The Manifest Image and the Scientific Image [1]

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And new Philosophy calls all in doubt ...
And freely men confesse that this world's spent,
When in the Planets, and the Firmament
They seek so many new; then see that this
Is crumbled out againe to his Atomies.
'Tis all in peeces, all cohaerence gone;
All just supply,and all Relation ....
John Donne, "An Anatomie of the World,
The First Anniversary"

Let me begin with a question: how well does science represent the world? How well does it describe nature, us, and our relation to nature? Does it give an adequate, exact, accurate picture, which shows what there is in the world and what it is like?

This question has a presupposition. It assumes that science represents, that it gives us a picture, so to speak: the scientific world picture. This is not an unusual assumption or way of speaking. Philosophers and scientists themselves have been writing about the scientific world picture at least since Galileo, who said that it was a picture drawn by means of geometry.[2] You may well have recognized this way of talking from various 20th century writers as well; perhaps you thought of Thomas Kuhn, Paul

Feyerabend, or Paul Churchland, or even Frithhof Capra. In fact, this way of talking, in terms of world pictures or world views, comes very easily to us, it seems, it feels very plausible and natural to speak this way about our intellectual history.

But that very ease should make us suspicious! If is comes that easily, isn't it too easy and too good to be true? What horrors of the intellectual deep are we letting in, as we speak of this so blithely? What illusions will prey on us, what muddles are we getting ourselves into?

PART ONE. WORLDVIEWS IN COLLISION (?)

1. The Clash

The question, as I said, has a presupposition, namely that science represents, that it gives us a picture, or perhaps a lot of pictures that somehow combine into one: the scientific world picture. Such a presupposition engenders further questions that automatically come along with it. Has this picture changed radically, so that there were perhaps 'ancient', 'medieval', and 'classical' world pictures, while now we have yet a different one, the 'modern' or even 'postmodern'? Yes, it seems so. In fact there seem to have been scientific revolutions which replaced an old picture with a very different new one. Could there be at any given time more than one rival scientific world pictures, competing for hegemony? Again, yes, it seems so -- in fact they could be so radically different as to be incommensurable. Well, what about pictures besides science or outside science or before science, is there also a picture we already have or had about the world, that lives in common sense so to speak -- the picture of the world as it ordinarily appears to us -- which still exists side by side with science, but may eventually be replaced by science in its entirety?

Such are the questions which are brought along automatically by the presupposition of our original question. If the presupposition were seen to be false, all its engendered questions would of course evaporate. To discuss them -- and eventually that presupposition itself -- I will focus on one specific philosopher who made all this very explicit. Wilfrid Sellars presented us with a clear dichotomy: the world as described by science. which he called the Scientific Image, and the world as it appears to us, the Manifest Image. Not that the dichotomy was so novel: Sir Arthur Eddington' famous example of the two tables is an obvious precedent. The table we see is solid, it is mostly material even if there are some small pores and little gaps in the wood. The table science describes, however, is mostly empty space, filled with small electrically charged particles frantically whirling around in the void. So the Scientific Image is astonishingly different from how things appear to us. Yet science is meant to represent the very same world in which we live -- and there is the rub.

Wilfrid Sellars he argued that the two world pictures are in irreconcilable conflict, and that the infinitely superior Scientific Image must eventually displace the Manifest Image altogether.

Now I'm going to ask: is this right? What about these arguments for superiority? What about this irreconcilability? Is there a real dichotomy, or is that dichotomy itself just an illusion -- a snare and a delusion created by the smooth talk that comes so easily to us? And if so, could we not find a better way to see these apparent clashes between science and the appearances? Obviously I am not sympathetic to this 'world view' discourse, even if I must admit that I fall as easily into it as the next philosopher, when not on my *qui vive*. I am going to ask you to think about rejecting this sort of discourse altogether -- to think about life without a worldview, life without world pictures ....

2. The three main differences between the Images

The first main difference between the Manifest and the Scientific Image lies in their history:

> each image has a history, and while the main outlines of what I shall call the Manifest Image took shape in the mists of pre-history, the scientific image, promissory notes apart, has taken shape before our very eyes.[3]

The second difference lies in their encoding. In the case of science we can find a concrete representation: written texts setting out theories which, even if they have no author, have many contributors. Are there, similarly, concretely available descriptions setting forth the Manifest Image?

Yes, Sellars replies: certain philosophers have been writing them. He refers here to the Aristotelian tradition, which tried to systematize common sense into a systematic scheme of categories, but also in our century to the Continental phenomenologists and in the Anglo-Saxon world to the so-called 'ordinary language' analytic philosophers. Clearly not all philosophers are engaged in making the Manifest Image explicit. Some (call them 'metaphysicians') are engaged in quasi-scientific system building of their own, either continuous with or rivalling both Scientific and Manifest Image.[4] Other philosophers there are who oppose systematizing of any sort, engaged instead as intellectual gadflies or midwives, or intent on showing the flies the way out of the fly bottle, as Wittgenstein said. Let us therefore give a special name to those philosophers putatively engaged in systematic exposition and elaboration of the Manifest Image: call them the 'systematizers'.

So here are the first two important differences: the Scientific Image is being created, by scientific theorizing; the Manifest Image "took shape" in the mists of pre-history, but is systematically described by the 'systematizing' philosophers. There is a third difference, which will come to light when Sellars argues for the former's superiority.

In this enterprise we should, I think, see Sellars' aim as continuous with Idealism.[5] For to argue the inferiority and indeed discardability of the Manifest, that comes pretty close to saying that all we see around us, at least in the way we see it, is sheer illusion, 'mere appearance' and not reality. This is not a new theme in philosophy. The British Idealists of the nineteenth century, classified all we see around us, all we feel within, the very bodies we have and thoughts we think, as Appearance. In fact, they mounted various arguments to the effect that the world as we experience it cannot be real, must be mere appearance. These are arguments to show that this realm is full of contradictions -- pursuing our understanding of it we inevitably find ourselves embroiled in self-contradiction. (Of course we land in inconsistencies! We are enmeshed in illusions, in Maya, so what do you expect?) Such were McTaggart's arguments concerning time, and Bradley's about relations, and many another wonderful dialectical deconstruction.

Sellars had worked through these arguments and found them wanting. The Manifest Image -- his version of Appearance -- is consistent, he thinks; but it has other defects. His account will "compare [the Manifest Image] unfavorably with a more intelligible account of what there is" (ibid., p. 29). This sounds modest. In actuality, Sellars attempts more. He tries to show that the Manifest Image is necessarily incomplete with respect to explanation -- that it must admit fissures, ruptures, discontinuities which of their very nature admit no explanation within the terms of the image itself.

Here emerges, in Sellars' essay, a crucial third characterization of the two images. The Manifest Image is the world of a theory which took shape in the mists of prehistory and which was interiorized by us who (speaking generally, and not entirely literally) created that theory. But this interior theory is different from current science not only in its age, but in that its formation involved no postulation of non-manifest entities of any sort. The postulational technique of theorizing is entirely foreign to it.

This is the basis of Sellars' argument that the Manifest Image will necessarily remain in the position of admitting phenomena which cannot be explained within it. For sometimes explanation is possible only by postulating realities behind the phenomenal scenes. To put it bluntly then, the Manifest Image must be regarded as Appearance only, and not as Reality, because it is necessarily explanatorily incomplete. If philosophy has largely been an effort to systematize the Manifest Image, and is equally in the grip of the eternal "why?" question, then we certainly have a clue here to its continual self-destruction. The 'systematizing' philosopher, if this is correct, tries to complete the Manifest Image by supplying the explanations it cries out for, but finds every avenue blocked: any explanation would involve postulating something real beyond or different from anything found in the Manifest Image.

This is his first argument, and I will not stop long to examine it. I have no sympathy with its implicit uncompromising demand for explanation. Why should we not admit that perhaps every candidate explanation is a fiction, that perhaps reality harbors no reasons at all for those phenomena that puzzle us so, that perhaps the mysteries, as well as the humdrum facts, are brute?

But I can't leave the issue with this dismissal of Sellars' first argument, for he has a second argument, to show that the Manifest Image cannot be of something real. The incompleteness to which he points is not simply that manifest phenomena lack manifest causes. Rather, the manifest physical phenomena are incomplete in the way images and other mental things -- Locke's general triangle, which is neither right-angled nor obtuse nor acute, for example -- are incomplete. To this we now turn.

PART TWO. THE PLAGUE OF IRREMEDIABLE VAGUENESS

3. Deconstructing the Manifest Image

Sellars had a favorite example: the pink ice-cube, made by freezing a soft drink.[6] Within the Manifest Image it is described as pink all the way through. Suppose you cut it into finer and finer pieces -- eventually you have pink crushed ice. But if the very small pieces are separated they look individually white or colourless -- so perhaps we have to say the ice-cube was not pink all the way through after all?

Well, trying to elaborate the Manifest Image here, we have several choices, and different philosophers have tried out all of them. Placed in a heap, this crushed ice is pink -- so one option is to say that perhaps the pieces are pink collectively but not individually? There is another option: the pieces did not exist in actuality while we still had the ice-cube. The cube was divisible but only potentially divided, so the pieces only existed potentially. Hence we could maintain that the ice-cube was actually pink through and through, though potentially white or colourless.

In either of these cases we have a problem with vagueness. For where is the lower bound? At what precise point do we get collective colour -- or, alternatively, at what small size would the colour disappear if we perform the division? The Manifest Image is not given to this level of precision: we can

ask the question, but we won't get a precise answer -- precision would have to be postulated, and that we can't do here.

Let us be quite clear on this. Whether we think that the manifest pink ice cube is a continuous expanse of pinkness through and through, or that it is a vague object whose lower fineness bound to pinkness is ill-defined, there is no such object to be found in the Scientific Image. First of all atoms and subatomic particles are not pink; and secondly, there is nothing vague, everything is precisely quantified -- if classical boundaries disappear they are replaced with equally numerically precise probabilities, and if those disappear they are replaced by exact sets of probability measures, and so forth. The two images are of worlds which cannot both be real, for as described the pink ice cube cannot be identical with any object in the world described by science.

What Sellars is denying here is that the Manifest Image can be accommodated by science, that it can be reduced to something scientifically respectable. It can be replaced, but it cannot be reconstructed or reduced to something in the Scientific Image, for any reconstruction or reduction would distort or change or improve, it just couldn't leave it the same. However we try to explain the way things appear to us, we run up against the openness of ordinary language. The assertions we make in our ordinary language is full of vague promises which we know we cannot make good on -- but life is like that.

When the openness is irremediable, within our own terms, does it not follow that we literally don't know what we are saying? Metaphysics and science, on the other hand, with their regimented languages, precise concepts, and quantifiable distinctions, appear to provide new terms in which the openness is remediable. ... a framework where vagueness or unstated qualifications are at most a practical defect, in principle removable. There we can speak responsibly, by the strictest standards, for the first time. Or so, at least we may hope ....

4. Deconstructing the Scientific Image

But now, with that problem in mind, let us take a close look at the Scientific Image. The revolution of Renaissance science and its codification in the seventeenth century aimed to remove these defects from our world picture once and for all. The primary qualities are really quantities, exhaustively described with full numerical precision in analytic geometry and differential calculus.(7)

But science has higher standards of precision, and so, when it comes to discussing vagueness and indeterminacy we have to hold the Scientific Image to much higher standards than the Manifest. Those higher standards are proper to its examination exactly because it set itself so much higher standards, namely those of mathematics. We should raise questions concerning the Scientific Image proper to it, of a sort it would have been unfair to raise for pink ice-cubes: mathematical questions.

Consider this beer glass: it has a shape. What that shape is, precisely, we do not know. It was assumed that it is an analytic function of the spatial coordinates (in the way that a straight line "is" a function $y = ax + b$). It has one shape, and that shape is a geometric object; with equal justice it is a function defined on the continuum of real number coordinates.

We are speaking here of the continuum of classical mathematics which has equal use for the representation of each primary quality: length, duration, shape, size, number, mass, velocity, what have you. The equation of the primary quality shape with geometric shape -- on which Galileo placed such emphasis -- is in effect the assertion that a certain representation is completely adequate. But now we must ask: what exactly is this representation?

Well, shortly after Galileo, Descartes created analytic geometry, in which shape is represented in the way I just explained. But you have to realize that what he created was not exactly the analytic geometry we have today. For example, Descartes allowed only finitary constructions in geometry, so a point only exists if two lines are constructed to intersect there. It was his contemporary Pascal who, very controversially, insisted on the ubiquity of the infinite, and said that a line or a plane is composed of infinitely many points. So the beer glass' shape already had rival representations at this early point. In the nineteenth century mathematics had developed much further, and it was sensible to ask: is this shape an analytic function? There is no question but that, as a reconstruction of the world picture of Galileo, Descartes, and Newton, we can choose either option. They had not said that every physical magnitude in nature is an analytic function, but they had not conceived of any alternative. Nothing would have been lost from the subject as developed so far if we had added to it that all the functions describing the primary qualities of real physical things are analytic -- nor if we had added that some are not. The description was open, indeterminate in that respect. Nor was there any kind of experimental evidence to cite. The only questions asked are, it seems, about which options could lead to more fruitful developments in later physics.

If we go on to still later mathematics, the strange and previously unaskable questions multiply. Around the turn of the century, Lebesgue and others developed measure theory. This made it possible for Birkhoff and von Neumann to raise a new and interesting question about the shape of the beer glass.[8] They pointed out that when classical mechanics solves problems about systems with given precise configurations, we can construe it as using conveniently simplified descriptions. For those descriptions will distinguish between regions that differ only by point sets of measure zero -- ones that are not empty but literally have no lenght, no area, and no volume. More realistic, they suggested, would be the description that results if we transform the precise descriptions by identifying regions that differ only by sets of measure zero. Their reasons for thinking of that as more realistic may or may not be cogent, but it suffices here to note the conceptual possibility. That is, after Lebesgue we can look back to the older description of nature and we have a new option. We can accept or reject the following advice: "Let the calculations go on as usual, but the shape is correctly represented not by one region in geometric 3-space, but by an object in the quotient construction that identifies regions modulo differences of measure zero".

You will realize that I am simply giving examples of how, in many ways, we must in retrospect look upon the Scientific Image inherited from the older generation as open, vague, ambiguous in the light of our new understanding (that is: in the light of alternatives not previously conceived).

What is the shape of this beer glass really? What was it in the Galilean, Cartesian, Newtonian Scientific Image? Indeed, we need to cast our net more widely still, if we want to find all the ways in which we could now understand the Scientific Image fashioned in the seventeenth century. There is no such thing as the classical continuum, if that is meant to be the continuum on which the classical (= modern) Scientific Image was erected originally. Cantor, Brouwer, and Weyl had equal right to regard it as erected on their continua, which are very different. Of course, today we will use "the classical continuum" to refer to the subject of real number theory as it now exists in main stream mathematics. That is the politics of linguistic usage. But their are these alternatives, which can within what we now call classical mathematics be regarded as perfectly well defined mathematical objects.

So, what would you like the shape of the beer glass to be?

The openness of scientific description here come to light is irremediable. Of course, every time we outline a range of alternatives for ourselves, we can ascend our private throne -- are we not all kings and pontiffs in realms of the mind? -- and assert that one of these alternatives is the one true story of the world. When the range of alternatives is refined by new conceptual developments -- or simply by having our attention drawn upward by logical reflection -- we can choose a new option and make yet another declaration ex cathedra. Arbitrary perhaps, but as definite as can be, by choice. What we cannot pretend is to be non-arbitrary, or to close our text once and for all.

Yet the form of understanding is always one of presumed objectivity and univocity. The Scientific Image is as replete with uncashed and ultimately uncashable promissory notes as the Manifest Image.

5. Philosophical choices in response

We have gone some way now to dispelling the air of superiority of the Scientific Image over the Manifest; but nothing I have said need necessarily be seen as a disaster for either. With respect to vagueness and ambiguity there is at most a difference of degree; there is no difference in principle, and if there is a problem of principle then the two images are in the same boat. What does follow is that anyone taking seriously either our ordinary way of understanding the world, or the way of science must take vagueness and ambiguity very seriously. The lesson learned in these reflections is that vagueness is irremediable, in science as well as in pre-theoretic description. Accordingly, this vagueness is, in itself, no defect, though one might wish to opt for or privilege the less vague image.

One option would be to insist that one of these images, or one of their possible successors in the course of human history, is actually a complete, non-arbitrary, correct representation of what there is. The world is vague; our task it is to develop conceptual tools adapted to the non-distorting description of a vague world.

Another option is to postulate that at each juncture, one refinement that diminishes vagueness will be more accurate than its rivals. The world is sharp, but impossible to represent sharply; that sharp world lies jenseits aller Vorstellung, beyond the endless task of constructing its image(s).

Both options, however, commit us to leaving the basic dichotomy of images intact. If we adopt either, we would be deeply engaged in metaphysics, and find ourselves on one side of a very deep divide in that putative enterprise. But can we really be so complacent about this dichotomy? I say not: the difficulties which this account of incommensurable worldviews led us to, seem to me to indicate something much more fundamentally wrong with the entire dialectic. That any description will always, upon a little pressing, turn out to be vague and often ambiguous, that every text is open, that despite all philosophical ambition no one can produce a text invulnerable to deconstruction -- that, I think is definitely so. But this philosophical story of images and worlds, perspectives, conceptual frames, and all their ilk is not thereby shown to have a coherent fall-back position in a metaphysics of vagueness. The flaw in Sellars', or any, story of clashing worldviews may lie much deeper.

PART THREE. AN INCOHERENT FICTION

When all the answers available lead you into absurdity, Kant argued in a famous passage, it's time to examine the presuppositions of your question. For a question may itself have something wrong with it, and thus make all its own answers impossible.

In our present context, it would mean this: there are no such things as the Manifest and the Scientific Image at all. Is that possible? Yes, in fact I can think of some very good reasons for that conclusion. If you agree to them, you may even find some reason to generalize this sceptical conclusion to all those -- what shall I call them? -- world-pictures, conceptual frames, worlds (as in "the world of science", "the world of the physicist", "the Ptolemaic world") which have so easily and smoothly crept into our discourse.

6. The Images as philosophical miscreants

My first two reasons concern how Sellars has misrepresented both our ordinary understanding, when we are not consciously or even implicitly drawing on science, and also science itself.

6.1 What is this thing called the Manifest Image?

The Manifest Image is the way the world appears to us; it is also the world as described by the 'systematizing' perennial philosophy, and it is the image to whose evolution and development all postulation remains forever foreign. There is nothing that fits this description. The philosophy in question engages freely in reification and postulation of all sorts.[9] Putative entities like conceptions, conceptual frames, images, and worldviews are indeed introduced within the perennial philosophy, through the reification of the language forms we create in such easy profusion -- but that is exactly what disqualifies the perennial philosophy from describing something to which postulation is foreign.[10]

Should we say then that those philosophical descriptions are simply faulty accounts of the Manifest Image as it really is? Unfortunately we have no description at all of that Image except by the philosophers Sellars singled out as engaged in that enterprise. Can we take Sellars' own initial description -- the Manifest Image is the world as it appears to us -- as the definitive identification? Could we in fact say that in this phrase, the Manifest Image is introduced into the philosophical pantechnicon by explicit

definition?

Now here we encounter the philosophical "as". This "as" is really the same as the infamous philosophical qua, a hyper-intensional locution of dubious intelligibility. A description of a thing may be correct or incorrect -- what is denoted by "the thing as described"? Something that exists regardless of whether the description is correct or incorrect? Or does it simply denote the thing, if correctly described, and denote nothing at all otherwise? On the latter option, if "Manifest Image" and "Scientific Image" are not denotationless, they denote the very same thing, thus ending all philosophische Spitzfindigkeit at once. But with the former option we would commit ourselves to an ontology which most of us -- including Sellars -- would explicitly reject, and for which he takes no responsibility.

So one side of this dichotomy is simply a self-created muddle, designed to give us a house of cards ready to fall apart under the scientific stare.

6.2 And what of that thing called the Scientific Image?

What about the Scientific Image? Isn't that at least real, and don't we have to confront it, cope with it, and relate ourselves to it every day? And does it not, by its very design, omit those colours, textures, smells, feelings and emotions, drives and aspirations that constitute our human existence? Isn't that reduction to the physical minimum our heritage from Galileo's insistence that science proceed entirely in terms of the quantifiable 'primary quantities, which set the program, in essence, for all future science, all the way to our day and for what we still expect in our future?

Once again, what I see here is something designed with the resources of rhetoric, that bears little relation to the actual history to which it appeals.

When Galileo insisted that science restricted its descriptions to a very few primary qualities, he had a good point. One of the defects that rendered the Scholastics' scientific tradition less and less effective was the the unconstrained multiplication of properties which passed for theorizing among them. So this innovation of Galileo's was much needed discipline. Compare this practical point with the later philosophers' reading of it: as a move introducing the great divide, the separation of those properties which do really pertain to the systems described by science -- the Scientific Image -- and all those other properties of our acquaintance which do not belong there. Scientific discipline did not require that idea!

Galileo himself was to blame. He could simply have claimed certain theories to be true and left it at that. Galileo was not so modest. A complete description of nature would give all its qualities, both primary and secondary -- but the latter, he claimed, could all be reduced to the former, so that science [the theory framed in terms of primary qualities only] would be complete. In this contention he made two dubious moves, neither of them vindicated by our later history. Firstly, there is his completeness claim for the total list of properties -- which all, at that time, were humanly sensible properties, very different from what science eventually marshalled as its basic theoretical quantities. Secondly, there is his claim of reduction. In fact, very little of the generally accepted description of the world at the time could have been given simply in terms of that list of properties; nor could it be now!

6.3 The dialectic that engenders the dichotomy

At this point you can see the dialectic moving with its own inner necessity. If B is not reducible to A, then either A is incomplete or the two are incompatible. So if A purports to be complete, then either it is false or else B is false -- one of the two must be eliminated. Here we have the picture: there are two

putatively complete images of the world, and they are incompatible.

But remember how I introduced this dialectic: Galileo's restriction of science to the primary qualities was a very good practical move for science, because it imposed a much needed discipline on scientific theorizing. What does that highly practical and commonsensical endorsement have to do with the ensuing dialectic?

This dialectic can persist only through the maintenance of an illusion. That is the illusion that "the scientific description of the world" or "the primary qualities" refers, and keeps referring, to one definite subject. Look at Galileo's primary qualities. He was still a bit soft; Descartes was the master of discipline, and made the cut at the only natural joint in sight, namely, the quantities definable in terms of spatial and temporal extension. But what happened when these were demonstrably not enough? Scientists understood the idea of discipline better than philosophers: at that point they very common-sensically introduced additional primary quantities. In the centuries that followed, not only did they repeat this manoeuvre as needed, but they also changed the original list, replacing spatial and temporal quantities by spatio-temporal quantities for example.

So the exclusion from the scientific vocabulary is a practical matter, it is provisional exclusion, not a matter of ontological principle. We abstract as far as we can to strip our problems to the bone, so as to see through the superfluous flesh to the skeleton -- but when we encounter new problems, we may have to retrench a little on that scorched flesh policy. That is not only the practical way to proceed in science; science must have learned it from practical men and women. When something is provisionally excluded, that is with the idea that eventually either (a) it will be shown to be reducible to what is included, or (b) it will itself be introduced into the scientific vocabulary, or (c) we will find that something new is introduced to which it is reducible.[(11)]

The argument for scientific realism from the incompatibility of Scientific and Manifest Image -- given the imperative to maintain the correctness of the science we have accepted -- is therefore disingenuous. For from the point of view of science there is no incompatibility, there are only temporary sticking points. Adjustments will be made on both sides, as need be, so as to reach accommodation. There are no stable A and B which have proved to be mutually incompatible.

The argument is disingenuous in another way. For the completeness claim which is crucial to the argument for incompatibility is itself a dialectical miscreant. First of all (this is related to the preceding point) it is infinitely malleable in content: no one claims completeness for current science, but only for science in principle in the ideal long run. Since no one can know what that will be like, no one can know what is being claimed in this completeness claim. But secondly (this is a new point) the completeness claim does not come from science, it is the philosopher's distorted codification of certain laudable aspirations in science. The scientific project is to reach a point (as Nancy Cartwright puts it[(12)]) of predictive closure. Descartes thought that he could develop a deterministic pure kinematics; but the true kinematic descriptions at t+d cannot be predicted from the true kinematic descriptions at preceding time t. Therefore the list of quantities is increased by Newton, to include dynamic quantities; and it seems that closure is attained. But predictive closure does not imply descriptive completeness -- that was not even the aim!

7. The very idea of images

Very striking in Sellar's characterization of the manifest and Scientific Image are two facts that should have greatly worried him.

The first is this: Sellars had said that he would explain his terms, but was then content to do so in the language of folk psychology. That is the account of human nature which introduces such mental entities as images and conceptions that populate the world together with platforms and Constitutions. So when he explains what sorts of things these images are, he resorts to terms belonging to traditional philosophical psychology and to folk psychology -- all stuff that finds no place in the Scientific Image, unless it be the place of phlogiston, N-rays, entelechies, and cold fusion. Note well: I am not disparaging psychological discourse here; I am saying it is not reducible to the discourse of physics, and Sellars cannot help himself to it in this context.

The second fact to be noted is that by his own account, within the Manifest Image introduction of such ideas as these -- that there are these images, world-pictures, conceptual frames or what have you -- counts as postulational and is therefore by definition foreign to it! In telling his story of those images, Sellars was therefore speaking from a perspective located neither in the Manifest Image nor in the Scientific Image -- thus, according to that very story, located nowhere at all. So Sellars is, as it were, speaking from within an ontology which he does not make explicit, which in effect he had already implicitly disowned, and for which he takes no responsibility.

Finally, let us be quite blunt, and bear down on this term "image" itself. We know very well what an image or picture is, in the primary usage of that term -- we see such things every day. But here the terms are of course used analogically. The effect of the analogy was to suggest that the philosopher is not thinking about real things but about a humanly created "likeness" (picture, graven image, description) or alternatively some naturally arising "likeness" (after-image, reflection in a pool, fata morgana).

To draw an analogy is only to say that it is "as if", and that we may gain some understanding from focusing on one respect in which two things are alike. But this particular analogy is apparently used to reify, to introduce an entity [indeed, two entities] which are like pictures. What sort of entities are they?

Perhaps you would like to say that these images must be things existing in the mind, mental images, mental entities. I do not know how far you are willing to trust this sort of talk, whether as part of folk psychology or in some more technical guise within cognitive psychology. But we have for a long time, at least since Wittgenstein, found it impossible to rely on it uncritically. You may know Wittgenstein's demonstration that the very idea of a mental image makes it something fundamentally unlike a real image, so that the analogy pretty well destroys itself. This is his demonstration from the so-called "duck-rabbit" picture, an optical illusion which is seen alternately (and quite spontaneously) either as a duck or as a rabbit. This sort of phenomenon is what supported the idea of mental images, for the explanation offered was that when two people look at the real picture, and see something different, they have different mental images. For this sort of explanation to work at all, we have to say that a real image is something that can be seen in two different ways, while a mental image is something that can only be seen in one way. But it is crucial to the very idea of a real image that it is something that can be seen in different ways -- so, conclusion, mental images aren't images at all.

PART FOUR. REAL LIFE WITH SCIENCE

Perhaps you accept this, and say fine, Sellars told a little fable to draw attention to something important. Images, conceptions, categorical frameworks, world-pictures are themselves fictions that facilitate the discussion of something really important. Since this very way of talking, if taken so literally, seems to lead us into incoherence, let's not take it too seriously, but concentrate on what is important. Important is the crucial insight: the insight into the impossibility of reconciling science and our ordinary common sensical way of thinking. Well, if you are so compliant, let us see what follows from this. We have to start all over again! What does the clash of images, their vagueness, and so forth, amount to if there are no images?

8. A new beginning

Many philosophers separate science sharply from ordinary life and ways of thinking. With such a sharp separations, our options reduce to extremes.

One option is instrumentalism, while attempting to place our ordinary way of thinking on a pedestal and preserve it through isolation. This ignores the fact that our response to our experience never takes a necessary form but is a historical product that could certainly have been different, and is in any case subject to constant change. The option is at war with itself for it purports to safeguard our history by abrogating the historical process.

The other extreme is scientism: if science is radically different and also superior, then we must submit ourselves to it wholly, forsaking all others. While the first option ignores the historical origins of our ordinary way of thinking, this one ignores the equally checkered historical development of science. Science has never enjoyed such undisputed superiority, has never ceased discovering its own shortcomings, and can't pretend to a faultless process of self-perfection or self-purification.

It seems to me that our verdict for both extremes should be the same. Not only is reification of worldviews a highly theoretical move of doubtful internal coherence, it stems from a radical misconception of the human condition.

If you ask me how things seem to us, I cannot do anything but speak and write. There is some choice: I can either invite you to observe the way I speak and write in response to my experience, or I can describe to you how things seem to me. On the first choice, you will see and hear me using the language of daily life -- some of which could of course be life in a laboratory if I am a scientist. This language certainly does not embody perfect understanding, you will detect some misunderstandings and some lack of understanding both in the language itself and in my use of it. You'll spot the defects all the more easily if you are aware of theories and myths that have played a role in our history, for those have certainly been factors in the evolution of our linguistic practices.

The defects get considerably worse, however, if I choose the option of describing how things seem to me. If I give you a philosopher's account, it will be pretty medieval, full of dispositions, possibles, potentialities, universals, and the like. If I give you a scientific account, whether from psychology, physiology, or physics, you'll notice that the feel and taste of real experience just is not there. Science is driven by highly practical motives. For that reason, the scientific account slashes and burns, to eliminate all factors that do not contribute to meeting its own criteria of success. That is only right, and as a practical person I applaud it -- but then cannot understand the philosopher who insists that the scientific account must be the one that is complete, that its sparsity is simply irredundancy with respect to all criteria for adequate description.

Yet, as with all great philosophical mistakes, there must be something to it: For every one of us there is therefore some point of rupture between, as we are inclined to say, the way we see the world and the way science describes it. On the other hand, we have the impulse to say with great conviction something that we can't seem to disentangle from metaphor but insist on nevertheless: that on a certain, familiar level, we would be in a position to communicate with all our forebears and descendants, that we can reach through all cultural differences to the shared human and earthly reality beneath.

Could we possibly, ever (now, finally?) discuss this without slipping into metaphor at every turn?

9. The continuity of common sense and science in method

What of Sellars' noble savage who lives, moves, and has his being in the Manifest Image? We have never been like that. The great and crucial divide, according to Sellars, is that scientific world views are fashioned by postulation while the Manifest Image contains nothing postulated, only things experienced though misdescribed.

Common sense, ordinary thinking has just one major dynamic principle, and it is superstition. The tactics and gambits of superstition are exactly analogy, metaphor, and linguistic extension followed by personification and reification, thus furnishing the world with vast arrays of newly postulated entities. Its driving force is the demand for explanation and the satisfaction derived therefrom. Inference to the most probable conclusion or to the best explanation are endemic in the tabloid newspaper, books about UFOs, the chariots of the gods, the miraculous efficacy of herbal cures, and so forth.

Of course the description I just gave of the mechanisms of superstition bears some likeness to various philosophical disquisitions on the structure of science. Nor need those be wrong: superstition, rational common sense, and science may have much in common. In fact, I was describing superstition here exactly in order to argue that Sellars' description of life in the Scientific Image fits all life, including that of the pre- and un-scientific -- not in order to convict us of irrationality. But there is a difference: that in science these processes are bridled, constrained, checked in their course by harsh demands of productivity -- which they are much less, and never systematically, in ordinary life. Science is bridled superstition, just as rationality is bridled irrationality.

So there is a clash, yes: bridling the unbridled meets with opposition. Science teaches us how not to believe things, how to let go of our ideas; but we love and cherish our ideas and their security. Rightly did Isaac Levi speak, in his epistemology, of relief from agnosticism. But note well: this bridle is not the yoke of a foreign prince, imposed in alien fashion from outside. Rather, if within our common sense we reflect on ourselves, we already applaud such bridling.

10. Perspectival discourse and relativity

There are many differences between 'ordinary' and scientific description. The first is that ordinary description is always perspectival, for obviously practical reasons. But such perspectival descriptions are banned from theoretical science. Here we have in a nutshell the idea of relativity: as soon as tacit relativity is detected it is first made explicit and then banished in favor of the (more) absolute. (Hence the irony of lumpen relativisms' air of warrant from science.)

But we must make a crucial distinction here, easily illustrated by what is perhaps the earliest illustration of such a theoretical change. The first astronomical frame of reference is the observer's Zenith and horizon. But already in ancient times, its relativity was realized. Hence there was a shift to the North

Star and the Celestial Equator as frame of reference, which is independent of the observer.

Now the distinction: the relativity detected was clearly not precisely observer-dependence but rather location-dependence. In order to use the description given in the common, "absolute" frame of reference, the observer still has to locate himself therein, so he still needs to use perspectival, or to be more precise, indexical language: "I am there, here is my Zenith, this region is within my horizon". This perspectival or relative form of description cannot disappear from science if it is also to be applied science. But in theoretical science, there is no such indexical description, and the location-dependent description is replaced by location-independent description.

There are two wrong reactions when intellectual reflection has brought to light a new and still farther reaching relativity. (We have seen this very clearly illustrated in the two well-documented philosophical reactions to Galilean and Einsteinian relativity.) The first is, obviously, denial: "No, there is absolute simultaneity and length, it is simply not describable in the language of Einstein's physics". The second is sickly affirmation, a bee-line for a new security: "Space and time are unreal, simultaneity and length are characteristic only of objects-of-thought, of the world we pictured to ourselves which turns out not to be the real world. Only what is invariant under the newly understood group of transformations -- Galileo's, Lorentz's -- is real. We lived in Maya, created by our own minds. Develop process meta-physics! Abandon persistents, develop an ontology of time-slices, punctal events, space-time worms"! I say, do not heed these counsels of despair. The only authentic reaction is the one that happens quite naturally in practice: nothing is given up, no form of assertion is discarded as meaningless, though of course we have now a richer and more nuanced construal of what we used to say. That is to say, the very same 'local', 'perspectival' description is now related to a different theoretical model.

Just as ordinary thoughts about the pink ice-cube were never (except in the philosopher's fiction) wedded to pinkness-through-and-through so ordinary thought was never wedded to a denial of Einsteinian relativity.

11. Value- and function-laden discourse

There is another source of apparent conflict between science and experience: our ordinary descriptions are charged with value and emotion, with needs, intentions, goals, and instrumental evaluations relative to those goals.

At first sight, ordinary naming and classifying seems largely use-independent. That may be so; but the dimension of praxis reaches for deeper than might be at first apparent. What about, for example, "tree", "rose", "lettuce"? Are these ordinary nouns completely characterizable without reference to praxis or intentionality? Well, roses are flowers; you may tell me that you gave your mother roses, or equally appropriately say that you gave her flowers. So why not, if you like, just tell me that you gave her pieces of plants?[13]

This use-related character of discourse is of course evident also in the laboratory (as is perspectival, 'pre'-relativistic discourse). Things are called by names that relate to their function, not to their physical constitution, when scientists work. The disparity with theoretical discourse is then all the more blatant. Neither in pointing to indexical language nor when I mention value-, use-, and function-laden discourse am I contrasting the language of the scientist with the language of the layperson. Both are indispensable to us, both inside and outside science, exactly when we turn back to those principles and constructions we have made as 'objective' and impersonal as we possibly can, in order to draw on them for living and acting.

Is there a clash here? Only apparently so. Our ordinary discourse is not reducible to theoretical descriptions in the language of physics, even if the latter is complete within its own terms of reference. Within science as activity, the two forms of discourse are happily integrated. That activity includes after all, besides the construction of theories and models in all their pristine purity, our use and application of those pure beings in our practice. That theoretical description does not pay heed to the location and interests of the speaker is just right. It does not mean that values, use, and intentionality exist only in some rival to what theoretical language describes. Nor does it mean that the theoretical description is factually incomplete; it means that theoretical language has a limited use. Its resources are not sufficient for ordinary discourse, not even for applied science; but they are not meant to be.

12. Theory-laden discourse

Now let me admit to one genuine source of conflict engendered y scientific theory change. It is true that language is always theory-infected, loaded with assumptions of all sorts. Consequently, when a new scientific theory comes along, contradicting older such theories and also common assumptions, it pulls the rug from under the way we speak. First it cleanses and then it infects our language in its turn .... Metaphors aside, this is surely so, since some new words are brought to birth in the laboratory, theoretical monograph, and patent office.

Let us, for simplicity, imagine that the radio was patented by Edison, and that the patent description is in terms of vibratory wave-like motions in the aether. This is where the new word "radio" received its meaning. A device is a radio if and only if it satisfies that description. Today's science says that the aether does not exist. So, anyone who believes current (1995) science and claims to have a radio is contradicting himself -- right?

Well, language is a little more complicated than that. Language is more like a wily, survival-adaptive animal than like a machine. The word "radio" left the patent office, forgot its theoretical origin -- or was adopted by a society happily oblivious of those theories -- and continued to flourish well after its original meaning turned out to exclude everything from its extension. As soon as the word "radio" became common coin, the criteria for application in common use were relaxed -- and those relaxed criteria obviously had priority, they alone seemed to matter when the "defining" theory was given up. Dictionaries are updated; patent law too is flexible. How the judge would laugh if lawyers tried to argue infringement of patents on such a theoretical basis![14]

I chose this example only partly to show that there is real conflict here. Such a case as this is in fact a prime example of how ordinary language can become theory-laden. At the same time, it shows how needlessly overblown is the dichotomy of Manifest and Scientific Image. It is true that assumptions and theories get 'embodied' in our language, that there are theoretical presuppositions of applicability even for very common nouns. But this is not a clash between ordinary and scientific thinking. It is a type of clash to be expected equally within Sellars' and Churchland's ideal scientific speaker community of the future, as well as within the most illiterate pre-scientific society.

Behind many puzzles over the clash of appearance and scientific description lies the conviction that communication is impossible or seriously hampered if conducted in a language laden with a false theory, or with a theory not believed to be true. In the original sense, there are no radios; but no one noticed. So if one person used "radio" in an attempt to refer to a real thing, other people, relying on the same false beliefs, took him to refer to exactly the thing he meant. But furthermore, when they all realized that there were no radios in that sense -- and perhaps had as yet no new, accepted theory to replace the original definition -- they kept using that same word to refer to real things and kept communicating successfully. The adjustment was, at least, pro tem, a small bit of semantic ascent. For if someone said "radio" everyone took him to refer to those things which were classified as radios under the now rejected theory. There is therefore no difficulty in principle in simultaneously saying that you doubt the existence of the aether, electromagnetic waves, electrons, etc. and describing the objects around you as radios, VHF receivers, computers, electric lights, and so forth. A good theory of language must be in accord with this, and shed some light on this.

13. The spirit of gravity versus the unbearable lightness

What a state of affairs we are in! Doesn't it cry out for metaphysical labor? At such moments as these, when the language in use is laden with doubted theories, discredited old assumptions, and already given up beliefs, we do not have a coherent opinion at all. Common sense has become a hodge-podge, laden with ontologies that fit only long discarded scientific views, hobbling along on make-shift metaphor and hastily carpentered crutches. Metaphysicians must set to work and show us how to cleanse, regiment, and elaborate a new system of beliefs, together with a language laden at most with the stablest of those beliefs. We need a coherent ontology, fit for science and accommodating common sense, a worldview in which we can rest in peace.
Do you agree?

I do not. There is clearly a lot to be said for straightening out our concepts 'locally' -- for example, those involved in our beliefs about the pens, pencils, and writing paper we use every day, the roads we walk, the rocks we climb -- to the extent appropriate to our immediate goals.[15][16] The question is: are we in poor condition if we do not do so 'globally'? That is, if we do not achieve unlimited cleansing of our language -- the entire description of nature and our own place in it -- from presuppositions that we do not fully believe.

What could be the argument to the effect that, prior to success in such a far-reaching enterprise, we are in poor condition? One premise might be that local efforts of the same sort cannot yield a coherent view if made within an overall defective context. But that, I think, is false. We live in that conceptual quicksand -- morass if you like -- we dance on that sort of tightrope fastened to highly suspect supports, we do build on sand, and look! we function perfectly well! A second premise might be that it is possible to succeed in that global enterprise, and that it is a project worthy of one created only a little less than the angels. (A work worthy of a man, as one might have said only a generation or so ago.) But here I beg to differ. Not only does it seem clear, from the actual structure of our existence, that we flourish while lacking any coherent world-view. It seems equally clear that the proposed global representation of beliefs and cleansing of language is literally impossible.[17]

From this I draw uncompromisingly the consequence: clear thinking in local matters does not require that we have, either actually or potentially a global conceptual scheme, metaphysical system, or worldview. A task more worthy of philosophy than the spinning out of such systems is trying to understand how this can be. That is the task of defeating a Spectre which claims the consequent utter meaninglessness of all thought. It is the problem all of us have, being post-foundationalist, post-modern: to describe ourselves without resorting to or falling into what Kant called the illusions of Reason.

Where exactly does Aristotle describe walking? If I remember it rightly, he says that we keep our center of gravity over one foot while moving the other to a secure place, and then shift our mass. This would indeed be prudent! But it describes a sort of goose-step, not our real walking which is a continuous falling forward, a slow version of a headlong run, trusting ourselves to fortune. Learning to walk is learning to fall.

ENDNOTES

(1) This paper was presented as part of the James B. and Grace J. Nelson Lectures, University of Michigan (Oct. 1994), and of the Kant Lectures, Stanford University (Apr. 1995) as well as at the Einstein meets Magritte Conference (Brussels, May 1995). For earlier thoughts on this subject, see my "On the Radical Incompleteness of the Manifest Image", PSA 1976, vol. 2 (East Lansing, MI: Philosophy of Science Association, 1977), 335-343 and "Critical Study of Paul Churchland, Scientific Realism and the Plasticity of Mind", Canadian Journal of Philosopy 11, (1981), 555-567. I would like to thank Prof. J. van Brakel for helpful comments and discussion; his "Empiricicism and the Manifest Image" (ms. 1995) includes a response to my view as well as to an extensive ambient literature (see further note 9 below).

(2) The recent popularity of such terminology, however, appears to begin with Hertz in the late nineteenth century.

(3) "Philosophy and the Scientific Image of Man", chapter 1 in W. Sellars, Science, Perception, and Reality (New York: Humanities Press, 1963), p.5.

(4) The reader may suspect that there is not such a great difference between the two classes which I'm calling the 'systematizers' and the 'metaphysicians'. My nomenclature tries to follow Sellars' typology here, and we'll have to see whether it is well based.

(5) See "Philosophy and the Scientific Image of Man", section V, p. 26ff (especially p.29).

(6) See "Philosophy and the Scientific Image of Man", p. 26, which is however just one of the places where this example appears. See also for example the section "A Pink Ice Cube" in Lecture 2 of Pedro Amaral, The Metaphysics of Epistemology: Lectures by Wilfrid Sellars (Atascadero, CA: Ridgeview Pub. Co., 1989), and section V of "Scientific Realism or Irenic Instrumentalism", R. S. Cohen and M. Wartowsky (eds.) Boston Studies in the Philosophy of Science, vol. II (New York: 1965).

(7) There was just one voice in the wilderness: Berkeley arguing that the primary qualities were not originally any better off than the secondary ones. I do not want to examine his argument here, but I will state in contemporary terms what I take to be his conclusion: the privileging of primary qualities and their geometric representation was an act akin to pure postulation, an assertion that a certain created representation is perfectly adequate, which gave the primary qualities their privileged status. Compare E.

Husserl The Crisis of the European Sciences and Transcendental Phenomenology (tr. D. Carr; Evanston: Northwestern University Press, 1970), Part II sect. 9 "Galileo's mathematization of nature" (espec. pp. 23-41) and Appendix B II "Idealization and the science of reality -- mathematization of nature" (espec. pp. 309-310).

(8) Birkhoff, G. and von Neumann, J., "The logic of quantum mechanics", Annals of Mathematics 37 (1936), 823-843.

(9) Compare here Sellars and van Brakel on the manifest/scientific image dichotomy: van Brakel does not conflate the manifest image in the sense of how things seem to us ordinarily with the postulationally constructed world of the perennial philosophy, as Sellars does. See especially J. van Brakel, "Natural kinds and manifest forms of life", Dialectica 46 (1992), 243-263; "Interdiscourse on supervenience relations: the priority of the manifest image", Synthese, forthcoming; "Empiricicism and the Manifest Image", ms. 1995.

(10) I cannot except phenomenology from this charge; Husserl urged us to go back to the things themselves in phenomenological analysis, but his Platonism was crucial involved in shaping that analysis.

(11) The sense of "reducible" can in fact not be too strict; it does not mean that the old excluded descriptions will turn out to be logically deducible from the new scientific descriptions. Both Feyerabend and Kuhn's more realistic description of what has been touted as reduction in the sciences, and leger-de-main with such ideas as supervenience, functionalism, the intentional stance, or instrumentalism, give us clues as to 'acceptable' weakening of the claim.

(12) Nancy Cartwright, "Fundamentalism vs the patchwork of laws", ms. 1995.

(13) The example, and the point, is not my own: see M. Heidegger, History of the Concept of Time: Prolegomena (tr. T. Kisiel, Indianapolis: University of Indiana Press, 1985), Ch. 2 sect. 5.c.α, p. 38.

(14) Compare Feyerabend's distinction between the characteristic and interpretation of a language in Ch. 2 of his Realism, Rationalism, and Scientific Method (Philosophical Papers vol. 1. Cambridge: Cambridge University Press, 1981). It does not seem to me, however, that we can rest easy with his discussion. There is not enough to really speak of a theory, only a sketch for a theory.

(15) I do take it, contrary to some epistemologists, that the very point of forming a set of full beliefs (on whatever subject) is to have a single (therefore consistent, coherent) view (of that subject). But we do so on specific subjects, confronted as they come, related to "live" problems-for-us, in ways suited to exactly those problems.

(16) The preceding few sentences earned me some laughs at the Einstein Meets Magritte Conference, where I delivered this paper on crutches, after a rock-climbing fall.

(17) Again: contrasted with 'local' reconstructions, whether of large parts of our past or small parts of our present -- such as logical reconstructions of classical physics or of population genetics.