

Mirrors and Things

or

Is Man the measure of everything?

Viv Pope

Here is a riddle. Describe what a mirror looks like in an unoccupied room. Does it reflect everything in the room, from every possible angle or from none at all? If from every angle, then what does that all-over reflection look like? Is it silver all over? And if from no angle at all, then is it just blank? Which is it to be? Is it silver all over, or just blank?

Now the surface of a lake is a mirror. So is that of a polished table. All objects which are not self-luminous are 'mirrors' in this sense. How we see them depends on where we stand with regard to them, how they reflect light, what colour they are and so on. Try, then, to describe a landscape as it appears from everywhere at once. Even worse, try to describe that scene as it appears to no-one – as in prehistory, say, before life appeared on this planet. Describe what the planet 'looked like' at that time, from all points, everywhere, both nearby and far off in space. Describe that *space*, as it is, in and of itself. How big or small is it, how old or young? What time is it in that vacuum? What date? What is its length, breadth, depth and volume? These sorts of questions are known to cause stress. In some cases they have caused students of philosophy to abandon their courses in order to seek psychological counselling. The problem these questions raised in their minds was that of what is known as *solipsism*, the psychologically distressing notion that only oneself exists and that everything else is some kind of dream.

The solution of this solipsism problem is, basically, very simple. It is, of course, that this problem is a conundrum, because, logically, 'look like' in this context makes no sense if no-one is looking. So the upshot of all this questioning is simply to accept that there is *no way* of describing or even thinking of what the world is like from more than one – far less from all – places at once.

To acknowledge this situation and accept it for what it is disposes of the notion which lurks in the back of our minds (*i.e.*, subliminally) that there is some ubiquitous, or 'God's Eye' view of the world in which things are what they are, absolutely, regardless of how they appear to us. Disposing of this superstition – for that is definitely what it is – establishes, by default, the essential *relativity*, or observer-centredness, of all descriptions and measurements of physical phenomena, as in modern relativistic physics.

So there is no view of the world from more than one position at once that can be sensibly described. But what about binocular vision where, by definition, the world is viewed from *two* different places at once? And what about the compound eyes of insects? Don't these see things from a number of places all at once? Each of these eyes – or multiple receptors in the case of insects – is supplied with nerve-endings whose afferent nerve-impulses converge together on the brain or some other seeing organ. Logically, this seems to be a case of seeing from all those different points at once.

But no, that is *not* seeing from more than one place at once. It is a *telecommunicational* (e.g. neural) connection between observers, or observicles, signalling information from different locations. Nor do these connections take place 'all at once'. This can be seen if we replace those observicles with human observers spaced macroscopic distances apart. It is well known, in relativistic physics, that every metre of space separating these macroscopic observers entails a minimum time-delay of 3.3 nanoseconds, and that as the theory of relativity emphasises, there is no state of simultaneity, or 'all-at-once-ness' that can possibly be established between them.

The same applies, of course, to any instrument-system that can be devised, such as an array of video cameras or anything else constructed along those lines. In *all* cases, barring none, there remains that time-delay that is proportional to the distance and which is absolutely inexorable, making any state of simultaneity impossible to determine, even on the microscale of vision in insects.

The statement, then, holds firm, that there is no possible view of the world that can be obtained from more than a single place at once. This solves the problem of the mirror, which problem arises only because we customarily imagine that behind our perceptions of things there is some unseen, ineffable 'Presence' whose perceptions are not limited, as ours are, to point-perspectives. In traditional physics, this decentralised, 'grid-space' (God's-eye-view space) is defined by *Cartesian* dimensions as opposed to the *polar* dimensions of point-centred observation ^[1]. As mathematicians are aware, these polar and Cartesian spaces are geometrically inter-transformable. Indeed, the Cartesian (or communal) space is what gives objectivity to what would otherwise be the complete subjectivity of isolated polar perspectives, so the two spaces, although categorically different, are complementary in defining physical reality.

But if there is no true view of the world other than from every single place at once, then doesn't this imply that there is no unified overall consciousness, so that the world exists only insofar as we humans perceive it, individually, each from his own peculiar, isolated polar perspective?

No, because of the objectivity provided by the community of observers, in Cartesian space where we are in continual communication with others like ourselves and with all those other point-sources that nature and our technology provide. This removes any logical basis for solipsism. As for there being no single, unified overall consciousness, that is no more than an assumption. After all our brains, like our eyes, consist of a community of observicles, yet we are empirically aware of an overall consciousness in that case. So what is so in that case may well be so in other cases, perhaps even on a universal or cosmical scale. At least, that possibility can't be logically excluded. Meanwhile, a down-to earth fact, as known to psychologists is that we, as individuals, are conscious only insofar as we are in continual communication with others, that is, other things and other people. How far that conscious communication extends into the world in general, whether it can be personified, deified or whatever, is essentially a matter of belief.

But if this objective, intercommunicational, Cartesian space, is no more than a extrapolation of human science, then surely, since none of those other

things, those simple, non-human observables and so on, are capable of making such extrapolations in the way our traditional physics does, then in the end, what we happily think of as 'physical reality' has to be no more than a human construct, in other words, no more than a *convention*. Does the world, then, like the image in the mirror, exist only in human perception and convention? And what about our most real, most fundamental physical measures', such as *mass, length, time, solidity*, and so on? Are these, again, no more than just projections of human convention? In that case, the Sophist, Protagoras^[2] must have been right in his view that 'Man is the measure of all things'; and so must Bishop Berkeley in his famous dictum '*esse is percipi*' (to be is to be perceived)? This, surely, is a most disturbing conclusion, only minimally less worrying, in the end, than solipsism! Is there an answer to that problem?

Yes, there is. It is that the customary 'Ubiquitous Presence', or unspoken 'God' ('demon' or whatever, call it what we may) of our classical science has to be replaced in modern physics by a different kind of All-Over-Presence – whatever we might choose to call it. In any way of thinking, that Presence is a *matrix*, or network of observational interconnections in which all things, in one way or another, are communicationally linked and in which all viewpoints, are essentially *relative*, with there being no *absolute* or universal viewpoint whatsoever to consider. However, despite the fact that our classical science implicitly assumes the background existence of some superhuman, universal or *absolute* presence, with a space of its own, a time of its own, *etc.*, there has evolved, in traditional science, an almost knee-jerk reaction of coyness against attempts at naming it, as 'God' or whatever, all language of this kind being regarded in professional science as 'not the done thing', being the distinct province of 'theology', as opposed to science. However, unless we are to remain stuck with the problem of 'Man the measure', albeit subliminally, that 'nettle' has to be firmly grasped and put in its proper place. This is in a much wider, *philosophical* context, of which both physical science and theology are no more than arbitrarily distinguished categories. For this, our Physics will have to come out of its traditional shell and re-examine its original philosophical foundations.

The ancient Greeks had a far better, more appropriate grasp of that overall Presence than we have. Theirs was a concept which did not presume an impossible overview of things from all places and all angles all at once as, implicitly, our traditional physics does. For them, the overall Presence was of the same nature as communication, or *language*. It was called *logos*, the root of all our modern words such as 'logic' and the endings of so many other words, like 'geology', 'palaeontology', 'phenomenology' and so on. In origin, the meaning of 'logos' was secular, and it was only later, in the biblical Gospel of St. John, that the word was used in an overtly religious context, *i.e.*, to signify God and/or Christ^[3]. What is so different with *logos* (in the original sense) is that whereas the presumed absolute overview of the 'God of the scientists' is inconceivable, hence inexpressible – the *logos* is essentially *relativistic*; that is to say its logical structure of classification and division of phenomena, like all true language, is implicitly point-centred, or polar. If the 'universe' of science is analogous to a Great Machine, then that of '*Logos*' is more analogous to a Great Informational

Hologram, more akin to the modern computer than to the steam-engine of emergent mechanistic physics.

Now whether or not this *logos* is sanctified or deified is purely a matter of choice. In any case, its existence is a fact, without which there could be no structure to our human or any other form of language. But how can we know that this *logos* exists, other than just another human convention? We know this from that very fact, that our human languages have the logical structure they plainly have, whereby they are interpretable to one another. Even the 'languages' of animals and plants, insofar as they are interpretable, have to be *logical*, which scarcely needs saying. *Logos*, therefore, is a Presence consisting of a whole community of observers (and observables), of which community, man and his academic 'Physics' is no more than a special and rather peculiar part. Indeed, *any language whatsoever*, be it even that of extraterrestrial beings, if they are assumed to be inter-communicable have to possess that basic *logical* structure by definition, otherwise they cannot signify as language.

So, not only are all the things on this planet parts of that information transacting matrix, or *logos*, but so are the moon, stars, galaxies, molecules, atoms, microbes and so on, so far as these are known and correctly interpreted by our contemporary science. This makes the true aim of our science not to follow blindly in the trail of mechanistic tradition but to winnow out of existing language, by all devices available, its true *logical*, as opposed to purely conventional, structure.

Implications for the conduct of Physics

First it needs to be understood that any statement we make about the world – the only world we can know about, the *real* world – has to be made implicitly from some specified viewpoint or other. There simply is no way in which we can assume the overview of some all-over, *absolute* observer who sees everything (or anything) from all viewpoints and angles, all at once, far less from no viewpoint at all. The only way in which we can describe anything from all possible viewpoints at once, whether in ordinary language, geometry, mathematics, cosmology or whatever, is in metaphysical imagination – that is, by implicitly presuming what is, in effect, an ubiquitous 'God's eye view'.

So, what does all this tell us? It tells us that there is no sense whatsoever, in secular science contexts, in talking about things, positions, processes, measures or whatever, other than *relatively to some finite and specifiable point of observation* in any instance. This, no more and no less, is what is meant by *relativity*. So *relativity* is not some abstruse mathematic 'theory', as so many of us are disposed to imagine. It lies right at the very heart of all our dealings with the world, in commonsense the same as in science. It stresses that there is no reality in 'things-in-themselves' but that all reality is essentially *relational*. No 'atoms', 'molecules', 'quarks', 'bosons', 'fermions' ... or whatever, come to us 'out of the blue' labelled exactly and permanently for what they are and how they are distinguished from one another. That is to say, they do not *exist* in any self-sufficiently 'real' sense. The only definable *existence* they have is in informational interrelations with other objects and, ultimately, with some *observer* like ourselves. who classifies, divides and labels (names) these things, according

to the conventions of the time. This is what the philosopher Wittgenstein meant by his massively misunderstood statement, 'The World is Language'. It does not mean that nothing is real, that everything we are accustomed to talk about is something which, as observers, we either individually or corporately dream up. What it means is that whatever we think of in normal circumstances as *real* is conditional on being, *a*) observable, *b*) commonly communicable, and *c*) remaining logically coherent and consistent with other experiences in general, our own and those of others at different places and times. This is as expressed within a common-language system which is never entirely fixed and finished but is – or at least, *should* be – always evolving, adjusting and readjusting to ever newer experiences.

Nothing, then, is plainer, than what physical science *ought* to be, namely, the ongoing categorising, classifying and dividing of physical phenomena, discovering and describing how, in nature, one thing or event relates to another and encapsulating this knowledge in a logically coherent and consistent, developing system of language. Is this what Modern Physics is? Decidedly not. Nothing is more logically *incoherent* and logically *inconsistent* than the language of Modern Physics. Not even to its most expert exponents has Physics ever been more incomprehensible, more mystifying, than at this present time. Why is this? There should be no good reason for it, since there can be no built-in principle of incoherence or logical inconsistency in nature itself. It follows, then, that insofar as we find nature so chronically incomprehensible, it has to be *our* fault entirely.

So why have *we* made it so incomprehensible? The reason is not hard to find. It is all a matter of the *language* that physicists use to describe things. The fact is that it is the *language* of physics, not the nature it seeks to represent, that has become incomprehensible. There are three main causes of this. One is that physicists forget that the things they talk and write about, such as 'photons', 'field-forces', 'electric charges', 'electrons', 'quarks', 'superstrings', 'black holes', 'wormholes', 'dark matter', the 'expanding universe', the 'Big Bang' ... and so on, are all, in the very last analysis, devices of *language* – *human* language, that is, not that of some imagined cosmical deity. Moreover, due to the arbitrary Arts/Science academic divide, physicists are professionally unaware of what philosophers know, that all items of our language, especially at that language's expanding scientific interface with nature, can never be regarded as fixed for ever, that it is always revisable in principle in all its various categories and distinctions, even down to its most familiar words and definitions.

The second cause is the syndrome that has long been known as scholasticism. This is the over-reverence for traditional language that leads to long periods of stultification, particularly in science. It is the sort of reverence that the Educational Establishment fosters in its science students as a measure of their competence in the subject. All emphasis is placed on maintaining this process of language-building, more or less by accretion, without disturbing its roots in the traditional norms and standards. Paradoxically, instead of ensuring logical coherence and discipline, this emphasis on conserving convention at the expense of strict rationality tends towards a complete unravelling of logical structure, leaving scientific genius, as someone has said, 'to do what the hell it likes' – in other words, to grow, like a cancer, without logical control. Science students are

not encouraged to realise that much of this traditional language, subjected to proper logical analysis, may transpire to be mere jargon. Only in the rarest of instances have items of physics language been completely withdrawn. Just two examples of this are ‘phlogiston’ and ‘caloric’, which are now no more than archaisms. This, however, has failed to alert physicists to the fact that all other appellations are, in principle, equally tentative and conditional, subject to the need for them to fit logically with the body of language as a whole in the building of what is commonly recognised as *understanding*.

The third and far from the least reason is the premium that is placed, in modern physics, on *theory* as opposed to plain observation. Theories involved in the continual reviewing and revising of traditional interpretations of natural phenomena are one thing. Theories aimed at solving *Scheinprobleme*, that is, pseudo-problems, puzzles about chimeras created what Wittgenstein regarded as misuses of language are something else entirely. Although it is obvious that there is never any guarantee that the traditional language that physicists have devised in interpreting phenomena can be taken as forever fixed and oracular, it is nevertheless taken by some physicists as sacrosanct, hence assumed to be a firm basis on which to construct their theories. Take, for instance, the phenomenon traditionally interpreted as ‘electric charge’. During a certain era, this was thought to be a measure of static energy, in arbitrary units called ‘coulombs’, whereby particles of matter attract and repel one another by invisible field-forces *in vacuo*. It was thought that ultimate particles possessed of this mysterious ‘charge’ might be usefully called ‘electrons’ after the Greek word for ‘amber’, the substance that attracts bits of fur and so on when rubbed. The distinction between this sort of ‘electrical’ energy, measured in coulombs, and ordinary mechanical energy measured in joules is purely arbitrary, since the measures in coulombs can be easily cashed out in joules. Indeed, it can be shown ^[1] that the mysterious static ‘charge’ ascribed to the particle called the ‘electron’ can be more sensibly and economically reinterpreted in mechanical units of ‘spin’, which makes unnecessary the traditional distinction, in physics language, between the ‘electron’ and other mass-particles generally. This, logically, and in the interests of conceptual economy, should remove from physics language altogether, all particular references to the ‘electron’ and all other words beginning with the prefix ‘electro’. However, now that the altogether illustrious tradition of ‘electronics’, ‘electrodynamics’ and so on has been set, words such as ‘electron’ and ‘electrostatic force’ have become fixed in the language to the extent that they are taken to be as definitive of physical objects as words like ‘cow’ and ‘cannon ball’. This leads to theories, and theories upon esoteric theories, as to how and why the entity named the ‘electron’ and its accompanying ‘electrostatic field’ behave in ways that bits of ordinary matter don’t. Thus, the word ‘electron’ is conceived as something that exists ‘*in itself*’, as some deity might be presumed to perceive it and name it. The possibility that the original interpretation of the phenomenon at the time, hence all the various connotations involved in the

[1] See, e.g., A.D. Osborne & N. V. Pope, ‘An Angular Momentum Synthesis of ‘Gravitational’ and ‘Electrostatic’ Forces,’ *Galilean Electrodynamics*, Vol. 14, Special Issue 1, Spring 2003, pp. 9-19. This is available on the website www.poams.org in section 10, Seminal Publications.

naming of it might not have been the best or most propitious for the future of theoretical physics, can now scarcely be considered.

In sum, then, it is proposed that the only way in which theoretical physics can emerge from its present state of stagnation is to restore a sensible balance between *theory* and plain observation. Theories as to what happens to one's image in a mirror when one leaves the room may be all very well for purposes of confounding and entertaining an audience. The same goes for theories about what 'electrons', 'photons' and so on do when they are all alone, unseen and undetected in the vacuum. Physicists need to ask themselves whether it makes sense to wonder whether 'God' sees images in the mirror in an unoccupied room in the same way as we would if we were there. Obviously not, so why talk, in physics contexts, as though things exist in this 'absolute' way independently of all ordinary perception and language? By the same token, why should we presume that 'electrons', 'force-fields', 'quarks', 'wave-functions' and so on exist, absolutely *in the way we conceive and name them*? What a conundrum that is! Nature cannot create conundrums. Only our uses and misuses of *language* can do that.

End-notes and References.

¹ These polar dimensions, or polar coordinates, are i), *elevation* (up-down angle); ii) *azimuth* (angle across, or left and right), and *range* (radial distance or depth of visual field). Cartesian dimensions are those of a field of extrapolated straight lines between those polar centres (observers or observicles), creating the usual Euclidean grid-space or objective matrix. Time, in these polar terms is the successional 'contraction', as it were, of these spherical spaces towards the centre.

² Protagoras was the pre-Socratic philosopher, or Sophist, of the fifth century B.C. His dictum was: 'Such as appears for me *is* for me and such as appears for you *is* for you.' Protagoras is often hailed as 'the first relativist'.

³ The meaning of the Greek *logos* was, originally, a cosmic principle of reason, ordered discourse, or language. The connection with Christianity was through Philo of Alexandria (1st century C. E.) In the Gospel of St. John the meaning of *logos* is taken as 'word' and was personified as the Christian 'God'; The mission of Jesus was said to be to convey to his disciples that *Logos* ('Word' or 'Reason') of which he, like God, was the very essence.