

ART IN THE ADVANCEMENT OF UNDERSTANDING

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Abstract:

Cognitive progress often involves reconfiguring a domain, bringing previously unrecognized likenesses, differences, patterns and discrepancies to light. I argue that the arts effect such reconfigurations, enabling us to discern and appreciate the importance of aspects of the domain that we had previously overlooked or underemphasized. I argue that so-called 'aesthetic devices' like metaphor, fiction, and exemplification figure in our understanding of science as well as art. We cannot do justice to our scientific understanding while denying that art and its devices function cognitively.

Human beings seem to gather information in the way that squirrels gather nuts. Bit by bit, we amass data and store it away against future need. Many epistemologists and laymen take cognitive progress to consist in data gathering. If they are right, art has little to contribute, since works of art rarely convey much new information. But we ought not too quickly dismiss art from the cognitive realm. For this conception of cognitive progress both constricts and distorts the subject. Not only does it fail to do justice to art, it cannot even make sense of a variety of cognitive innovations that figure in the advancement of science. A broader, more variegated conception recognizes that understanding is multifaceted, hence can be affected by changes along a variety of axes. I suggest that a conception of cognitive progress complex enough to account for the advancement of scientific understanding cannot avoid accommodating art. That being so, if we understand how art advances understanding, we gain insight into the growth of science as well.

The inadequacy of the dominant view stems from its indifference to the fact that cognitive progress often consists in reconfiguration -- in reorganizing a domain so that

hitherto overlooked or underemphasized features, patterns, opportunities, and resources come to light. Epistemological theories that restrict their purview to justified or reliably generated true beliefs seem blind to such progress. They take beliefs as their inputs. Since belief contents have a propositional structure, these theories deal with intensional, hence already categorized, items. They can, of course, discredit beliefs cast in terms of certain categories on the grounds that such beliefs cannot be justified or reliably generated. But they lack the resources and the incentive to explain how or why the reconfiguration of a domain can itself be cognitively valuable. In what follows, I sketch several modes of reconfiguration prominent in the arts and illustrate some of the ways they enable us to make something new of the information at hand. If the arts effect and enable valuable reconfigurations and reconceptions, they enhance understanding whether or not they disclose new facts.

According to the dominant view, cognitive progress is the growth of knowledge, the acquisition of new (justified or reliably generated) true beliefs. A person learns a hitherto unknown but properly grounded truth¹ and smoothly incorporates it into his epistemic corpus. On this picture, information comes in discrete bits, and the growth of knowledge is cumulative. To be sure, we learn some things this way. If Sam was previously ignorant of the capital of Manitoba, he learns something new when he finds out that it is Winnipeg. Now he knows more about central Canada than he did yesterday. But, it should be acknowledged, he does not know much more. If we are concerned with advancing understanding rather than merely augmenting his stock of known facts, we should concede that the new information contributes little. The reason is this: The

¹Reliabilists and internalists disagree about what the basis should be, but the structure of their positions is otherwise the same. See Nelson Goodman and Catherine Z. Elgin, *Reconceptions* Indianapolis: Hackett, 1988, 135-153.

discovery that Winnipeg is the capital of Manitoba is not surprising. It violates no expectations, since the fact fits neatly with what he already knew or reasonably believed. Nor does it generate fruitful consequences. It does, of course, equip him to infer infinitely many more truths. But they are on the whole pretty insignificant, being logical consequences of things he already knows. Moreover, the newly acquired information creates no ripples. He does not need to reassess formerly accepted conclusions, reconsider his methods, or revise his standards. Rather like a piece in a jigsaw puzzle, the new information fits neatly into a cognitive slot that was already prepared for it.

More significant advances in understanding are apt to involve reassessment. Surprising new information sometimes serves as a trigger. Perhaps it is contrary to expectations. Perhaps its conjunction or juxtaposition with other things we accept has unexpected or counterintuitive implications. For example, we learn that Al Gore won the popular vote but George Bush won the US presidential election. We did not anticipate that an election could have such an outcome, one which is deeply at odds with what we had believed about democratic processes -- viz., that the candidate with the most votes wins. So the question arises: how are we to assimilate the new information? We might develop a more complex conception of democracy, or conclude that the US is not really a democracy. Or we could decide that even though the US is a democracy, this particular election or the laws and rulings that determined its outcome violated democratic principles. There are a variety of ways we might revise our views to accommodate a surprising fact. But if we want to understand the situation, we cannot simply add the new information to the beliefs we already have. Given our antecedent beliefs, the election results force the question: How could that happen? Understanding here comes not

through passively absorbing new information, but through incorporating it into a system of thought that is not, as it stands, quite ready to receive it.

Nor is cognitive progress always a matter of learning something new. We have a vast store of information at our disposal already. Often our problem is what to make of what we've got.² This is true even at the level of perception. To a large extent, looking involves overlooking; listening involves discriminating between signal and noise. So a critical epistemological question is: What is worthy of notice? What should be overlooked, marginalized, or ignored? Ordinarily, answers to these questions are simply presupposed. We seldom even notice that we notice some things and overlook others. We automatically invoke routine categories to describe or represent phenomena. We adopt familiar orientations and judge by received standards. These may vary contextually, of course. What is a routine classification in the kitchen is not a routine classification in the lab. Nevertheless, we have, as it were, cognitive default settings that we invoke unthinkingly. Often, of course, this is entirely appropriate. Using the familiar conception of a provincial capital is the right way to proceed in attempting to learn the capital of Manitoba. Using the grocery-store notion of sugar is unproblematic when looking for something to sweeten one's tea. But routine application of familiar labels does not always serve our ends. Sometimes it gives rise to anomalies or allows for the formulation of legitimate questions it lacks the resources to answer. Sometimes the sentences it yields don't satisfy our cognitive needs. Sometimes practice simply palls. Even if we have no articulable basis for dissatisfaction, the received view of things just seems stale, flat and unprofitable. Sometimes sheer curiosity induces innovation.

²See David K. Lewis, 'Postscripts to "Truth in Fiction",' *Philosophical Papers I*, Oxford University Press, 1983, pp. 278-279.

By calling default assumptions into question, and developing, entertaining and invoking alternatives to them, we may come better to understand a subject. Reorganizing a domain in terms of different kinds, highlighting hitherto ignored aspects of it, developing and deploying new approaches to it, and setting ourselves new challenges with respect to it are among the ways we increase our understanding. Physics restructures its field when it rejects the classical concept of mass in favor a pair of concepts, rest mass and relativistic mass. Things that had been construed as alike under the old categories are now considered different. Paleontology reconfigures its domain when it reclassifies brontosaurus and apatosaurus as the same kind of animal. Things that had been considered different are now deemed the same. Medicine makes progress when it elevates a physical or behavioral concomitant of a disease to the status of a symptom. Statistics advances when it develops new techniques for operating on large data sets. None of these innovations require new facts. All improve the ways we think about or operate on information at hand.

Every object belongs to myriad divergent classes and is like the other members of each class it belongs to. Most such likenesses are of no interest whatsoever. Although the members of the class consisting of a rogue elephant, the planet Neptune, and a Sacher Torte are alike by virtue of their membership in that class, their similarity is surely a matter of indifference. In all probability, we will never have reason to care about it. Likenesses that matter tend to become codified in our schemes of classification -- families of alternatives we use to sort the objects in a realm. The availability of a scheme with the category *dog*, for example, enables us to recognize the similarity between a dachshund and a greyhound. The availability of a scheme with the category *fast* enables

us to recognize the similarity of a greyhound and a jet. Codification is efficient and largely effective. But it tends to channel our thinking along well trod paths. Sometimes these paths do not lead where we want to go. Sometimes a detour looks intriguing. Then categories need to be reconfigured, new lines need to be drawn.

In drawing new lines, we mark out similarities and differences that were previously unmarked and, as a result, were often unnoticed in our encounters with their objects. When, for example, we distinguish between the trivial and the paltry, we discover that even insignificance admits of nuances. When we differentiate between fashion and style, we recognize that trendiness and elegance often diverge. Reconfiguration also occurs when we erase or relocate previously accepted boundaries. Lepidopterists advance their enterprise considerably when they ignore obvious differences and introduce a classification that counts caterpillars and butterflies as the same sort of thing, and when they ignore obvious similarities and construe butterflies and moths as different. By recognizing that intelligence and obtuseness are not mutually exclusive, we gain resources for recognizing frequently overlooked but surprisingly common qualities of mind. The utility of drawing new lines is plain. The difficulty lies deciding where and when and how to draw them.

Picasso drew them literally. When critics charged that his portrait of Gertrude Stein didn't look like her, he is said to have replied, 'No matter, it will.'³ Whether or not the story is apocryphal, the point is sound. A picture that originally did not look like Gertrude Stein managed, without any repainting, to come to do so. Robert Schwartz explains how this feat was accomplished. Perception is selective. We cannot register everything that meets the eye. We have to overlook a vast number of potentially visible

³Nelson Goodman, *Languages of Art*, Indianapolis: Hackett 1968, p. 33.

features if we are to discern anything. We can't see the trees for the forest or the forest for the trees, or either if we focus on the cell pattern in a single leaf. Moreover, perception is malleable. A variety of factors -- including experience, context, interests and background assumptions -- affect not only what we perceive, but even what we *can* perceive. That being so, it is possible to modify what we see, even when we are looking at a familiar object. By painting a picture of Stein that highlights certain hitherto unnoticed or underemphasized features, Picasso enables us to see her differently. People who knew her came, as a result of looking at the portrait, to realize that she actually had the features Picasso portrayed, to see her as having them, even to recognize them as characteristic of her. Gertrude Stein's appearance is thus reconfigured as a result of Picasso's work. But that is not all. The reconfiguration Picasso effected is not just a reconfiguration of Stein. For by giving Stein a new look, Picasso set a new standard for what it takes to look like Stein. People who previously would not have qualified as looking like Stein now do, for they share the features that Picasso has convinced us are distinctive of her appearance. We do not just see Gertrude Stein differently as result of the portrait, we see other people differently as well.⁴ Nor, one might urge, does the portrait prompt us to reconsider only what Stein and others look like. Picasso portrays Stein as a magisterial figure. The portrait thus conveys her character, as well as her appearance. The picture portrays its subject as someone to be reckoned with. Arguably, this is the first portrait in history to portray a woman as magisterial. So it raises questions: Who else is worthy to be so portrayed? Why aren't there more such portraits? What took so long? Picasso was hardly a feminist. But his portrait of Stein provokes exactly the questions that feminists have been urging us to ask.

⁴Robert Schwartz, 'The Power of Pictures,' *Journal of Philosophy*, (1985), 189-198.

Innovations in scientific representation function similarly. Projections belonging to a novel co-ordinate system disclose previously unrepresented, often only vaguely apprehended aspects of their objects. Data looks quite different when plotted in Cartesian, polar, and elliptic coordinates. Although all three representations are accurate, they bring different features to the fore. Data that appear irregular or discrepant when plotted in one coordinate system can present a smooth curve when plotted in another. As we multiply modes of representation, we gain capacities for enriching our understanding of the phenomena.

Familiar category schemes direct thought along antecedently established pathways toward readily recognized goals. Metaphor reconfigures a domain, drawing boundaries that cut across familiar distinctions, disclosing neglected aspects of the terrain, pointing thought in new directions. To call bribe taking *corrupt* is to class it with other disreputable political activities, under a literal and not especially illuminating label. To call it *a cancer* is to do more. It is to classify the act as not just objectionable in itself, but as a source of endless corruption with the potential to destroy the political institutions it affects. The metaphorical classification equips us to see how taking a bribe is like other initially unseen, seemingly insignificant but potentially devastating events. It underscores kinships within and between domains, likening its referent both to other members of the metaphorical extension and to their literal counterparts. A single cell that goes wrong can cause a cascade of consequences that eventually kills the organism. A single politician who sells a single vote can begin a cascade of equally devastating consequences, involving the vote itself, efforts to cover up what he has done, and enduring expectations that he and others will be further susceptible to bribery and other illicit influences. By fusing features into patterns, the metaphor affords epistemic access

to characteristics and regularities we might otherwise overlook. It underscores the idea that the corruption spreads insidiously, and that its spread undermines both the trustworthiness of, and public trust in government. It also equips us to raise new questions: What causes the cancer? Can it be stopped or its spread be limited? Is the problem just that we have a few disreputable folks in office, or are there endemic reasons why contemporary politicians are vulnerable to particular, and particularly dangerous forms of corruption? Questions that could neither be formulated nor motivated given just a literal description of the action, press for answers then the action is construed metaphorically.

Metaphor is often dismissed as mere artistic embellishment. But metaphors are not only widespread in science, they are often ineliminable. Cognitive science is grounded in the metaphor of the mind as a computer.⁵ The mind contains *storage* and *retrieval systems*. It has *central* and *peripheral processes*. It takes *inputs*, engages in *computations*, and generates *outputs*. And so on. Immunology is riddled with epistemological metaphors.⁶ The immune system is said to *know* the difference between self and other, to *recognize* threats, to *remember* previously encountered antigens, and so forth. Autoimmune reactions are characterized as immunological *mistakes*. These are not mere *façons de parler*. Neither science can conceive of its subject matter, pose its problems or formulate standards for their resolution without resort to the metaphors.

Even in literature metaphors are more than embellishments. Toward the end of *The Tempest*, Prospero says,

Our revels now are ended. These, our actors,

⁵Richard Boyd, 'Metaphor and Theory Change,' *Metaphor and Thought*, ed. A. Ortony(Cambridge: Cambridge University Press, 1979), pp. 359-364.

⁶See Alfred Tauber, *The Immune Self*, Cambridge: Cambridge University Press, 1994.

As I foretold you, were all spirits, and
Are melted into air, into thin air;
And, like the baseless fabric of this vision,
The cloud capp'd towers, the gorgeous palaces,
The solemn temples, the great globe itself,
Yea, all which it inherit, shall dissolve
And, like this insubstantial pageant faded,
Leave not a rack behind. We are such stuff
As dreams are made on, and our little life
Is rounded out with sleep.

[Shakespeare, *The Tempest*, IV, i, 148-159]

Within the play, the passage pertains to Prospero's dismissal of the magical creatures he had conjured up to do his bidding. Metaphorically, it describes the art of drama, in which the actors, and stage sets are conjured up to do the dramatist's bidding. At another level, the metaphor concerns ephemerality generally. If we acknowledge that the spirits Prospero conjures up are unreal, why should we think that he is any more real? If we acknowledge that he and the world he inhabits are unreal, why should we think that any differently about ourselves and our world? What makes the cloud-capp'd towers, the gorgeous palaces, the solemn temples outside the theater any more real than those inside? The speech then is then a layered metaphorical meditation on appearance and reality, on fiction and fact, on time, death, and decay. Interpreted metaphorically, Prospero's speech invites a phenomenalist, or even an idealist reading. But it resists literal paraphrase. Just as immunology cannot do without its epistemological metaphors, Prospero's speech cannot do without the metaphors of ephemerality.

A category scheme is just a system of labels that organizes the objects in a domain. A metaphorical scheme effects a reorganization. Objects that are literally the same sort of thing -- both being, say, political wrongdoing -- are metaphorically different sorts of things -- one being a cancer on the body politic, the other a mere wart. The differences the metaphor highlights are as real as the similarities the literal label locates. Metaphor then is a device for drawing new lines. It reorganizes the items in a realm, grouping together things literal categories keep apart, distinguishing among things literal categories group together. But it does not do so arbitrarily. Metaphor imports a scheme that has proven effective elsewhere. Metaphor then enables us to recognize membership in normally neglected classes. If someone says of a brilliant philosopher, 'His mind is a laser', how are we to understand the claim? Literal lasers are such intense, tightly focused beams of light that they can cut through steel, but are so easy to wield that they can be used to perform the most delicate surgery. To apply the term 'laser' metaphorically to minds is to classify together those minds that are not just brilliant, but so intensely focused, and acute that they can cut to the heart of the problem and make the most delicate judgments. If we cannot say exactly how those minds differ from other brilliant minds, it is not because the metaphor is imprecise, but because the literal vocabulary is inadequate. The metaphor identifies a quality of mind that no literal label quite captures. The lack of a suitable literal label is no surprise. If we rarely need to so characterize minds, or to differentiate them from other brilliant minds, we have little need for, hence little reason to invent a lasting literal label. Metaphors are ad hoc expedients introduced to fill the gaps that literal language inevitably leaves. But they are not question-begging or arbitrary. They are custom made to suit their contexts. They make

no claim to versatility. Their merits are to be judged entirely by their effectiveness in the contexts for which they are contrived.

In sum, metaphor enables us to identify previously unmarked classes, and to state previously inarticulate truths. It equips us to recognize new likenesses and differences, patterns and discrepancies both within and across domains. It enables us to draw on cognitive resources we have developed elsewhere to advance our understanding of a given realm. It provides resources for asking questions and exploring hypotheses that could neither have been framed nor motivated without the partition of the domain that the metaphor supplies. When these resources and abilities constitute or contribute to cognitive progress, metaphor advances cognition.

As we have seen, any object has and is known to have an instance of a host of features. We do not, and ought not give them all equal weight. Some stand out, others serve as a backdrop. Still others are so deeply overshadowed that we're apt to overlook them entirely. Exemplification is a mode of reference by which an object highlights some of its own features; it brings them to the fore. An exemplar thus is not just an instance of the features it exemplifies; it is a symbol that refers to them. A splotch of house paint on a drop cloth is just an instance of a particular color of paint. A commercial paint sample -- even if it is exactly the same size and shape as the splotch -- is different. For it exemplifies its color. That is, it both instantiates and refers to the color. The sample does not typically refer to the age of its manufacturer, its distance from the Eiffel Tower, or its chemical composition. So under its standard interpretation, it does not exemplify such features. Exemplification is selective. An exemplar highlights, underscores, displays, or conveys some of its features while overshadowing, marginalizing, downplaying others.

By making features salient, exemplification affords epistemic access to them. The features in question need not be particularly conspicuous, and a good deal of effort may be necessary to bring them to light. A complicated experiment may be mounted to exemplify subtle differences between the expression of closely related proteins, and an intricate plot contrived to exemplify extraordinarily complex patterns of loyalty and betrayal. Once we have access to these features, we may be in a position to recognize them and appreciate their significance when we encounter them in other contexts.

Every application of paint to canvas, no matter how deliberately executed, is a unique, unrepeatable event whose effect can never be exactly duplicated. Works like *The Birth of Venus* or *The Girl with a Pearl Earring* instantiate this truth but make nothing of it. Abstract expressionist works, such as Pollock's *Shimmering Substance*, which consist of paint spontaneously flung onto canvas, exemplify it. They call attention to, and make us mindful of the impossibility of reproducing a precise configuration of paints. Once this feature has been brought to our attention, however, we may go back and look at *The Birth of Venus* or *The Girl with a Pearl Earring* with a new eye, and appreciate its role in them as well.

A shift in emphasis changes the contours of the intellectual landscape. Although exemplification is selective, there is nothing in the nature of things that makes some features inherently more worthy of selection than others. Reconfiguration may result from re-selection -- from, that is, bringing an item to exemplify features that had previously only been instantiated. Rather than using volumes and shapes as the means for depicting scenes, Cézanne uses the depiction of scenes as a vehicle for the exemplification of volumes and shapes. By, as it were, shifting figure and ground, he makes us mindful of the composition of a painting, of the elements and combinations that

make it up. Rather than taking the lives and material conditions of the common folk as the inarticulate backdrop against which political and military events take place, Annales historians construe the lives and conditions of the common folk as historically central. To understand Victorian England, they maintain, it is not so important to know who said what to whom in Parliament as it is to know how industrialization affected the structure of communities and the dynamics of family life. Conditions that traditional historians take eras merely to instantiate, Annales historians take them to exemplify. The same change in emphasis is found in painting and literature. Painters like Courbet and writers like Balzac shift our gaze, showing how portrayals of people whom 'high art' had ignored yield a more richly textured understanding of the human condition.

In classical tonal music, even when all the notes of the chromatic scale are utilized, a particular key predominates. Melodic and harmonic relationships, consonances and dissonances are defined and discerned by reference to this key. Atonal music alters the structure of the musical field by giving equal weight to each note in the chromatic scale. Without the differential importance that tonality assigns to a particular key, the distinction between dissonance and consonance breaks down, and new musical configurations emerge. In tonal works the keynote serves as the center of musical gravity, as that by reference to which musical relationships are defined. Atonal works lack and exemplify their lack of such a center of gravity. Here reconfiguration results from reweighting.

Works of art often provoke reclassification by forcing us to focus on factors we ordinarily overlook. In so doing, they sensitize us to, and sometimes call into question the validity of, stances we typically take for granted. Adrian Piper is both a philosophy professor and a performance artist. One of her pieces consists of her standing alone in a

circle, giving a fairly standard lecture on Kant's ethics. If she delivered that lecture in the classroom, we would know exactly what to make of it -- what aspects of her presentation to attend to: the argument she gives, the points she emphasizes, her fidelity or lack of fidelity to the text and its historical and philosophical setting, and so on. But when she gives the same (or is it the same?) lecture as a work of performance art, we cannot be so complacent. Does the argument matter? Is the exact sequence of words important? Does it matter that she is discussing Kant, the valorizer of autonomy, rather than a communitarian like Sandel? Is it significant that she is an African American woman, that she is standing alone in a circle? Such questions naturally arise when we confront a work of art. Any aspect of the work could in principle be significant, so the capacity of the work to provoke these questions about itself is not particularly remarkable. But their feedback may be. Once we recognize how naturally and appropriately such questions arise when we are told we are confronting a work of art, we find ourselves wondering why we're so convinced that they do not matter in the lecture hall. What is the justification for deeming such factors irrelevant? We start thinking about the hitherto unconscious assumptions that frame our reception of academic lectures, and asking what -- if anything -- justifies them. Minimally, we become aware of the framing assumptions. As a result of our encounter with the work, we may find ourselves reassessing standards and conventions we had previously taken for granted.

A symbol must instantiate the features it exemplifies, but its instantiation need not be literal. For metaphorical instantiation is genuine instantiation. So a literally lifeless painting can exemplify the vigor, vitality, exuberance, and optimism that it metaphorically instantiates. A literally intangible, invisible symphony can metaphorically exemplify an intricate tapestry of textures, colors, and shapes. A literally

inert proof can metaphorically exemplify power, promise, elegance, and economy. The importation of a metaphorical scheme then supplies means not only for marking out new categories, but also for making manifest the features their instances share.

Symbols require interpretation, and are open to reinterpretation. Sometimes a reinterpretation wrings new insights out of a familiar work. As Olivier interprets it, *Henry V* is a patriotic glorification of war. The very same play, under Branagh's interpretation, is a bitter condemnation of war. The interpretations diverge over which passages are literal and which are metaphorical, which are sincere and which are ironic, what emotions and other features are exemplified, and so on. The productions convey their divergent readings of the text via differences in props, scenery, and stage business. Each interpretation is powerful, and compelling. But the two give diametrically opposed readings of the work. Branagh shows those of us brought up on Olivier that there is more to the play than we previously thought.

Jane Smiley's novel, *A Thousand Acres* is a fictional reinterpretation of *King Lear*. It accepts the basic plot line, but poses the daunting question: What if Goneril and Regan were right? What if Lear was growing senile, and as a result had embarked on a course of action that would destroy what he had devoted his lifetime to creating? How does one tell? What should one do? The novel not only provokes us to rethink Shakespeare's play, it heightens our sensitivity to a perennial problem of other minds -- not the problem of telling whether other people have minds, but the impossibility of knowing, even when it matters most, what is on their minds.⁷ When someone we care about engages in behavior that we consider both self-destructive and out of character, should we regretfully conclude that he knows what he's doing and is within his rights to do it? Or should we

⁷This, Stanley Cavell contends, is the real problem of other minds. See his *Disowning Knowledge*, Cambridge: Cambridge University Press, 1987.

conclude that he is, for one reason or another, losing touch and needs to be protected from himself? The juxtaposition of Smiley's interpretation and more standard readings of Lear brings home how utterly and permanently equivocal the evidence may be.

One way that science promotes understanding is through thought experiments. These are imaginative exercises that ask: What would happen if. . . ? They tease out implications of theories or hypotheses to test their tenability. They may be computer simulations, or purely cerebral acts of imagination. But they are not actual experiments. Nor are they typically mental rehearsals for actual experiments. They may involve entertaining scenarios that are not physically possible. Einstein drew out startling implications of the theory of relativity by asking what a person riding on a light wave would see. Schrödinger emphasized bewildering implications of quantum mechanics by considering the fate of an imaginary cat. Neither of these experiments could ever be carried out. Still, they are informative because thought experiments are carefully contrived fictions. Their contribution is not to disclose an unknown fact, but to reveal unrecognized or unappreciated commitments. Those commitments may tell in favor of or against the theory under investigation. Or they may simply flesh out the theory, enriching our understanding of what its acceptance would commit us to. Thought experiments are central to science. That being so, to understand how science advances understanding, we need to understand how fiction does so.

The tables can be turned. If thought experiments are fictions in science, fictions are thought experiments in literature. Like scientific thought experiments, literary fictions ask: What would happen if. . . ? They invite us to explore the consequences of making certain assumptions. Like scientific thought experiments, they may go to extremes. In everyday life we do not encounter the simple goodness of Alyosha in *The*

Brothers Karamazov, or the unadulterated evil of Iago in *Othello*, or the blind obsession of Ahab in *Moby Dick*. But by devising a suitable context, the authors can investigate the characters and their impacts on others in a way that reflect back on reality, perhaps enabling us to recognize the less pure cases we are apt to encounter in fact. Nor is plot the only refractive lens. One of the best ways to explore the commitments of phenomenism is read *Mrs. Dalloway*. Another is to study impressionist art. Works of art often problematize what had previously seemed unproblematic. They highlight tacit, even unacknowledged presuppositions and ask why we consider ourselves justified in them. Bach's *B-Minor Mass* provides a case in point. In the *Confiteor*, the music becomes deeply mysterious and expressively complex. It conveys a tapestry of mortification, hope, uncertainty, and fear. Since it is a fundamental tenet of the Christian faith that those who repent will be forgiven, what is at issue is not suspense over whether forgiveness will be granted. The apprehension obtains despite the fact that forgiveness is assured. The music thus conveys more adequately than any theology text, the utter incomprehensibility of the divine forgiveness. The enormity of the wrong that needs to be forgiven, the unworthiness of the penitent even to ask or hope for forgiveness raises the question: Why should God forgive? The fact that the sin to be forgiven is the murder of the forgiver's son (as well as the murder of the penitent's God) raises the question: How can God forgive? These questions are hard enough. But the complex expressiveness of the music leads to an even more basic question. What exactly is it to forgive? The question concerns not only divine forgiveness. It concerns anyone forgiving anyone for anything. To forgive is not to forget. To forgive is not to believe or pretend that the offense never occurred or that it does not matter. The shame, dismay, and bewilderment that persist in the face of forgiveness indicates that forgiveness does

not wipe the slate clean. There is a residue. The residue, moreover, may diminish both parties and permanently alter the relationship between them. The penitent may resent being in a position vis à vis the forgiver where she has to feel ashamed and the forgiver may resent being the object of resentment. The music then raises the questions: What exactly is forgiveness? How is it possible? What does it cost? The cognitive advance here is Socratic. Knowing that one does not know is the first step toward trying to find out. To think the concept of forgiveness is unproblematic is to blind ourselves to issues in moral psychology that deserve to be examined.

A problem remains. Aesthetic devices in art and elsewhere are suggestive. They indicate problems, point toward solutions, propose alternatives, and so on. But what determines whether these suggestions are sound? Logical positivists distinguished between the context of discovery and the context of justification. Although contemporary philosophers no longer make the distinction explicitly, the line is still implicitly drawn. The context of discovery is the realm in which the free play of ideas takes place. One might investigate the psychology, sociology or even politics of discovery. But there is no perspective from which to say, in advance, that one approach is epistemically preferable to another. There is no logic of discovery. It is in the context of justification where epistemology comes into play. For justification is a matter of evidence, and epistemology is involved in determining what evidence, and how much evidence is required to confirm an hypothesis. But the context of justification is the realm of hard fact. Evidence is supposed to be stated in literal declarative (preferably quantitative) sentences. Its weight is determined by rigorous scientific standards, which themselves are vindicated by their prospects of yielding truths. If this picture is accurate, then the factors I claimed to

function cognitively, seem to reside on the wrong side of the divide. They figure in the formation of hypotheses, not in their justification.

There is something to this worry, but it is not as scathing as it seems. The suggestions adduced by works of art or by 'aesthetic' devices in scientific domains should not be accepted without further ado. They need to be tested in the realm of fact. By suggesting something interesting and important about moral psychology, a work like the *B-Minor Mass* or *Middlemarch* can supply a reason to take the hypothesis seriously. If so, they give us reason to subject that hypothesis to further investigation, but not a reason to accept it without further investigation. It might seem that this simply concedes the point to the positivists. If epistemology is concerned exclusively with the context of justification, and the context of justification is concerned exclusively with the question whether evidence confirms an hypothesis, then the aesthetic factors in question have no epistemological weight. But we need not accept this view. The problem is a problem of plenty. There are a huge number of hypotheses that might be framed. Indeed, there are a huge number of true hypotheses that might be framed. This follows directly from the fact that every object belongs to indefinitely many extensions, and is therefore like every other object. The question is, which hypotheses are worth framing and investigating. Not every truth is worth knowing; nor is every falsehood worth dismissing. Some truths are trivial. Some falsehoods are useful approximations or idealizations. If we can center in on the truths and falsehoods that are worth taking seriously, we make cognitive progress.

The arts and the devices they deploy equip us with resources for doing this. They sketch alternatives to standard ways of seeing, representing, and understanding phenomena by reorganizing, reweighting, and shifting the center of epistemic gravity.

They invite us to consider whether the alternatives enhance or undermine the adequacy of the beliefs we already hold, or the perspectives we ordinarily adopt. They may highlight the need for conceptual clarification, as the *B-Minor Mass* undermines our confidence that we know what forgiveness is. They may point up the vulnerability of our methods, as *A Thousand Acres* highlights the danger of taking a person's sincere statement of his desires as expressive of what he really wants. They suggest and flesh out possibilities, affording what Bernard Williams calls 'thick' descriptions or depictions of how such possibilities would look in detail. They thereby afford resources for thought experiments, and for recognizing possibilities should we encounter them in fact.

The devices under discussion thus bridge the gap between the context of discovery and the context of justification. If they provide resources for deciding what hypotheses, stances, or modes of categorization are worth taking seriously, they provide some normative structure to the context of discovery. They indicate that discovering p would be fruitful, whereas discovering q would not. So they afford some cognitively grounded incentive for investigating p rather than q . They indicate which truths are worth having. So they enrich the context of justification as well. They not only yield the information that p is justified, but also that the categories in which p is cast, the stance from which p is framed, the questions to which p yields answers, and the questions which the confirmation of p enable us to raise are epistemologically valuable.

Part of the reason is pragmatic. We may decide for good reasons that we want one sort of knowledge rather than another. That is, we want to know some things rather than others. Perhaps we want the fruits of current inquiry to serve certain purposes -- purposes that they will not serve unless they are cast in particular terms, or the inquiry is done in particular ways. If we want to make predictions of impending events, we cannot

require calculations that would take so long to perform that the events in question would already have taken place by the time the computations are complete. This might make it reasonable to settle for less precise calculations or a greater margin of error. If we want to use our findings for self-improvement, we need to glean information that is available and useful from a first person perspective. If we want the findings from one inquiry to interface with the findings of others, we have reason to seek commensurate vocabularies, methods, and perspectives. If we know whether p is confirmed by the evidence, we know whether we have reason to believe that p is true. But if the issue is the advancement of the understanding, we also need to know whether we have reason to care whether p is true.

Art often operates at the cutting edge of inquiry. It challenges complacent assumptions, not just about matters of fact, but also about how problems and proposed solutions should be framed. It pushes the boundaries, reconfigures domains, highlights unusual perspectives and stances. It thus leads us into terra incognita, where the route to cognitive advancement is nowhere clearly marked. It does not, and does not purport to deliver literal, descriptive truths. It seeks, rather, to challenge, to disorient, to disrupt, to explore and thereby to reveal what more regimented approaches lack the resources to attempt.

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