine in different ways to produce the same aesthetic effect. Getting some of the information wrong need not result in a false aesthetic assessment of an object (at least beyond the false information itself.) In this case, it may be that perceptual norms for both whales and fish are similar, or are judged on the more general basis of sea life, and the creature appears grand on either conception.²⁸

The focus on perceptual norms helps explain why empirical knowledge alone cannot guarantee any particular aesthetic value. This aspect of the view is the key to rejecting one part of Carlson's cognitive account. Carlson argues for positive aesthetics, which "claims that the natural world is essentially aesthetically good."²⁹ Carlson defends the view in the following way: "... as science increasingly finds, or at least appears to find, unity, order and harmony in nature, nature itself, appreciated in light of such knowledge, appears more fully beautiful."³⁰ Further, if one judges only by criteria of unity, order, and harmony in nature as uncovered by science, then with an ideal scientific understanding, everything is equally beautiful.³¹ According to Donald Crawford, both positions are problematic because in nature there seem to be objects that have comparatively more or less aesthetic value, and even objects that have negative aesthetic value.³² In other words, an object's place within a system cannot be the sole factor that determines its value.

By viewing science as a guide to perceptual norms, we can see that any unity discovered with respect to the place of the object within a system will be only one aspect of the perceptual object. In the end, whether the object is aesthetically valuable will depend on the total perception of it—not merely how it fits into a system, but what other aesthetic (and nonaesthetic) properties it has and how unity relates to those other properties when the object is perceived. So experience, not just knowledge, is important. We may know that both hurricanes and tornadoes are highly destructive and dangerous, but through experience we find that the aesthetic quality of the two is quite different. The calm before a tornado is eerie; the rising wind and tide before a hurricane is exhilarating.

The same point can also be made by returning

to Walton. Walton points out that standard features do not typically seem striking or noteworthy, but that they can contribute to a work's sense of order, inevitability, stability, and correctness.³³ Yet, if all nature equally belongs to a system, then belonging to a system will be standard for nature. It may be that our current aesthetic appreciation of unity in nature is a function of our ignorance. If we always perceived unity in nature, we might find it beautiful, or we might find the unity simply normal or even dull.

The focus on perceptual norms also helps understand why, intuitively, we value the knowledge of the naturalist and preservationist, as Carlson claims. Stecker suggests that we may value the knowledge of the naturalist simply because a naturalist pays attention to the aesthetic qualities of nature. But then the appeal to knowledge is simply an appeal to pay attention to aesthetic value and is unhelpful.³⁴ The naturalist focuses on perceptible properties of the object, properties discovered through careful observation. So it is not simply, as Stecker claims, that we make use of the knowledge of a naturalist because she pays attention to aesthetic qualities. Rather, she pays attention to perceptual properties, and those properties are the most likely to alter our aesthetic appreciation. In the case of the preservationist, we learn what properties are signs of destruction. Seeing such properties as destructive will change our aesthetic appreciation of the object, just as they do in art.

Consider, for example, the most recent renovation of Leonardo da Vinci's *Last Supper*. Critics are divided on whether the painting is aesthetically better or not. The split is between those who see the renovated painting as revealing Leonardo's true work and assess the renovated painting positively, and those who see it as the destruction of the work as it has been known for much of the last five centuries and judge the renovated painting negatively. Consider, for example, the assessment of Ken Shulman, whose writing appears to support the restoration project:

The new *Last Supper* . . . is considerably lighter and more delicately wrought than the version art lovers were used to seeing. The faces of the apostles, previously inert and almost anonymous, have taken on a soulful character. And though there is considerably less color on the wall, Leonardo's complex perspec-

tive scheme is more compelling and far easier to read.³⁵

Compare this to the assessment of Jacques Franck, permanent consulting expert to the Armand Hammer Center for Leonardo Studies at UCLA: "All that was left of the head of Christ were tiny fragments of the beard and hair. The work is a ghost—pale and hazy, like a Seurat painting."³⁶ While parts of these statements are consistent, others are at odds with each other: that the painting is considerably lighter and more delicately wrought seems to assess the same features as the claim that the painting is pale and hazy. Yet, the first is a positive aesthetic assessment, and the second negative. So, it appears that in both art and nature, properties that are seen as destructive of the object can negatively affect our aesthetic appreciation of that object.

I began this series of objections and replies with Carroll's claim that there are correct aesthetic judgments that do not require scientific knowledge. I then appealed to Carlson's response, in which he extends the sort of knowledge required to cover empirical knowledge more broadly. We can now return to the question: Do we really need strictly scientific knowledge? From the considerations above, this is an empirical question. The knowledge that is relevant is knowledge that can change our aesthetic assessment of the object by changing how we perceive it. But until we perceive objects under different scientific categories, it is not clear just how those objects will change for us. It seems obvious that our judging the waterfall to be wonderful is correct no matter what else we know, but perhaps this is because we know of nothing that would change our assessment. But, in fact, our visceral response to falling water might be different, or, on the other hand, it might be less visceral when we know more. And that latter judgment might conflict with the earlier one. Certainly we judge the falling water at Disney World differently than we judge the falling water in Northern Georgia. And although the former is not natural, it is possible that there is something more we could learn about the natural waterfall that might change our assessment in a way that renders our old assessment incorrect.

Other judgments about objects based on visceral emotions are altered or corrected as we learn more about the object. For example, on

first seeing a pet rat, our judgment based on a visceral emotional reaction may be to find it scary. After getting to know the animal, we may find it sweet, loving, and harmless. If ordinary judgments based on visceral emotions are correctable, why not aesthetic judgments based on visceral emotions, as well? For example, our initial aesthetic judgment of the rat, based on a visceral emotion, might be that it is disgusting. Later, we may change our assessment and find the rat sleek (and not disgusting).

Are we wrong to judge the waterfall as wonderful without knowing anything more about it? Probably not. But if we want to be sure that our judgment is correct, we ought to know more. This is the sense in which scientific knowledge is required for correct aesthetic judgments. In the end, some or all of the additional information may leave our original assessment unchanged, or simply enhance it. But because the knowledge is relevant to a correct and complete understanding of the object, and because it is an open question whether the additional knowledge will change our more naïve assessment, it is not irrelevant to find out more about the object.

There is a worry about whether our aesthetic assessments of nature are ever correct, given that we may continue to learn new empirical facts that may continually change our aesthetic assessment of an object.³⁷ I have two suggestions for dealing with this problem. The first is that one might believe that there is some sort of god's-eye view of nature, according to which one would have all the relevant knowledge for aesthetic assessment, even though humans could never hope to have such knowledge. In theory, if not in practice, there would be correct aesthetic judgments about nature. Practically speaking, however, this need not mean that we need to reach a god's-eye view in order to be fairly secure in our aesthetic judgments. With experience, we can draw generalizations about what scientific knowledge makes a difference and focus on that. Second, we might concern ourselves with the degree to which aesthetic judgments are justified, instead of whether or not they are correct. Aesthetic judgments that are well informed by empirical knowledge would be better justified than those that are less well informed. Focusing on justification rather than correctness would still allow the same role for empirical knowledge in aesthetic judgments of nature.

So far I have only considered objections raised to Carlson's account, objections that, I argue, can be answered by extending the perceptual model, even when Carlson fails to do this. But there are also problems with the view as I have proposed it that have not yet been raised in the literature. One such problem is that there are multiple ways to correctly categorize objects in nature, all of which are scientific. And categorizing in different ways can lead to different knowledge being relevant, and to different, even conflicting, aesthetic properties. For example, a particular deer might be a graceful animal, but an awkward deer. Further, chemical composition, which is ordinarily irrelevant for appreciating a tree, might be relevant if we are examining a sample of the tree under a microscope. These examples raise two different problems, but they are problems that occur equally in art and nature. The first example illustrates problems with finding the right level of generality in which to categorize an object. This is a problem that is inherent in the idea of finding a category, whether it is with respect to art or nature. Like nature, in art there are generic levels of categories (painting, Cubist painting), and additionally, sometimes objects fit into more than one different category at the same level. The second case illustrates the problem of treating a part independently or as part of a whole. The same situation arises in art, as when we consider a passage in a painting to be well executed, but are critical of its contribution to the work. So, in both nature and art, there are questions about the precise category that one ought to use.

For any given natural object, there are ways to broaden or narrow the context of the object, or its spatial or temporal frame. While this makes it difficult to delineate all the knowledge required to appreciate a particular object, it is also part of what gives nature aesthetic depth. We can see this by returning to the idea of thin and thick conceptions of nature. The same distinction applies to art. A thin conception of a work allows for appreciation of its surface qualities, while a thick conception gives meaning or further symbolic significance to the work. One difference between art and nature is that the surface qualities of nature are, in a certain sense, particularly "thick." In a painting, we can usually distinguish between physical properties that matter aesthetically and those that do not. While we take an aes-

thetic interest in the painted surface, we usually do not care about the kind of wood over which the canvas is stretched. In a natural object, such as a tree, the surface is aesthetically relevant, but we also take an aesthetic interest in the inside of a tree, whether on account of its rings, the grain of the wood, or whether it is hollow or solid. We can keep moving beyond the immediate surface to reveal further surface properties that are also of aesthetic significance. Further, many artworks have a permanence that natural objects lack. Most artworks have an end state, and they are supposed to remain in that state. Although all material objects decay, in the case of art, we often do our best to preserve objects in their original state or to return them to that state. On the other hand, part of what we appreciate about nature is the way that objects change and develop, and particular states of nature that we are able to catch throughout this change. So nature has what we might call surface depth, and this means that, in this respect, the range of relevant knowledge for nature will be greater than that for art. But this is part of nature's appeal. And it need not imply that we cannot distinguish between relevant and irrelevant knowledge.

One might think that there is the following important difference between art and nature. In the case of art, the features relevant to aesthetic experience are fully prescribed by the category under which we perceive the artwork. On the other hand, the features relevant to the aesthetic appreciation of nature are not fully prescribed by any scientific or empirical category.³⁸ I would argue, however, that neither categories of art, nor categories of nature, fully prescribe the features relevant to aesthetic appreciation. For example, we might say that according to the category of painting, weight is not relevant to aesthetic appreciation. But suppose an artist were to paint on plastic wrap, instead of canvas. The aesthetic feel of the work would be significantly different, and not just because the surface had a different look. Our knowledge of the lightness of the wrap probably would make a difference. This is one example, but the boundaries of art and art forms change, and we are often surprised by what makes an aesthetic difference, even when we are familiar with a particular category of art. Further, in art, the changes in what matters in a category may be intentional, but they need not be. An artist might layer paint for the economy of being

able to reuse a canvas, and that layering may result in desirable new aesthetic features. So, I would argue, in both science and art, categories do not tell us definitively what features will be aesthetically relevant.

There is an important dissimilarity between the role of categories of art in art appreciation, and the role of scientific or empirical categories in the aesthetic appreciation of nature. We have said that art categories can provide aesthetic goals or purposes. Science, on the other hand, does not tell us the purpose of an object, if "purpose" implies that things are intentionally created. More importantly, it does not reveal an aesthetic purpose or aesthetic standards.

Carlson does argue that because scientific categories are often determined by aesthetic considerations of unity, harmony, balance, etc., any object seen through scientific categories will have these positive aesthetic qualities. One could then argue that science does offer aesthetic goals because science is guided by aesthetic standards. There are several problems with this solution. First, science, at best, will explicitly guide us to some aesthetic criteria, but not all. Second, insofar as all science has these aesthetic criteria, the range of relevant scientific knowledge will not be limited. Finally, as I have noted above, aesthetic properties must be empirically discovered. Even if science helps locate unity in nature, it is not clear that this unity will be perceived as a positive feature, or as dull and boring, or ignored as a standard feature of nature. And there is no way to know in advance of experience how the unity will combine with the other properties of the object—whether, in the end, the object will be perceived as part of a unified nature.

But there is something comparable in nature to the aesthetic purposes offered by art categories. We might find aesthetic value in a work of art because its purpose is to have property *p* and *p* is aesthetically valuable, or it might be that its purpose is to have *p* and we find it aesthetically valuable because it succeeds at having *p*, although *p* is not intrinsically a source of aesthetic value. There might be something similar to the latter situation that science could uncover. There are roles that certain kinds of objects play within systems, and individual members of a kind can play these roles more or less well. We can admire how well a particular animal fulfills its role. Or we might simply admire how well a

species is adapted to its surroundings. And where we focus on these considerations, the admiration can be aesthetic.³⁹ Scientific knowledge is relevant if it gives categories that include ideas about the function of natural objects within systems.

Scientific knowledge is not ordinarily relevant to the appreciation of art, so why should it matter in the case of nature? Scientific knowledge usually seems irrelevant to the appreciation of art because it fails to capture art for what it is. Other disciplines, such as art history and criticism, are more adequate to this task. But many believe that scientific knowledge does get at the nature of nature, and is therefore required for its aesthetic appreciation. I have argued that scientific knowledge, or empirical knowledge more generally, is relevant and required insofar as it provides correct perceptual norms for nature. By expanding and refining the analogy that Carlson makes between categories of art and empirical knowledge, I hope to have shown that the use of categories in art provides a guide for the function of empirical knowledge in aesthetic appreciation of nature and the kind of knowledge that is required. Admittedly, the view I defend still allows for a very broad range of knowledge to be relevant, but this is a function of the aesthetic richness of nature, rather than a problem with the cognitive model.⁴⁰

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1. "Appreciation and the Natural Environment," *The Journal of Aesthetics and Art Criticism* 37 (1979): 267–275, reprinted in *The Philosophy of the Visual Arts*, ed. Philip Alpers (New York: Oxford, 1992), pp. 592–599, esp. p. 597. See also Kendall Walton, "Categories of Art," *Philosophical Review* 79 (1970): 334–367, reprinted in *The Philosophy of the Visual Arts*, pp. 490–503.

2. See "Nature, Aesthetic Judgment, and Objectivity," *The Journal of Aesthetics and Art Criticism* 40 (1981): 21–25 for several formulations of this claim.

3. So, for example, we survey a prairie, look at subtle contours in the land, etc. Ronald Hepburn discusses this general idea earlier in "Contemporary Aesthetics and the Neglect of Natural Beauty," *Wonder and Other Essays: Eight Studies in Aesthetics and Neighboring Fields* (Edinburgh University Press, 1984), pp. 9–35.

The cognitive model is often contrasted with the position

that we appreciate the sights, sounds, smells, and feel of nature immediately, and with views in which imaginative associations are made when appreciating nature, but these associations need not be based in, and may conflict with, scientific knowledge of nature. For a discussion of the latter type of account and its difficulties, see Emily Brady, "Imagination and the Aesthetic Appreciation of Nature," *The Journal of Aesthetics and Art Criticism* 56 (1998): 139–148; and Marcia Muelder Eaton, "Fact and Fiction in the Aesthetic Appreciation of Nature," *The Journal of Aesthetics and Art Criticism* 56 (1998): 149–156.

4. Noël Carroll makes this point in "On Being Moved by Nature: Between Religion and Natural History," in *Landscape, Natural Beauty and the Arts*, ed. Salim Kemal and Ivan Gaskell (Cambridge: Cambridge University Press, 1993), p. 245.

5. Robert Stecker, "The Correct and the Appropriate in the Appreciation of Nature," *The British Journal of Aesthetics* 37 (1997): 400.

6. Carroll, "On Being Moved by Nature: Between Religion and Natural History," p. 258.

7. Stecker, "The Correct and the Appropriate in the Appreciation of Nature," p. 398.

8. Donald Crawford, "Comparing Natural and Artistic Beauty," *Landscape, Natural Beauty and the Arts*, p. 191.

9. Carroll, "On Being Moved by Nature: Between Religion and Natural History," p. 245. Carroll's own account is also cognitive, because he has a cognitive account of what it is to be moved by nature.

10. "Nature, Aesthetic Appreciation and Knowledge," p. 398.

11. Carlson, *Aesthetics and the Environment: The Appreciation of Nature, Art and Architecture* (New York: Routledge, 2000), p. 7.

12. Stecker, "The Correct and the Appropriate in the Appreciation of Nature," p. 398.

13. Walton, "Categories of Art," p. 492.

14. A feature of a work of art is standard "just in case it is among those in virtue of which works in that category belong to that category"; a feature is variable "just in case it has nothing to do with the works belonging to that category"; and a contraststandard feature is "a feature whose presence tends to disqualify works as members of the category" (Walton, "Categories of Art," p. 492).

15. Walton, "Categories of Art," p. 495.

16. Bernd Heinrich, "The Color of a Bird's Egg," *The Nature of Nature*, ed. William H. Shore (New York: Harcourt Brace, 1995), pp. 204–205.

17. *Ibid.*, pp. 210–211.

18. *Ibid.*, p. 213.

19. Hepburn claims that the stopping point of relevant knowledge is that point at which one loses track of sights, sounds, etc. Such knowledge would impoverish, not enhance, appreciation (p. 31). The perceptual model suggests a further limit, namely, that the knowledge must be active in the perception of the object.

20. Stecker, "The Correct and the Appropriate in the Appreciation of Nature," p. 400.

21. *Ibid.*

22. *Ibid.*, p. 398.

23. Hepburn, "Contemporary Aesthetics and the Neglect of Natural Beauty," p. 19.

24. "The Beauty that Requires Health," *Placing Nature*,

ed. Joan Iverson Nassauer (Washington, DC: Island Press, 1997), p. 91.

25. Thanks to an anonymous reviewer for this journal for this objection.

26. Quoted in Carlson, "Nature, Aesthetic Appreciation, and Knowledge," *The Journal of Aesthetics and Art Criticism* 53 (1995): 399.

27. "Nature and Positive Aesthetics," *Environmental Ethics* 6 (1984): 26.

28. Malcom Budd also makes the point that if you misexperience an item as being a certain kind of thing and there is no change in your perception, it is not of aesthetic significance. "The Aesthetic Appreciation of Nature," *The British Journal of Aesthetics* 36 (1996): 218.

29. "Nature and Positive Aesthetics," p. 28.

30. "Aesthetic Appreciation of the Natural Environment," in *Aesthetics*, ed. Susan Faegin and Patrick Maynard, (Oxford: Oxford University Press, 1997), p. 39. The details are worked out more fully in "Nature and Positive Aesthetics." Elsewhere, Carlson claims that positive aesthetics holds because scientific stories "illuminate nature as ordered and give it meaning, significance and beauty" ("Appreciating Art and Appreciating Nature," *Landscape, Natural Beauty and the Arts*, p. 221). It is not clear how this view of the relationship of science to appreciation relates to his earlier perceptual model.

31. Carlson takes a position similar to this in "Appreciating Art and Appreciating Nature," p. 221. The view is

based on the idea that it is appropriate to appreciate only order in nature, and all nature is equally ordered. Crawford also attributes the view to contemporary environmentalists (p. 191).

32. Crawford, "Comparing Natural and Artistic Beauty," p. 191.

33. Walton, "Categories of Art," p. 495.

34. Stecker, "The Correct and the Appropriate in the Appreciation of Nature," p. 398.

35. Shulman, "The Last Supper: Worth the Wait," *Art News* 94 (1995): 113.

36. As quoted in Rossella Lorenzi, "Restoration Drama," *Art News* 98 (1999): 64.

37. A more radical worry is that scientific theories are never fixed and always revisable, so that there is no fixed scientific truth, and, hence, no hope for correct aesthetic judgments. I shall set this skeptical worry aside for the purposes of this paper. Thanks to Stephanie Ross for emphasizing the importance of this problem.

38. A similar point is made by Stecker, "The Correct and the Appropriate in the Appreciation of Nature," pp. 398-399.

39. This would be true on the sort of view of aesthetic value that Walton defends in "How Marvelous! Toward a Theory of Aesthetic Value," *The Journal of Aesthetics and Art Criticism* 51 (1993): 499-510.

40. I am grateful to Sam Rickless, Stephanie Ross, and an anonymous reviewer for this journal for their helpful criticisms and suggestions on earlier versions of this paper.