Prospects for Reconciling Sellars’ World Images

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Abstract
Almost fifty years ago Wilfrid Sellars described two competing ways of imagining the world, the Manifest Image and the Scientific Image. The Manifest Image is an idealization of common sense aided by critical philosophy, whereas the Scientific Image is the product of our best science. The methodologies of the two images are very different: the Manifest Image deals with experience and looks only at relations among bits of experience and analysis of experience into the relations that must lie behind it, whereas the Scientific Image is grounded in explanations of experience, typically causal explanations. This need not be a problem if the two images are compatible. Sellars argued, however, that the Manifest Image implies continuity, so that any analysis must also reflect this continuity. However, the best science of the time told us (or appeared to tell us) that the world is made up of discrete subatomic particles and discrete transitions between quantum states, making the two incompatible. Although Sellars noted that future science might show that the world is continuous, he did not follow this up. Science in the last fifty years has given much more evidence for continuity in the world from complexity studies and Quantum Mechanics, so perhaps the two images can be reconciled after all.

Introduction
Almost fifty years ago Wilfrid Sellars (1963) described two competing ways of imagining the world, which he called the Manifest Image and the Scientific Image. The Manifest Image is an idealization of common sense aided by critical philosophy, whereas the Scientific Image is the product of our best science. The methodologies of the two images are very different: the Manifest Image deals with experience and looks only at relations among bits of experience and, alternatively, analysis of experience into the relations that must lie behind it, whereas the Scientific Image is grounded in explanations of experience, typically causal explanations. Causation is not available directly to experience, or even indirectly through the analysis of relations among or behind experiences, so the gulf in methodologies is very wide. This need not be a problem if the two images are compatible. However, Sellars argued that the Manifest Image makes experience continuous, so that any analysis must also reflect this continuity. However, the best science of the time told us (or appeared to tell us) that the world is made up of discrete subatomic particles and discrete transitions between quantum states. The continuity of the Manifest Image is incompatible with the discrete character of the Scientific Image.
If, as Sellars suggested, there is an irreconcilable conflict between these images, it may not be possible to reconcile science with common sense. The Scientific Image, as we have inherited it, has a strong reductionist element that seems to imply that things are not really as they appear to common sense. Although some amount of discrepancy between common sense and science is tolerable, since we know from past experience that we may be mistaken about nearly any given thing, a systematic clash between science and common sense presents problems for the acceptance of one, the other, or both views.

Sellars' discussion of the clash between the images is both complex and subtle. He eventually argues that the Scientific Image is preferable, but he makes remarks in passing that suggest possibilities for reconciling the images. Reductionism has typically been the domain of the “hard sciences” like physics and chemistry, but has held less sway in biology (except perhaps evolutionary and molecular biology) and the social sciences. In behavioural biology and cognitive science, questioning reducibility has been the rule for some time now, for both practical and principled reasons. Sellars discussed both the biological and behavioural routes to a possible reconciliation, and also suggested that future science might lead us away from reduction even in physics. He rejected neither of these resolutions conclusively. There is enough flexibility in Sellars’ conception of the images that their reconciliation is not impossible: there is a genuine tension, but no clear logical contradiction between the two images.

There have been significant developments in science during the years since Sellars wrote his article. We have seen the rise of chaos theory, which challenges Laplacean mechanistic views of predictability and reduction in physics itself, and complexity theory, which helps to justify emergent properties and failures of whole-part reduction. Developments in Quantum Mechanics and its applications have challenged classical views of locality. Together and independently, these developments in physics and trends in the behavioural sciences have led to a renewal of interest in emergence, which is now invoked widely (and sometimes carelessly) throughout contemporary scientific literature. The implications of this trend are slowly being assimilated by philosophers of science. A recent book, *Every Thing Must Go* (Ladyman and Ross 2007), uses contemporary science to present a naturalized metaphysics to argue against a metaphysics of things, especially of little particles bouncing off each other, and for a structuralist realism that makes relations fundamental, as they are in the Manifest Image. Nonetheless it is grounded in fundamental physics, which is still a long way from everyday experience, so there is much to fill in.

I am going to take a broad view of the impact of these developments on Sellars’ discussion. Sellars did not shy away from problems, perhaps contributing to the difficulty of his article. It seems that he anticipated some aspects of later developments, but didn’t develop their import. I will start by briefly discussing the nature of the images, and then turn to some obligatory criticism of Sellars’ characterizations of the images. Next I will discuss the clash between the images and how some recent work in science can help to resolve some of the problems in a way that Sellars anticipated. Finally, I will point to a problem that is still open, and does not seem to have a solution within either image as they stand now.

Why the images appear incommensurable
Sellars describes the images as stereoscopic views on a single reality, though he raises the possibility that one or the other or both are false, and rejects the possibility that
both could be true (Sellars 1963: 5). He ultimately favours the Scientific Image through an imagined incorporation of the Scientific Image into our way of life, rather than its being ‘an alien appendage to the world in which we do our living’ (Sellars 1963: 38). This is reconciliation of the images by elimination of the Manifest Image. We must examine how that can be possible given the longstanding plausibility of the common sense view. For this purpose it is useful to examine the nature of the images and their potential to clash in more detail.

The images are more than merely ways of approaching the world and our place within it. If this were not so, the choice between images would be the purely pragmatic matter of which is more useful for a given purpose. We could then think of the images as instruments that are neither true nor false, nor globally correct nor incorrect. Instruments can of course clash, but avoiding clashes is merely a matter of keeping the instruments out of each other’s way. As Sellars makes clear, though, despite the “stereoscope” metaphor, “image” itself is a metaphor for conception. These image-conceptions are idealisations designed to illuminate philosophical developments in our self-conception and our conception of our role in the world. Sellars makes his commitment to the conceptual content of the images clear in his discussion of the clash of the images. As philosophical tools, the images work only if they are taken seriously as true or false. Their clash is a conceptual clash, and we cannot escape issues of truth and falsity and apparent contradiction by taking an instrumentalist view.

Sellars’ images place different values on different methodological practices. According to Sellars, the primary difference is that, whereas the Manifest Image is relational, and uses the same inductive methods as the Scientific Image, the Scientific Image also postulates unobservables to explain observables, and unifies its approach through theories and cross-identification of the imperceptible across different domains of science that use different methods and have different values. I will argue below that the methodological differences between the images are not so clear cut as Sellars suggested, but to a first approximation his characterization of the methodological differences is correct.\footnote{In many respects, the images are like Kuhnian paradigms (Kuhn 1962, 1970, 1996): they classify the same objects differently, have their own methods and tacit assumptions, and cannot be internally justified except in their own terms. Many of the problems that arise in comparing the images suggest that they may be incommensurable, where two views are incommensurable if and only if there is not enough common conceptual ground for their comparison to be possible. In fact this seems to be the root problem in their clash. We have no common image which contains the two images, within which their claims can be comparatively evaluated.}

As idealizations, it is not clear that the images are the sort of thing that can be in historical sequence, although Sellars discusses an Original Image of a rather magical and uncritical nature that preceded the Manifest Image, and recognizes that the Scientific Image appeared much more recently than either. The ideal character of the images presents certain problems in evaluating their relative status, since our conceptions of both images change with time as our investigations proceed, and any consideration of them is bound to be based on an idealized projection from their current state. The images, as such, are images projected from an historical state, not some eternal theory (though ideally they would be eternal). For this reason, historical developments within the images since Sellars wrote cannot be ignored.

The images also share divergent emphasis on more substantive values, especially in the area of culture. This is a common characteristic of encompassing world views.
example, the Aristotelian and Mechanical world views are each associated with values that go far beyond their scientific domain. Perhaps the most important difference in values between Sellars' images is that while the Manifest Image is human centred, the Scientific Image (at least in its idealised form) purports to be objective, at worst centred on nothing, and at best centred on Nature, not Humanity. In their most extreme opposition, the Scientific Image seems to have no place for what makes us uniquely human, for it is exactly the Manifest Image through which humans conceive of themselves as human.²

I have argued that incommensurability is primarily a pragmatic condition that can be alleviated by making the conflicting tacit assumptions of each paradigm explicit within a common framework (Collier 1984). Sellars is careful to do this as best he can, with the science and philosophy of his time. This does not fully resolve the problem of differing values, but it can make these problems less mysterious, and correspondingly less acute. The rationale behind this approach is that paradigms and the evidence that might support them, whether empirical or conceptual, are interpreted within the constraints of unexamined tacit assumptions. Evaluation of cognitive claims concerning the evidence for a particular claim often means something quite different depending on the paradigm, and the claims themselves can differ in meaning for less than evident reasons. Making tacit assumptions explicit helps to show how and where the images tend to justify themselves implicitly. I said above that it seems that we have no common image to compare the two images. Perhaps we can either find or construct one, or else show that their differences do not require that they conflict. First, though, it is important to understand the nature and limits of the self-justification of the image's support for themselves and critiques of each other.

Within both images, there are correctness and error with respect to their respective frameworks, allowing both image relative correctness and progress away from image defined error. Sellars gives ample evidence of this within the Manifest Image, drawing on the phenomenological tradition and ordinary language philosophy (Sellars 1963: 7ff). Some evidence of progress includes the recognition that a) the association of thoughts is not the association of images, b) the direct action of perceptible nature on individuals can account for the associative nature of thought, but not for the rational connections of conceptual thinking, and c) the Manifest Image is a group phenomenon, the group mediating between the individual and the intelligible order. This progress has been brought about by methods internal to the Manifest Image itself. On the other hand, the conceptual framework of the Manifest Image, especially relations between the intelligible order and the individual, cannot be explained within the image, since these relations are presupposed (at least tacitly) by the study of the image within the image, and do not stand separately (Sellars 1963: 17).

Sellars suggests that the Scientific Image, through evolutionary theory, may be able to explain how we humans came to have an image of ourselves in the world (Sellars 1963: 17). There are certainly those who argue that evolutionary theory can do no such thing, with a raft of objections to evolutionary naturalistic epistemology and eth-

² This aspect underlies Snow's two cultures, and to some degree the recent "science wars". The division is old and it has not gone away. It would be too narrow to restrict the (apparent) conflict to the best of contemporary analytic philosophy versus the best of current science. However, although, the Manifest Image is human centred, whereas the Scientific Image is not, this is not enough to render them incompatible. There may be a translation of these properties of the images that would be rejected only by those who held dearly to the images themselves.
ics. Typically (but not always B some of the objections are scientific) the objections come from the standpoint of the Manifest Image itself. If these objections are well grounded, then we must be left with something unexplained and inexplicable within the Manifest Image, since neither scientific methods nor the “perennial philosophy” can explain the place of the individual within the intelligible order, i.e., the framework of the Manifest Image itself. This must be taken for granted, since it is both the central assumption and root value of the Manifest Image. The motivation of the image itself requires as a cognitive norm the central place of the individual as interpreter (or, in some versions, manufacturer) of the intelligible order, which in turn makes the individual the reference for all norms within the image. (The social mediation of interpretation does not undermine this role, though it makes a purely Cartesian philosophy impossible.) Given this limit on explanation, it is not surprising that many resort to a faith in something beyond understanding, which being incomprehensible, they can never truly conceive or believe. In the face of this pessimistic outlook for human understanding, Sellars asks us to imagine a future science with a place for humans as conceived in the Manifest Image (Sellars 1963: 38ff). Unless the Manifest Image can be reconciled with the Scientific Image, or we can find some way to transcend or reconcile both but retain their essential aspects, our likelihood of ever understanding our place in the world is truly dismal.

For example, consider traditional versus naturalistic approaches to knowledge. The traditional approaches try to analyze the concept of knowledge in a way that makes knowledge occur in the sort of cases in which we normally think it occurs. Scientific approaches, however, try to explain how we have knowledge in the sort of case in which we normally think it occurs. This will involve reference to physical, biological and psychological processes, which are themselves explanations for other observations we have made. From the perspective of the Manifest Image, however, naturalistic explanations are patently circular, since they rely on things that are themselves subjects of knowledge, and we need to ask how it is that we know them. Reference to these less apparent things seems beside the point in trying to understand the nature of knowledge (though there is a long tradition of invoking such things to help understand knowledge, going back to Plato). Surely our conception of knowledge must be something that depends on our thinking, and not on something else. The naturalist, on the other hand, finds attempts at philosophical understandings of the idea of knowledge to be more or less pointless, if not delusional (Piaget 1971).

Sellars points out that challenges to the Scientific Image on the grounds that it is false because of antinomies or contradictions in the framework of objects in space and time are met with arguments for the consistency of the image from within the framework of the image itself (Sellars 1963: 28). The objections come from the perspective of the Manifest Image. Just as fundamental problems with the Manifest Image are not addressed from outside the image, neither are those of the Scientific Image. Similarly, the critique of the Scientific Image arises from intuitions that come from outside the image.

Recapping, each image has certain tacit assumptions and values that cannot be criticized or supported within the image itself. These assumptions and values are embedded in the methodologies of the images, and in assumptions about their role in either reconciling common sense with itself, or empirical evidence with likely explanations.

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3 I am grateful to Julia Clare for asking me about this when I gave a previous version of this paper.
4 Compare to Putnam (1980: 482): ‘We interpret our language or nothing does’.
Both images permit progress, at least away from error, and possibly (if not probably) toward some greater satisfaction of their regulative principles. Neither image is demonstrably irrational, but each is rational on its own grounds. On the other hand, neither image seems to be supported fully from the perspective of the other, nor do they seem to converge naturally on some common view.

Some Peculiarities of the Images
There are several peculiarities of Sellars’ characterization of the images that are worthy of note. These peculiarities stem largely from, not surprisingly, tacit assumptions underlying the methodologies and values of the images, especially where the two are intertwined with tacit knowledge that we use in applying the images in practice. One peculiarity of the differentiation between common sense and science along the lines of postulating unobserved entities is that many cultures invoke non-perceptible entities to explain certain practices, such as healing and natural phenomena, but these explanations do not seem to be scientific. Ian Hacking (1983) has pointed out the distinction between representing and intervening. Perhaps we can repair Sellars’ characterization by requiring the use of imperceptibles in technology, which is closely linked to modern science, as a guide to the acceptability of explanations, and as a test of real understanding. This would rule out explanations that cannot be non-trivially used to successfully guide intervention. I think there is still a problem, however, since traditional Chinese medicine invokes imperceptibles, as do the shaman healers of many non-scientific tribes, who use sympathetic medicine and herbs, often to good effect. We value science largely (but not solely) because of its predictive power and claims to objectivity that go beyond personal or cultural values. It might be argued that these non-scientific cultures lack the application of sufficient critical inductive powers. Possibly they do, in comparison with our culture, but many people in our culture all the time, and virtually all people some of the time suffer similar lacks. These are a matter of degree, and to deride alternative technologies that make use of unobservables as “unscientific” because they have not accomplished our achievements seems to be beside the point. Similarly, there seems to be no obvious reason to reject these alternate technologies as unobjectionable. Possibly science is an historical entity rising out of pre-science, much as the Manifest Image is portrayed by Sellars as an historical entity arising out of the “Original Image”. I will not follow up the possible implications here. It is worth noting, however, that technologies involving unobservables in non-scientific cultures are usually integrated well into the common sense views of those cultures. This is exactly what is not claimed for science in our culture. In our culture, science plays a very dominant role that contrasts with our non-scientific understanding, and promotes itself as better, at least within its domain, than other approaches to knowledge. Furthermore, the domain of science has no specific limitation, since its methodology is presumed to be appropriate to anything we might study. Science, then, has these additional implicit values of universality, dominance and what we might call finality: it is the best judge of itself.

Continuing on this line, but in a slightly different vein, it seems that there are many things that are firmly within the Manifest Image that are not perceptible. My common sense view is that I have beliefs, but I have never perceived or experienced a belief. Former Prime Minister Trudeau of Canada, when asked which of the two official languages he thought in replied, “Neither; I think in the abstract”. On the evidence they present to me, I believe other people think in the abstract as well, though many deny
this to me, saying they usually think linguistically. I think they simply don’t pay much
attention to their non-linguistic thinking. Not only that, but I am not aware of my own
thinking in most cases. I know I must have done it, since I have reached conclusions
that I did not have before, though I am often not aware of even these until I speak
them or speak something implied by them. I use mental words only when rehearsing
discussions I might have with someone, and sometimes do this even in my dreams.
Thinking with words is far too restrictive to be efficient in many circumstances. How-
ever, I don’t think my attribution of unconscious thoughts or of beliefs to myself or
others is especially scientific. In fact it seems to be central to the intelligibility of the
Manifest Image itself. I suspect that we take thoughts and beliefs so much for granted
that we tacitly and uncritically take them to be something that we observe. This prac-
tice is so common that it does not raise any question of theory, any more than a skilled
carpenter using a hammer raises questions of theory, to use an example of
Heidegger’s. The purposeful use of a hammer is not a straightforward consequence of
inductive relational processes, however. Much is assumed, as we quickly discover
when something goes wrong with ourselves, the hammer, or the context in which we
are working.

Though there is surely progress in our understanding of the Manifest Image, our
current understanding involves many tacit assumptions, and is far from complete. We
cannot assume that our current vision of what is relevant to articulating the image in
the future is anything like what we have found to be useful in the last hundred years,
such as phenomenology and ordinary language philosophy. As, no doubt Sellars was
well aware, the use of idealized images as philosophical tools is more valuable for
pointing out our failings than for framing our successes. The fact that this sort of
philosophical investigation involves a self-destructive irony does not mean, however,
that we should not take the tools seriously in the context of using them to help to en-
hance our understanding. We should, however, expect ideas that we take seriously to
turn out to be ultimately untenable. This is true of any genuine open inquiry. In any
case, correlation of the Manifest Image with common sense and its contrast with the
Scientific Image misrepresents all three. So maybe there is an encompassing view after
all.

Reconciling clashing images

The respective images cannot be justified on their own grounds, though defences of
each appeal to their own frameworks and success within those frameworks. This is a
situation ripe for the partisanship that infects much of contemporary philosophy and
science studies (and not without some due cause: both sides must be taken seriously).
Each side has a program that cannot be effectively defended internally, nor attacked
effectively from the outside, and both can argue for their necessity or at least usef
nness. Sellars offers three possible solutions to the paradigm clash: 1) manifest objects
are identical with systems of imperceptible particles in the way that a forest is identical
with a number of trees, 2) manifest objects are what really exist while objects of the
Scientific Image play only an instrumental role, and 3) manifest objects are appear-
ances to the human mind of a reality constituted by systems of imperceptible particles
(Sellars 1963: 26). The identity claim (1) allows both images to be true, with the Sci-
etific Image merely a more refined version. Since the Manifest Image is presumed to
eschew all unobservables, however, it seems that identification of the images is not
open. Solution 2, which Sellars does not pursue in detail, places primacy on the Mani-
fest Image. Solution 3 places primacy on the Scientific Image in its reductive incarnation of the time. I will argue below that there is another alternative with certain resemblances to 1 and 3, but identical to neither. This position is one that Sellars actually suggested might come from some more advanced science, though I think he viewed it as a version of 3. This is hard to judge, though, since he did not follow up all of the implications he laid on the table.

As Sellars pointed out, and as fits my rendition of the images as a kind of paradigm, arguments from one perspective against the other are really arguments not against the details, but against the whole perspective. Such arguments can have some value in helping to focus attention, but overall this is not a satisfactory situation, and Sellars wisely argues that the aspects of the Manifest Image that appear to conflict with the Scientific Image should be resolved by joining those aspects. In particular he argues for the joining of intentionality in the Manifest Image with the Scientific Image, presumably by finding a scientific account of intentionality. This issue is especially important because of its significance for morality, responsibility and community standards. As much as giving a scientific account of intentionality is important for reconciling the images, that alone will not likely be enough to place the individual in the world as the locus of interpretation, and it will almost certainly not be sufficient to give the value to the individual that the Manifest Image presumes. Resolving the tensions over subjects, the question of whether these interpretative and normative primacies are just as illusionary as manifest objects were thought to be on the reductionist science of Sellars’ time, or can be integrated into a scientific world view, is a problem of at least equal importance to resolving the tension over objects. The best solution we might expect is that, though the Scientific Image does not justify the primacy of the individual, it does not rule it out either. I fact, I can see no reason why science should say anything about the relative rank of subjects. This seems to leave the game up to the Manifest Image.

Leaving aside intentionality and relative rank, I will look at two issues concerning perception and objects that have seemed at least since the time of Descartes to present problems for reconciling the manifest and scientific perspectives. Unlike Sellars’ suggested approach to intentionality, however, I will look at how aspects of the Scientific Image that seem to clash with the Manifest Image can be resolved by joining those aspects to the Manifest Image. This procedure requires a) recognizing that the Manifest Image rests on certain tacit postulates about what it is to be real, and what can be taken for granted, b) recognizing that the projection of the reductionist, mechanist science of Sellars’ time is not really the Scientific Image, but includes certain scientifically false tacit assumptions concerning locality and homogeneity, and c) showing that the revised scientific view can be joined to the Manifest Image via its tacit postulates.

The two issues are similar. The first is the relation of experience to the substrate of experience, the interacting body, and especially its brain. The second is the relation between experienced properties of things and the properties of the things themselves. Both are related to a more general issue of the relation between properties in the Manifest Image to those in the Scientific Image. Eddington’s famous desk in the Manifest Image is solid, of a certain colour, and has other sensory attributes. From the scientific point of view (of the time) it is made up of small atoms that contain within themselves vast open spaces, and between which there are even more vast spaces. These atoms are colourless, and lack texture and other sensory features; though in combination they may be able to explain overall shape and possibly texture. A similar case is Sellars’
problem of the pink ice cube (Sellars 1963: 26). It appears homogeneously pink, but it is made up of colourless atoms. Sensory experience in general is homogenous, but science seems to tell us that the basic constituents of the world are discrete. From the perspective of common sense, it seems that colours and hardness must be real properties, thus the scientific story must be literally false. From the scientific perspective, the appearance of these objects is merely that, and does not reflect the scientific reality, so the phenomenal view is false. My strategy is to deny the premise of each of these arguments, so neither conclusion is justified.

First we should note that in everyday experience we often view things that from a distance appear homogenous, but on closer inspection are discrete. Examples are pointillist paintings, granite rock, and forests. It should not be surprising, then, that a collection of imperceptibles would appear to be homogenous. Viewing them is similar to viewing a forest from a distance. Near galaxies look like hazy blurs rather than collections of stars, and the individual stars can be resolved only with powerful instruments. In itself this is hardly enough to resolve the problem. It does not explain, for example, how colourless atoms could appear coloured in a collection, or how they could appear hard or cold. Nonetheless, it does raise some doubts as to the ultimate reality of colour and hardness as we perceive them. We know that our perception is normally lacking somewhat in discerning capacity, and that greater discerning capacity might lead to different perceptions. While this does not imply that properties like colour and hardness are not real, it does allow that they might not be exactly what we take them to be on the basis of our everyday use of these classes of perceptual experience. What we cannot do is to deny the reality and homogeneity of the experiences, or that they are experiences of properties of objects in the world. To deny this would be to deny central postulates of the Manifest Image. This somewhat weaker assumption, however, does not conflict quite so readily with the scientific story. Perhaps, for example, the reductionist scientific story tells us what we would discern perceptually if our perception could discern much more finely than it does. This doesn’t give us an explanation for why our more coarse perceptions are reliable and largely true, however, and there is still a tension between what the reductionist view tells us is really there and what we find to be really there. Something must go.

In considering what might go, presciently suggested that systems of particles might not be able to be cut up except conceptually without altering their effects (Sellars 1963: 37). Both objects and the neurophysiological basis of sensory consciousness, for example, might have a nonparticulate, or at least a non-local, character. The former is suggested by quantum mechanics and the latter by holographic theories of the mind, like that championed by Karl Pribram (1991).

Some theories of mind combine both holographic approaches with quantum mechanics (e.g., Penrose 1989, Hammeroff 1998)\(^5\). If the physiological substrate of consciousness is homogenous just to the extent that experience is homogenous, and if the properties of objects should turn out to be homogenous just to the extent that our perceptions of them are, in most cases, then the premise of the second argument above can also be rejected. There are some reasons to think this might be so, though these reasons are currently on the edge of what is scientifically acceptable.

Pribram’s holographic theory holds that mental processes are not localized in specific neurons, but work through the coordination of large networks of neurons in

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\(^5\) It should be noted that the evidence for the Hammeroff-Penrose approach is limited. Penrose has dropped it.
which information is stored holographically in each small region, much as photo-
graphic information can be stored in each small region in a holograph, but at the same
time distributed over larger regions of the holographic image. On this account, inte-
grated information from large numbers of sensor cells could be stored together in one
location, but with lower fidelity, but with greater fidelity over larger regions. This in-
formation would be homogenous, and related information can be stored in an overlap-
ing way for easy, seamless access. If the brain works this way, neither the discrete-
ness of neurons nor the of the atoms that compose them is relevant to mental func-
tioning, or to the functioning of the brain inasmuch as it is relevant to mental functions
like perception, thought or belief. Even if the holographic theory is incorrect, it may
well be that sensory processes in the brain simply are not sensitive to disturbances of
atomic movements or neural events, through a property I have called cohesion in other
contexts to explain the emergence of objects and properties (Collier 1988, 1999, 2000,
Collier and Muller 1998, Collier and Hooker 1999). Just as the cohesion of a kite fil-
ters the individual movements of air molecules to produce lift, an average property
produced by a physical averaging process, the cohesion of neurological processes may
well filter individual perturbations similarly to produce homogenous perceptions and
other thoughts. Therefore the fact that nerves are composed of atoms and that nerves
conduct individual impulses may be of no consequence. Work as early as the 1959 on
the frog’s eye (Lettvin et al. 1959) showed that coding is in the rates of impulses at
best, not in individual pulses, and a rate is, like an average impulse of molecules, not a
simple additive property, but one that requires temporal integration. It is not tempo-
really local. This integration, whether holographic or otherwise, has no implication that
the nerves or their properties are not physical; they have a physical composition, but
reduction to their component atoms is irrelevant at best to brain function. The same
probably holds for the relation between individual neurons and nets of neurons that
perform some sensory function. Similar principles can apply up through a hierarchy of
what we might otherwise call abstractions and correlations, thus explaining the emer-
gence of homogeneity. If this story is true, sensory experience is not merely an
appearance of homogeneity, like the trees that appear as a forest from a distance, but it
actually is the homogenous property of the closure of certain neural processes.

A further point worthy of note is that cohesive systems that average atomic motions,
though composed of atoms, cannot necessarily be reduced to atoms in each individual
case, since their higher level properties almost certainly cannot be deduced from lower
level properties. It is not known whether or not the three body collision problem is
solvable, but it is known that the three body force interaction problem is not in general
solvable. As a consequence, the lower level processes may well be chaotic and unpre-
dictable in principle, especially as to which stable condition of many possible they
might fall into. This unpredictability of higher level organisation from lower relations
undermines classical reducibility. It must be stressed, though, that this does not imply
that the higher level processes are not just as physical as the atoms that make them up.
Sellars anticipated such a possibility in his discussion of the unity of the sciences, dis-
tinguishing between, say, atoms, as they are treated in physics and in biology, but al-
lowing the identification of the entities involved. This reflects actual scientific prac-
tice, and may well be the best we can do in many or even most cases. In any case any
argument from the reducibility of the mind within science to atomic particles, and con-
sequent illusory or unreal nature of perceptions and other mental experiences does not
follow readily from current scientific knowledge.
The second issue is the relation between perceived properties and the actual properties of objects. Since Sellars opts for solution 3), according to which the Manifest Image is an appearance of the Scientific Image, he does not address the issue of the identity of observable objects in the two images. Nonlocality in Quantum Mechanics can help to explain the homogeneity of the pinkness of Sellars’ ice cube and the hardness of Eddington’s desk. In the case of the desk, the interactions among the particles of the desk create a cohesion that makes the desk act physically as a single entity, except for very energetic particles or forces that are strong enough to break the desk. The ultimate explanation of this is in terms of Quantum Mechanical nonlocality, but normal classical forces are sufficient. With the aid of Quantum Mechanics, however, we can recognise that the idea that there are vast open spaces within and between atoms is a mistaken projection from the fact that individual atoms and located electrons take up small regions of space. When in combination, however, atoms and electrons are not localised, but interact so that their measurable properties are spread out over a probability distribution that fills space. The shape of the probability distribution of an electron in a hydrogen atom in its lowest energy state, for example, is a sphere centred on the nucleus that fills much more space than a measured electron. Even on Bohm’s interpretation of Quantum Mechanics (Bohm and Hiley 1993), which has the electron follow a specific trajectory, it has an accompanying pilot wave which is non-localised in the same way as the probability distribution. Eddington’s apparent paradox is the result of a misconception based on classical models of the atom. It is only through poor communication of science to philosophers that it remains at all puzzling.

When we turn to the pinkness of Sellars’ ice cube, we find a similar sort of nonlocality explains how colourless atoms in combination can be pink. The light passing through the ice is partially absorbed, and partially reflected, to give a net effect that we call a pink colour. The light is absorbed and re-emitted by individual atoms in the combined ice crystals in a way quite different than if they were absorbed and re-emitted by a single atom. On the Bohmian explanation, the electromagnetic field interacts with the atoms holistically; the homogeneity of the colour is no illusion (the complete explanation involves quantum chaos that results from the non-linearity of the wave function acting as a pilot). Other Quantum Mechanical explanations are less clearly nonlocal, since they involve paradoxes about measurement, but the Bohmian interpretation gives the same empirical results as any other interpretation for the sort of cases we have so far observed, and the wave function from which the probability distribution is derived has the same properties of nonlocality. The information in the reflected light is entangled in such a way that it carries information about the reflective properties of the ice cube holistically, not unlike the way information is carried in Pribram’s holographic model of the mind. In fact, Bohm has called is Quantum Mechanical ontology holographic. Given the likely holistic character of the basis of colour sensation, and the holistic character of the reflection of light of light by the light cube, the information that is contained in our experience of the ice cube is just as homogenous as the information conveyed to us from the relevant property of the ice cube, and of that property itself. There need be no discrepancy between the scientific account and the experienced account. We do not know, as yet, if this sort of account is correct. But surely consilience of our common sense experience and this scientific account give some additional credence to the scientific account.

We can thus say that there is at least an explanation of how both sensory experience and the thing experienced can be equally homogenous, and there is no need to insist
that there must be a discrepancy between the properties as described in the Manifest and Scientific Images. In fact the consilience of these two eminently plausible views through these sorts of nonlocal and nonreductionist scientific theories is good evidence in itself for their plausibility. Furthermore, contrary to Sellars, the postulation of hypothetical entities is common in common sense approaches, and was typical of the Original Image from which the Manifest Image emerged. That still allows that an idealized Manifest Image might eschew all non-relational hypotheses. Still, recent science suggests that science does not imply the sort of reduction that the science of 1963 seemed to imply, and a closer look at common sense shows that it is open to hypotheses. These two observations bring the two images closer together, or at least less in conflict than they appeared to Sellars.

A last consideration I want to address is the claim that fundamental science implies that the world is made up of discrete particles undergoing discrete transitions of state. If this is so, then perhaps recent complexity science is as much an illusion as the Manifest Image is supposed to be. Fortunately for the reconciliation project there is reason to believe that fundamental science implies the relational metaphysics of Structuralist Realism, and not metaphysics of little things having small collisions with each other. A recent book (Author and others) propose(s) that Quantum Mechanics is best served by structuralist metaphysics according to how things are related to each other, rather than some sort of inaccessible intrinsic properties of things in themselves. Furthermore, these structures cannot be completely localized; in principle everything is connected, at least historically, with everything else. If this is correct, then it is relations all the way down, and there is no disconnect between the metaphysics of fundamental physics and that of a critical approach starting from common sense.

Conclusions
Sellars’ images are really instances of a generalised idea of paradigm, based on extending the Kuhnian notion of paradigm outside of science. Reconciling the images requires locating and making explicit the tacit assumptions on which they differ, so that they can be compared. This takes us only some way, since values also differ between the images, and these must eventually be shown to be either reconcilable, or else applicable only in different contexts. Recent trends in science that mitigate against reduction together with a more modest interpretation of what the commitments of the Manifest Image concerning the nature of the reality of experience permit the consilience of scientific accounts of perception with experienced perception, and of experienced perception and the perceptible properties of things in the world. Furthermore, a more scientifically informed metaphysics for contemporary science implies a relational ontology, just like the Manifest Image does. A satisfactory account of intentionality also seems to be possible, though I have not addressed it here in any detail. Nonetheless, neither of these advances in reconciling the images would help directly in solving the issue of the relative primacy of the individual both cognitively and normatively in the Manifest Image and the Scientific Image. I suspect that the best we can say is that they do not really conflict, given their different pragmatic considerations.

References


