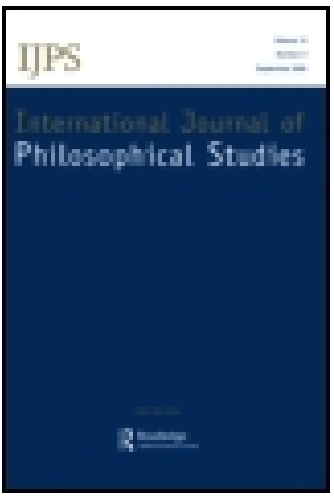

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Scientific realism and observation statements

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Scientific Realism and Observation Statements

Crispin Wright

Tractarian Themes in the Logical Positivists' Philosophy of Science

If one had to single out any one book published in the course of this century as that most responsible for the concerns and overall direction assumed by analytical philosophy, it would have to be the *Tractatus*. It is something of a paradox that a text of such opacity should have been so influential. Nevertheless, the thought of the logical positivists undeniably took its scaffolding from the *Tractatus*; Wittgenstein's own subsequent philosophy is self-consciously informed by reaction to it; and these two sources – positivism and the later Wittgenstein – encompass, between them, the most important formative forces on the writings of the philosophers – Quine, Davidson, Putnam and Dummett – who have done most to establish the parameters and concerns of contemporary metaphysical and epistemological debate. The topic of this paper is one of the central themes in this progression.

When students are told of the fundamental influence which the *Tractatus* exerted on the positivists, they are sometimes puzzled to understand in what this influence could have consisted. To be sure, there are a number of thematic affinities; the deflationary stances towards necessary truth and the a priori, and towards value judgements, for instance. But there is no hint of verificationism in the *Tractatus*, indeed no explicit epistemology of any sort, empiricist or otherwise. What is there in both the *Tractatus* and positivism which is *fundamental* to both? The answer is: a certain kind of semantic foundationalism. Each conceives of a base class of statements whose content is determined in some canonical way; respectively, by being apt for the depiction of Tractarian atomic fact, or by being apt to report a possible finite episode of sense experience. All other genuinely significant statements are then conceived as the products of iteration of a finite set of statement-forming operations – in the *Tractatus* and among the more purist of the positivists, just the logical constants – upon members of the base class. It is of central importance in both the *Tractatus* and positivist versions of this theme

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that a substantial programme of analysis is required to disclose exactly how significant statements of ordinary language do indeed decompose semantically into recursively yielded combinations of basic propositions. And it is recognized in advance that many species of what pass for significant judgements would resist such analysis; rather than being the cause for complaint about the underlying theory of meaning, this is viewed as the discovery that, for instance, moral discourse, religion and theology, and metaphysics have no genuine factual content. In essentials, positivism departed from the *Tractatus* only in the empiricism which determined its conception of the nature and content of the basic propositions.

If the consequences of such a conception of meaning for ethics, religion and metaphysics were not unwelcome, there was another region where their reception was far less grateful. Positivism was marked by a respect for empirical science hardly any less intense than its contempt for traditional metaphysics. But a demonstration that it was possible to represent the content of theoretical statements in the physical and life sciences in the sort of fashion demanded by the underlying theory of meaning was clearly going to be a very difficult undertaking. Carnap, for one, took the challenge up, but unsuccessfully. Others responded by espousing forms of *instrumentalism*: scientific–theoretical statements, while possessing a perfectly valid and proper role, were indeed not literally significant. Their function was rather to systematize patterns in experience and to facilitate the prediction of particular experiential episodes. The task of the theoretical scientist was to codify regularities in observable reality, not penetrate the secrets of an unobservable one.

Both these tendencies are totally dependent, of course, upon the existence of a well-demarcated base class. There has to be a well-defined class of experiential statements in terms of which the content of theoretical statements is to be analysed, or by reference to which their instrumental role is to be characterized. One of the most dominant motives in the reaction against positivism was the growing conviction, powerfully fostered by Sellars and Quine, that there was no such base class; no level of language at which statements served merely to record what is purely experiential in a fashion neutral with respect to the theoretical commitments of the recorder. Rather observation, it was urged, is invariably conditioned by theory – 'theory-laden', as the point is habitually expressed. The positivists' commitment to the existence of a category of purely empirical, semantically and epistemologically foundational statements, was a commitment to a myth.

There are features of the positivist philosophy which have maintained an attraction for some philosophers, even when dissociated from their original source in the positivist theory of meaning. Conventionalism about logic and mathematics and non-cognitivist views of ethics are two examples. But the positivist conception of a base class of purely empirical statements is nowadays generally regarded as totally discredited. The received view is that

the whole idea of a level of language at which statements concern only experience, are conclusively verifiable or falsifiable on the basis of finite episodes of experience, and whose vocabulary imports no ontological commitment to a material world, is an illusion; and further, that if one looks instead to statements which describe observable features of the material world, one finds that their content is indelibly stained by theory, that they are quite unfitted to play a semantically or epistemologically foundational role.

The principal concern of what follows is with the dominant response to the perceived impossibility of a defensible philosophy of science of either of the kinds – reductionist or instrumentalist – which the positivists proposed. This has been to view the situation as providing a decisive or at any rate very powerful argument on behalf of scientific *realism*. I shall argue, to the contrary, that unless something can be salvaged of the traditional notion of an observation statement, the prospects for realism about theoretical science are hardly less bleak than those for instrumentalism and reductionism. I begin by making some suggestions about what people who would regard themselves as scientific realists had better be maintaining.

Scientific Realism and Dummettian Realism/Anti-realism

According to a well-known proposal of Michael Dummett, realism about the subject matter of any class of statements is best regarded as a view about their content: the view that the meaning of each such statement is determined by its association with certain necessary and sufficient conditions of truth, where the relevant notion of truth is understood as *bivalent*. To take a realist view of a class of statements is thus to conceive of each of them as being determinately true or false quite independently of any possibility of getting evidence relevant. The connection of this proposal with intuitive realist thinking – the idea of a world which is fitted to confer truth and falsity upon our thoughts independently of our investigations and opinions – is easily appreciated. If statements are guaranteed determinate in truth-value for which there is no guarantee of available evidence, favourable or unfavourable, the source of this guaranteed determinacy must be distinct from our cognitive operations. That is apt to impress as a nice gloss on the idea of a world fitted to confer truth upon our thoughts independently of our investigations.

An obvious problem, though, is that the principle of bivalence is unacceptable where *vague* statements are concerned. And one might well want to take a realist view of the subject matter of a range of vague statements. Vagueness is a pervasive feature of our language. But in order to respect the point, a very simple modification of Dummett's proposal suffices: a realist view of the subject matter of statements in a certain class is to the effect that, as before, their content is determined truth-conditionally, except that the relevant notion of truth is understood to be (not bivalent but) *epistemically*

unconstrained. According to realism, so characterized, it is no part of the concept of *truth* that a statement's being true requires the availability, in principle, of evidence that it is true; though it may of course be a consequence of the kind of content that a particular class of statements have – effectively computable arithmetical statements, for instance – that their being true does require the possibility (in principle) of verifying that they are.

My question here is whether realism in this modified Dummettian sense is among the commitments of anything worth regarding as realism about the subject matter of scientific theory. Must a scientific realist conceive of the truth, or falsity, of scientific theories as having no essential connection with the availability of evidence of their truth or falsity?

There may seem obvious reason for thinking so if, with Quine, we accept the essential underdetermination of scientific theory by empirical data. Suppose, for example, Special Relativity Theory and the Lorentzian Theory of Corresponding States do indeed have precisely the same testable consequences.[1] Then the question whether one of those theories might be true at the expense of the other is, it seems, precisely the question whether the content of theoretical statements allows them to be true in a manner which transcends our capacities for knowledge.

But the example is rather a special one. Is there any reason for thinking that underdetermination of the kind it(perhaps) illustrates holds generally?

What would be the commitments of Dummettian *anti-realism* with respect to scientific theory? Well, that the notion of truth appropriate to scientific theoretical statements is an 'epistemically constrained' one; but what does that mean? Presumably, that the extension of the concept of truth among scientific theoretical statements is limited to the range of cases in which proper scientific method is capable of disclosing sufficient reason for belief. And that will involve, for every true scientific theoretical statement, that there is a theory in which that statement figures *essentially* and which is *recognizably successful*. There will be, of course, considerable difficulties in providing satisfactory explications of those two notions. Such, nevertheless, is the shape which the epistemic constraint would have to take in the scientific theoretical case.

Now, there is no actual inconsistency in believing both that the notion of truth appropriate to scientific theories is so constrained and that the situation (putatively) illustrated by the example of Einstein and Lorentz is an ineliminable predicament of scientific theorizing. The latter belief amounts, I suppose, to a conviction of the correctness of the following thesis (*Maximal Underdetermination*):

> For any theoretical sentence S and empirically acceptable theory T essentially containing S, there is a theory T^1 with the same testable consequences as T but which contains, essentially, the negation of S.

The two beliefs would entail only that no notion of truth meeting the epistemic constraint characterizes any scientific theoretical statement, and hence that such statements are not apt for truth or falsity at all – just as traditional instrumentalism supposes. But inconsistency will result when the basic scientific realist thought is introduced that (a wide class of) scientific theoretical statements *are* apt to be true or false in an appropriately substantial sense. That conviction, married to a belief in maximal underdetermination, forces the scientific realist into the mould of Dummettian realism – into a position which Dummettian anti-realism is committed to opposing.

However there is, so far as I know, *absolutely no compelling case* for believing in maximal underdetermination as formulated. No doubt we can cobble up a kind of underdetermination on the back of any given presumed acceptable theory, T, by generating a set of idle hypotheses such that either they or their negations may be added to T without generating a theory whose testable consequences differ from those of T. But in that case the experimental support enjoyed by T merely does not extend to the idle hypotheses or to their negations. Maximal underdetermination requires situations where, but for the possibility of incompatible theories with the same consequences, we could rightly have regarded the *whole* of a theory as confirmed by the available evidence. Such a situation may sometimes occur. But I know of no reason, to repeat, for thinking that it is of the essence of scientific theorizing.

So far, then, it is an open question whether scientific realism may not be compatible with Dummettian anti-realism. What the scientific realist essentially wants to maintain is that there are aspects of *reality* for the describing and cognizing of which we are dependent upon the vocabulary and methods of scientific theory: aspects of the natural world which we cannot understand or know about without relying upon the techniques of concept-formation and statement-testing used by theoretical science. The important ingredients in the view are thus two: (1) against reductionism, the belief that a scientific theoretical vocabulary is no dispensable *ersatz* for a vocabulary of some epistemologically more basic kind, and (2) the belief that statements formulated in scientific theoretical vocabulary are apt to be true or false in a substantial sense, one associated with *fit* with objective worldly states of affairs. These highly intuitive and inchoate ideas seem prima facie quite consistent with Dummettian anti-realism; why should not a substantial notion of truth also be an epistemically constrained one?

This should be a congenial thought for anyone disposed to recognize the power of the case against realism in Dummett's sense. For scientific realism is unquestionably the most attractive philosophy of science: cognitive adventure is a much more appealing project than useful fiction.[2] Nevertheless I do not think that things are so straightforward. When we look a little further into the commitments of scientific realism, characterized neutrally and intuitively so as to be prima facie compatible with Dummettian anti-realism,

it will emerge – or so will be the gist of the argument to follow – that this neutrality is inconsistent with the belief, so gleeful to the critics of logical positivism, that there can be no epistemologically foundational observation statements. Rather, the cost of the latter belief is that the scientific realist has to be a Dummettian realist; an exorbitant cost, in my view, though I shall not, in this paper, rehearse the reasons why.

What Scientific Realism Must Hold. Minimal Truth, Representation and Cognitive Command

I spoke above of a 'substantial' conception of truth. Is there any other kind – isn't truth of its very nature a substantial property of a statement, conferred on it by an objective reality? Well, that this is a proper or fruitful way to conceive of truth has long been challenged by deflationist and coherentist traditions. What is not usually challenged is that there is some *one* proper way of conceiving of truth. This is why one kind of anti-realist tradition – that of *irrealism* – has taken the form of denying that, for instance, ethical statements, or pure mathematical statements, are genuinely candidates for truth and falsity at all. For thinkers in this tradition, the presumed unitary character of truth, coupled with recognition of the essential connection between assertion and truth – crudely, that to assert a statement is to present it as true – led directly to the programme of attempting to construe the apparent assertions of ethics, or pure mathematics, as though they were really something else: expressions of moral sentiment, for instance, or the laying down of linguistic rules.

Long after the logical positivists' motivation[3] for such proposals had come to be widely regarded as discredited, the programme of non-assertoric or, more specifically, *expressive* or *performative* interpretations of apparently assertoric discourse continued to flourish. Moral discourse, mathematical discourse, aesthetic discourse, ascriptions of responsibility, professions of knowledge, even ascriptions of truth itself, all came in for such interpretations during the heyday of 'linguistic philosophy'. But this whole movement was nourished by, indeed scarcely intelligible without the assumption that certain distinctions, principally to do with objectivity (to express the matter in an admittedly unhelpful way) could not be recognized once it was admitted that truth was predicable of such 'statements'.

This was an unfortunate assumption. As Geach was perhaps the first to point out,[4] the forms actually assumed by expressivist proposals resulted from an almost exclusive concentration on the use of the statements in question in unembedded (putative) assertions and paid no heed to their role as constituents in compound statements, for instance as the antecedents of conditionals or as objects of propositional attitudes, or as unasserted hypotheses in contexts of inference. Such proposals are still pursued, of course, with varying degrees of ingenuity and success.[5] But I know of no

instance where a proposal of this kind has been able to account for and conserve all the aspects of the relevant species of apparently assertoric discourse which its proponents would (or should) want to conserve.[6]

A much better response to the intuitions that motivate the whole tradition, it seems to me, is to recognize the various problematical regions of discourse as genuinely assertoric, to recognize that assertion always imports a commitment to *some* notion of truth, but to abandon the idea that truth is uniform, or anyway has the same objectivity-connected characteristics, across all regions of discourse. The intuitions about objectivity which foster expressivist or other forms of non-assertoric proposal are better respected, and developed, by drawing distinctions *within* the concept of truth – or by highlighting variations among the further characteristics which a unitary notion of truth may exhibit in different regions of discourse.

Now, opposition to scientific realism, when it has not been reductionist, has traditionally been cast as the denial that truth is properly predicable of scientific theoretical statements. Instrumentalism, insofar as it was associated with the doctrine of the literal senselessness of such statements, was an extreme version of such a denial, and more moderate ones are possible. One example of a more moderate view could result from combining the conception, advocated by such writers as Mary Hesse,[7] that the content of scientific theoretical statements is properly viewed as metaphorical, with the view, espoused most notably by Donald Davidson,[8] that truth and falsity are not appropriate dimensions for the appraisal of metaphor. The more modest form of anti-realism – *constructive empiricism* – advocated by van Fraassen[9] involves an agnosticism about the truth of scientific theories, rather than denial that they are so much apt to be true, which is supported by the claim that it is quite consistent with such agnosticism to rely for practical purposes upon scientific method and extant scientific theory. If, however, the assumption of the unity of truth is dropped, scientific anti-realism need take none of these forms. The focus of dispute becomes not whether truth applies to scientific theoretical statements, but *which* notion of truth applies – or, at any rate, what characteristics it has. Likewise, the key issue raised by Van Fraassen concerns not whether trust in a scientific theory involves a commitment to its truth but *which* notion of truth is implicit in an endorsement of such a theory.

I propose that we should agree that *some* notion of truth is in play in any region of discourse whose sentences are subject to acknowledged standards of warranted assertion and have the kind of aptitude for embedding to which Geach called attention; crucially, embedding within negation, the conditional, and other sentential connectives, and embedding within expressions of propositional attitude. Accordingly, we may regard sentences like

'It is not the case that industrial espionage is wrong'

'If industrial espionage is morally permissible, so is insider trading'

'Jones believes that insider trading is morally permissible'

at face value, as compounds of bearers of truth or falsity. The alternatives are revisionism – the view that the some such contexts are simply improper – or a Ptolemaic story describing how the distinction, between the real and the merely apparent, which exists among the class of putative assertions, is replicated within the concepts of negation, conditionalization, disjunction, belief, fear, hope, and so on.

If it is accepted that some notion of truth is operative whenever these potentialities for embedding are operative, what conclusions can be drawn about its character? Principally that it is, as anything worth regarding as a notion of truth must be, minimally *normative*, that it reflects the currency of a concept of correct assertion. For there would be no use for negation unless content had been attached to the idea of *error*, and no use for the conditional, or for expressions of propositional attitudes like hope and fear, unless provision had been made for the notion of *ignorance*. And the possibilities of error and ignorance collectively provide for a concept of what it is proper to think or say, determined independently of any particular subject's dispositions of thought and speech. Naturally, there is need here for a much more fine-grained account than I shall now attempt. I anticipate – though I cannot prove – that such an account would deliver two results: first, the fact that a region of discourse is constrained by some notion of correct assertion can be manifest *only* in the use of embedding contexts of the relevant kind; second and conversely, that such contexts would have no intelligible function save in the presence of such a constraint.[10]

Obviously enough, such a notion of truth is predicable of scientific theoretical hypotheses. It is also predicable of moral and mathematical judgements, expressions of aesthetic response, and expressions of a large class of affective responses, for instance claims about what is funny, or revolting. The question is therefore how, if we accept this proposal about truth, we can recognize and appraise the intuitions of those who have wished to urge an irrealist view of these various types of discourse. What can a region of discourse lack if its sentences are minimally apt for truth and falsity in the sense of the proposal?

Take a case where irrealism is almost everyone's antecedent prejudice: judgements about what is funny. Such judgements are minimally apt for truth and falsity: I can overlook the humour in a situation, miss the point of a joke, be open to justified criticism for what I take to be funny, work with conditionals with comic antecedents, etc. Most people's conviction is nevertheless that the comic is not 'out there' in the world, that our judgements about what is comic do not express purely cognitive responses, and that insofar as cognitive responses are involved, they are responses to states of affairs whose full description would require no use of the vocabulary of comedy, nor of any vocabulary onto which a plausible reduction of the vocabulary of comedy might be effected. More specifically, those who are drawn towards irrealism concerning the comic are likely to believe two

things: first, that we typically appraise claims about what is or is not comic on the basis of an exercise of capacities which are not purely cognitive but involve certain emotional and affective susceptibilities; second, that this is essential – that the capacity for competent such appraisal depends upon possession of the relevant non-cognitive capacities.

That suggests a plausible, not particularly adventurous-seeming proposal: that the notion of truth appropriate to a certain class of statements involves a substantial increment over the minimal notion only if the ability to appraise such statements as true or false need involve only *cognitive* capacities. That is: if appraisal is possible at all, it will be within the compass of any creature with an appropriate cognitive endowment, however otherwise unusual.

The lack of adventure is owing to the fact that we are still operating more or less at the level of platitudes. The proposal reflects a formal connection between realist intuition and the notion of strict cognition, but nothing substantial has been said about what should qualify a capacity as 'cognitive'. So the proposal as formulated has absolutely no cutting edge in the context of realist/irrealist disputes. What obstacle is there, for instance, to the contention that the 'sense of humour' should count as a strictly cognitive capacity? In addition, there is an immediate worry about circularity – can we hope to decide which of our capacities are genuinely cognitive without a *prior* decision about what there is to be cognized – what the 'real facts' are?

Without directly addressing these concerns, however, it is possible to develop the proposal a little further. If the notion of cognition is, in the fashion proposed, to connect with realist intuition – with some more-than-minimal idea of truth and falsity – then strictly cognitive capacities have to be capacities to form beliefs which *reflect* or *represent* real, independent, autonomous (or however else one wants to describe them) states of affairs. But notions like reflection and representation have a salient implication. The snapshots of a properly functioning camera accurately reflect, within the limits of the apparatus, the scenes it is used to photograph. So if photographs taken of a single scene with two cameras differ – that is, if they represent the scene not merely differently but incompatibly – and if the cameras have the same technical limitations, then it cannot be true that both functioned properly. Similarly, where appraisal involves the exercise only of what are properly regarded as purely cognitive capacities, there will be a way matters *ought* to be represented – an opinion, if only agnosticism, to which the correct and responsible exercise of those capacities will lead any cognitively lucid subject. So, conversely: disagreements will have to involve something broadly characterizable as improper functioning, as cognitive shortcoming.

I think that this thought needs a qualification, which I will offer in a moment, but that it is basically correct. Its effect is that we are entitled to regard a class of statements as apt for truth in a more-than-minimal sense, only it is a priori that any disagreement about the status of a member of the

class will ultimately involve, for instance, perceptual, procedural or inferential error, or a lapse of memory or attention, or an inference soundly drawn from faulty data or from data which, though correct, are misleading, or a prejudicial weighting of data – or, anyway, *something* which deserves the title of cognitive shortcoming. Where there is no guarantee that the explanation of a disagreement must be found along this track – if there are always other kinds of explanation which cannot be ruled out a priori – there can be no adequate case for the claim that more-than-minimal notions of truth and falsity apply.

The necessary qualification is to allow for vagueness. A vague statement may nevertheless be apt for appraisal by the exercise of purely cognitive capacities; and its vagueness may be such that in certain circumstances a pair of subjects may disagree in their appraisal of it without any cognitive shortcoming being involved. It is tempting to say, indeed, that a statement's possessing (one kind of) vagueness just *consists* in the fact that, under certain circumstances, cognitively lucid and properly functioning subjects may permissibly agree to differ about it. Moreover vagueness bears upon our concerns in another way. The notion of what counts as a sufficient justification for a particular appraisal of a statement may also be vague. This is especially clear with probabilistic evidence. The incidence of childhood leukaemias at Sellafield in Cumbria is many times the national British average. Most people who know the facts agree that it is reasonable to believe that the proximity of the nuclear reprocessing plant is responsible. But there is no real number, n, such that an incidence n times the national average justifies that belief, while anything smaller does not. Rather, there is a vaguely bounded range of values for n where, as you might put it, suspicion about the effects of the nuclear reprocessing plant would not be unreasonable but where someone who took a more sanguine view would not be determinately irrational either. The thresholds of probability which determine commitment and action are, in some measure, a personal matter.

Absorbing the qualification, we refashion the proposal as this:

> *Cognitive Command*
> The statements in a certain class are more-than-minimally apt for truth and falsity only if it is a priori that disagreements about the status of any member of the class, if they cannot successfully be explained by appeal to vagueness – in either of the ways noted – will involve something which may properly be regarded as a cognitive shortcoming.

It still remains, of course, that lacking a sharp criterion of the cognitive, we cannot use the proposal directly to adjudicate realist/irrealist disputes. But it would be a mistake to conclude that it is toothless. Consider the case of comedy. Suppose we disagree whether a senior colleague's Graduation Day address to the parents of graduands was unintentionally comic (though agree

that, if it was comic at all, it was unintentionally so). What can be said, a priori, about the range of possible explanations of this disagreement? Well, it may be that something which we could independently agree to be a cognitive shortcoming – independently, that is, of the issue about the comic – is at the root of it. One of us may not have heard, or have misheard, part of the speech; failed to have noticed some unintentional pun; been unaware of some important fact about the audience; and so on. But equally, the explanation may be of none of these sorts. It may be that we are in agreement about all other germane facts – that our only disagreement concerns whether or not the speech was comical. And in that case, if our respective judgements on the point are to qualify for more-than-minimal truth and falsity, one or both of us must be guilty of some *further* cognitive shortcoming relating directly to the matter at issue. So a defence of comic realism along these lines – a defence of the claim that judgements about what is comical are apt for more-than-minimal truth and falsity – will have to resort, it would appear, to taking the notion of a 'sense of humour' very seriously. It will have to involve thinking of the comic value, as it were, of a situation as something accessible only to a special kind of sensitivity.

Accordingly, the proposal, while not itself incorporating a decisive criterion for their resolution, can play a useful role in determining the proper *direction* of realist/irrealist debates. The comic realist, for instance, may be manoeuvred into a position which is structurally similar to ethical intuitionism, and which faces similar difficulties: if comic sensitivity is *sui generis*, for example, why is it that ordinary features of a situation can be relevant to the appraisal of its comic value? And how should we conceive of the states of affairs to which the alleged sensitivity is responsive? Ought they not to have a range of identifiable effects besides stimulation of our comic-appreciative faculties? And ought there not to be a detailed story to be told about how they have that particular, important effect? And so on.

To revert to our main concern, and to summarize, I am proposing that a defence of scientific realism has to involve a defence of the claim that scientific theoretical statements are more-than-minimally apt for truth and falsity; and that the latter claim can be made good only if it can be shown to hold a priori that scientific theoretical disagreements, where not attributable to vagueness, must involve cognitive shortcomings. The considerations offered in support of the proposal were, first, that it seems to explicate irrealist intuitions about the comic and other affective matters; second, that if the *telos* of our cognitive faculties, properly so styled, is the accurate representation of the world (within their limits), then divergent representations have to be attributable to those faculties' operating less than perfectly, in some appropriately wide sense.

Theory-ladenness: Some Distinctions

We need to approach the idea of the 'theory-ladenness' of data, and of the Myth of the Given, with care. First, I am concerned with 'data' in the sense relevant to physical science: items of information concerning what is observable in *public* time and space. So there are several respects in which someone could justifiably dispute that any such data are purely and immediately 'given':

First, observing is perceiving, and perception is distinguished from mere sensation by being informed by concepts. Hence what a subject will be inclined to report on the basis of a certain episode of sensory stimulation will be a function of the concepts which they possess, and there is provision for the idea that subjects whose conceptual equipment differs may, for that reason, offer different reports on the basis of relevantly similar sensory episodes.

Second, any statement about the material world, including all those that we would not hesitate, pre-philosophically, to regard as observably true or false, will bear on experience in indefinitely many ways; there are no end of ways in which an episode of experience which prompted a particular statement might be augmented so as to confound it. The experiential content of an observational report thus invariably exceeds whatever experience actually motivates it.

Third, the possession of concepts is not merely the possession of certain classificatory skills, but essentially imports the possession of certain beliefs. I can, in any ordinary sense of the term, observe the presence of a zebra and correctly report as much. But possession of the concept *zebra* involves, more than such an ability of classification, some grip on the notion of an *animal*, and of a *species* of animal, and the belief that zebras comprise such a species. Even concepts as apparently (but only apparently) simple as those of colour are properly understood only if the subject has grasped that they apply to enduring material objects (inter alia) and can characterize such an object when it is not being perceived or is placed in a darkened room.

Fourth, the reports which subjects are prepared to offer on the basis of their experience will be – and indeed ought to be – a function not just of the concepts which they bring to bear but of their beliefs concerning the circumstances in which the observation takes place. An experience which prompts a subject to assent to a certain description of colour, or shape, in certain circumstances may no longer do so if they come to believe that the conditions of observation are deceptive or non-standard in some way – artificial light, or an Ames room, for instance – or that their own perceptual function is abnormal.

All this is sound and familiar. But we must remember that the principal point of the idea that observation is ineliminably theoretical, was to challenge the opposition between data and empirical theory. And there is no such challenge unless the case is made, quite generally, that what it is proper

to assent to, on the basis of observation, is a function of one's *empirical* beliefs. So the fact that concepts are involved in all perception and that – as illustrated in the cases of zebra and colour concepts – grasping them may involve possession of certain a priori beliefs, is not to the purpose. Similarly, the indefinite experiential content of ordinary empirical statements, and hence their essential defeasibility, seem to constitute no immediate impediment to their amounting to data in the relevant sense: the possibility is left open that, provided one has the appropriate concepts, one's experience may assume such a pattern that one ought, irrespective of one's background empirical beliefs, to assent to such a statement, even though such assent is invariably in principle defeasible by untoward subsequent experience.

Those considerations speak to the first, second and third notions distinguished. But the fourth, the role of belief in the normality, or conduciveness, of conditions of observation, and in the competence of the observer, is another matter. It is true that, in any ordinary observational situation, we take these things for granted. But we can hardly maintain, it seems, that such beliefs hold true a priori. On the contrary: they are liable to be confounded by experience and, indeed, by empirical theory of great sophistication. A popular example is that of the Doppler effect on light passing between bodies of high relative velocity, so that the light reaching us from rapidly receding stars is preponderantly of frequencies towards the red end of the spectrum. Consequently an untutored observer may, perfectly properly but wrongly, be disposed to assent to 'That star has a yellowish hue' in circumstances in which someone who knows enough about the physics of light and the relative velocities of the stars will not.

In summary. It is possible to move quite some distance from the logical positivists' conception of an observation statement without compromising the idea of empirical data which are available independently of empirical theory and to which the latter has to answer. We can disallow the notion of a purely phenomenal language, fitted for the formulation of statements which can be exclusively verified or falsified by experience. We can recognize that all observation involves conceptual activity, and that the data one finds will be a function of the concepts one brings to bear. We can acknowledge that concepts import beliefs. We can even allow – a point not so far touched on – that, *pace* such writers as Christopher Peacocke[11] there is no properly observational vocabulary, that notions taken from empirical theory may enter ineliminably into our reports of what we observe. (A nice example, due to van Fraassen,[12] is 'sunrise'.) None of this will alter the existence of hard empirical data so long as reports of observation, whatever vocabulary they contain, are determined as correctly assertable or not purely as a function of the experience and concepts of the subject and independently of their background empirical beliefs. (Assent to 'the sun is rising' need not involve a commitment to a pre-Galilean picture of the relative motions of the Earth and Sun.) Those who reprimanded the logical positivists for falling

prey to the Myth, insofar as they were motivated by considerations such as these, and their complaint was directed against epistemological foundationalism, rather than the semantic foundationalism which logical positivism intertwined with it, were, it seems to me, quite mistaken. Nevertheless: we have glimpsed a case for something stronger, which, if correct, is absolutely to the point.

The Main Argument: Theory-ladenness and Scientific Realism

Suppose that all observation is indeed theory-laden in the sense just characterized: *any* statement concerning what is observable is such that whether or not it is reasonable to believe it on a particular occasion will depend on what other empirical–theoretical beliefs one holds. There are thus no statements of which it can be said that, in a particular context, any rational subject who understands them and whose experience in that context assumes a certain course, is obliged to assent to them (precisely: no *synthetic* statements in the sense of 'synthetic' of Quine's 'Two Dogmas of Empiricism'). Rather, warranted believability for observation-statements is a four-term relation holding between the statement, a subject, a course of experience, and a set of background empirical–theoretical beliefs. Then our problem is going to be how this can be reconciled with the view that scientific theories are apt for more-than-minimal truth and falsity.

Why is this going to be a problem? Suppose theorist A accepts a certain theory H_0 on the basis on certain observations, O_0. But theorist B considers there is no reason to accept H_0. It is not that she is merely ignorant of the observations. Rather B assesses the experiences which motivate A's acceptance of O_0 in terms of a theory H_1 which A doesn't accept and which justifies B in not assenting to O_0 in those circumstances. So A and B disagree about the status of H_0. Must their disagreement, if not attributable to vagueness, involve some specific cognitive shortcoming? Naturally it may; *must* it do so?

Let's tighten up the description of the case so as to preempt certain possible modes of involvement of vagueness and certain possible types of shortcoming. Let A agree that if H_1 is accepted, his experience does not provide sufficient grounds for accepting O_0. So the problem is not, for instance, to do with vagueness in O_0, nor with ignorance or error concerning the implications of accepting H_1. Rather it concerns the status of H_1, accepted by B but not by A. If either vagueness or cognitive failings have to be involved in the original dispute, then one or other must be involved in the dispute about H_1. And again, that may be so. But it seems straightforward to continue the story in such a way that is not yet made clear *how* it is so. Suppose for instance that B accepts H_1 on the basis of observations O_1; but A, unlike B, holds a theory H_2 which so conditions his assessment of the relevant experiences that he concludes that there is no reason to accept O_1. B, in contrast, does not Hold H_2 but agrees that *if* H_2 is held, then A's

response is perfectly appropriate. Clearly we are now embarked on a potential regress, in which each theorist disputes the acceptability of each theory, and each relevant set of observation statements, accepted by their opponent; but in which there is complete agreement about the *conditional* acceptability of each of the opponent's theories relative to the relevant disputed observations.[13]

Where is the cognitive shortcoming? At the most general level, it seems that there are only three kinds of shortcoming that might be involved. *Either* A or B has accumulated faulty evidence – some of the cited observation statements are mistaken –; or A or B has accumulated sound evidence which the other lacks – either A or B is wrongly rejecting true observation statements; *or* one or the other is over-or underestimating the evidential force of the observations which he or she has made. But we may perfectly properly stipulate the third possibility away. Just as A and B are agreed, rightly as we may suppose, about what observations it is proper to record in response to their experience *if* certain relevant background theories are accepted, so we may suppose them rightly agreed about the character of the impact on relevant theories which those observations would have if allowed to stand. And we have also stipulated that A's and B's respective observative reports are correct *relative* to the background theories which condition them and the theorists' respective experiences. So if either is working with faulty data, that's going to require that he or she is conditioning their observation reports with a *false* background theory. And if either is working with materially incomplete data, that's going to require that the opponent is working with a *true* background theory to which he or she does not subscribe. In other words: the first two types of material cognitive shortcoming – accepting incorrect data or failing to accept correct data – are going to require analogous shortcomings with respect to the accompanying theoretical commitments.

The crux of the matter is accordingly: can it be guaranteed a priori that if a dispute originates, in a fashion we have illustrated, purely on the basis of competing background theory, and no other cognitive shortcoming or material vagueness is operative, there nevertheless will *be* cognitive shortcoming in the background theoretical commitments of the protagonists? Such a shortcoming can only consist, obviously, in one party or the other accepting a mistaken theory, or being in ignorance of a sound theory accepted by their opponent. But recall now that our reflections on the matter are, as it were, lumbered with evidential constraint: such a theory's being mistaken or sound has to be *recognizable*, at least in principle. And that can only mean that the correctness or incorrectness of such a theory has to be certifiable, if only defeasibly, by proper application of scientific method.

Such a certification, however, could only consist, ultimately, in the assembly of *independently credible* data which confer or tell against the theory in question. The predicament is therefore that, on the governing

assumption of theory-ladenness, the independent credibility of such data is always hostage to that of any theory which is apt to condition their acceptability. So the possibility can't be excluded, it seems, of an intractable dispute on the matter, in the fashion of A and B. As long as the notion of truth appropriate to scientific theories is held to be essentially epistemically constrained, there can be no guarantee that, in the original dispute, either A or B must be guilty of cognitive shortcoming.

The reader may be bursting with the following objection. Consider any point in the regress where one theorist, by virtue of accepting some theory H_N, discounts observations, O_{N-1}, accepted by the other. Now reflect that, plausibly, the relationship between experience and reports of observation will be, as we might say, *positive presumptive*. That is, it is not as if it is *only* in the context of appropriate background empirical beliefs that experience has any tendency either to confirm or to disconfirm an observational report; rather, there are default relations of the confirmation between experience and observational statements – the experience which prompts the report 'That star is yellowish in hue' is a default-justifier of that claim, in so far as it concerns colour – the justification is defeasible in the context of suitable background beliefs, but otherwise it stands presumptively. That being so, cannot we drive home a charge of cognitive shortcoming as follows? Do the theorists have between them any presumptive, so far undefeated observational support for H_N? If so, then the theorist who accepts O_{N-1} must do so on the basis either of ignorance of this support for H_N, or on a prejudicial refusal to acknowledge its force. But if not – if there is no presumptive, so far undefeated observational support for H_N – then the first theorist's acceptance of H_N is unjustified, and his opponent is quite right presumptively to accept O_{N-1}. Either way, we have found what we wanted.

The trouble with this objection is that it overlooks the evident possibility that the regress of theories and observations may dovetail back, as it were – that the first theorist's observational support for H_N may be provided by observation statements, $O_1 \ldots O_J$, which have already featured at earlier stages in his personal system. In that case, his acceptance of H_N is not without observational support; but the observations by which he supports it will be discounted by his opponent, by virtue of his differing theoretical commitments. Once the possibility of dovetailing is recognized, we can no longer affirm that, if nothing else has gone wrong, the theorists between them must at least be guilty either of deployment of unsupported theories or a failure to acknowledge the undefeated presumptive support afforded certain observational reports by available experience.

So there is the problem. If truth is evidentially constrained, and all observation is theory-laden, scientific–theoretical disagreements cannot be guaranteed to involve cognitive shortcoming. None of this, of course, need provoke anything but glee in scientific realists who are also Dummettian realists. They will consider themselves entitled to a conception of the truth-

conferrers for scientific theoretical statements such that the most that the foregoing discloses are certain ways in which it might in principle be impossible to *decide* whose was the shortcoming in a scientific theoretical dispute. But there would be a fact of the matter: so much is ensured by the idea, to which these realists consider themselves entitled, that scientific theories can be determinately true or false in ways that transcend all available evidence. (And if, in a particular case, there is no fact of the matter, then that will be spoken to by the explicit proviso of vagueness built into the cognitive command constraint.)

To be sure, the possibility presented is highly abstract, even abstruse. It is unclear how even the beginnings of a concrete example might be constructed. But it would be completely misconceived to complain about that. For recall that the cognitive command constraint, as formulated, demands satisfaction a priori; so a discourse should be presumed to fail if no a priori reason is evident that the constraint is satisfied – and the abstract possibility described constitutes a presumptive case that there is no such reason.

The argument has been, in briefest summary, as follows. A defence of scientific realism must involve a defence of the claim that more-than-minimal notions of truth and falsity are appropriate to scientific statements. More specifically, according to our proposal about representational content, it must involve a defence of the claim that something properly describable as a cognitive shortcoming can be guaranteed to be involved in any scientific-theoretical dispute where no material vagueness is in play. But the belief that the acceptability of anything worth regarding as an observation statement is invariably a function of background empirical theory is inconsistent with the possibility of such a defence so long as scientific realism is married to Dummettian anti-realism.

Save the Observation Statement?

The plot thickens when one reflects that the bearing of the argument outlined is not *merely* on scientific realism. The scientific anti-realism of Carnap, and of the instrumentalists, was rooted in a firmly realistic view of what could be observed or experienced. But the argument we have been considering leaves no such sanctuary. Obviously enough, if what it is correct to believe oneself to have observed is a function of one's background theoretical beliefs, then an irrealistic view of the latter will enjoin an irrealistic view of observation statements also. Disagreements about observation statements cannot be guaranteed to involve cognitive shortcoming if they may originate in disagreements about theoretical statements about which there is already no such guarantee. Whether or not observational data underdetermine theory, therefore, such data are themselves, it seems, underdetermined by experience, and matters seem to have got out of control. For almost any dispute, about any subject matter, *may*, in certain

circumstances, originate in a dispute about what is observed. It would follow that no such dispute can be guaranteed a priori to involve cognitive shortcoming if no material vagueness is involved – unless we are prepared to resort to Dummettian realism across the board. Provided, then, that the whole framework of our discussion has not been misguided, the proper conclusion would seem to be not that scientific realism faces certain distinctive difficulties if the theoreticity of observation is granted, but that the whole prospect of a moderate kind of realism – a realism which respects the case against Dummettian realism but urges the reality of the distinctions which many would wish, for example, to draw between perception and our responses to the comic – is exceedingly dim.

It would perhaps be slightly tendentious to describe the situation as a paradox. Its effect, it could be claimed, is merely to bring out how good Michael Dummett's original proposal was – to show, in other words, that the realist's intuitive idea of truth as constituted by fit, as conferred on our judgements by some kind of autonomous reality, does indeed turn out to imply precisely the idea of truth as epistemically unconstrained. The alternative is to acknowledge that truth is nowhere more substantial than the minimally normative notion which characterizes our judgements about the comic, the revolting and the tasty. But Dummett himself would not be happy with such a result,[14] and neither am I. I conclude by briefly considering what prospect there may be for averting it.

If I have made no mistake, the only hope lies in conservation of the pretheoretical observation statement. Can anything be done to rehabilitate the notion? It may well be that something can be done for the notion of an observational *concept*, or predicate. Christopher Peacocke makes an interesting proposal in Chapter 4 of his *Sense and Content*. Roughly: observational concepts are those whose possession both requires and is required by the capacity to have certain kinds of experience. For any such concept, there are certain possible experiences whose representational content cannot be characterized except by using it, and possession of such concepts depends upon the capacity to undergo experiences of just that kind.[15] I have elsewhere made a proposal in a similar spirit.[16] My idea was that an interesting class of concepts were marked off by their satisfaction of the following conditions:

1. that they may typically be recognized to apply, or not to apply, to demonstratively presented items by unaided observation;
2. that such a recognitional skill is necessary for the possession of such a concept;
3. that such a recognitional skill suffices for possession of such a concept.

A large class of concepts, involving different kinds or degrees of theoreticity – for example, 'geiger counter' and 'tomato' – satisfy (1). But most theoretical concepts which have the feature that they can, by people with a special competence, be recognized to apply to demonstratively presented items may

nevertheless be fully understood by someone who lacks that competence. 'Geiger counter' comes into this category, plausibly. Such concepts fail condition (2). And others – like 'tomato' – a full understanding of which does, plausibly, involve an appropriate recognitional skill, so that they pass condition (2), are not *eo ipso* grasped by anyone who has such a skill; there is more to being a tomato than looking, feeling and tasting like one, and no-one, however good a tomato-recognizer, fully understands 'tomato' until they know that. Such concepts fail (3).

Do these basic concepts provide the means to characterize an interesting class of observation statements? There are various difficulties with this proposal. One, fairly immediate, arises as soon as we enquire how the notion of a recognitional ability is being understood. Plainly, not any kind of behaviour which is differentially sensitive to the presence of an observable feature counts as *recognizing* that feature. To qualify as an expression of recognition, the behaviour has to qualify as an expression of *belief*; specifically, the belief that the relevant feature is present. But now condition (3) seems to lose its teeth: exercising the recognitional capacity is bound to entail possession of the appropriate concept, since it entails the formation of a belief in whose content that concept figures.

Plainly, we need a more refined account of what a recognitional capacity is: one which respects the essential connection with belief formation, but leaves us with space to say that it is possible to have the recognitional capacity appropriate to tomato-recognition without having a *full* grasp of the concept of a tomato. But even before we attempt such an account, we can see that providing one is going to generate an obverse difficulty. Once recognitional capacities no longer *trivially* suffice for possession of the relevant concepts, it is unclear whether they can ever be sufficient, even in the case of concepts – I mainly had in mind Lockean secondary quality concepts, Peacocke usually uses 'square' – which we want to pass the test. For somebody could presumably possess the appropriate recognitional skills for 'red', say, and yet have no conception of red as an enduring quality of the object, a quality which, as stressed earlier, objects can possess when unperceived or situated in darkness. Thus if a recognitional capacity is not trivially sufficient for possession of the concept, it is open to serious question whether it is ever sufficient at all.

The obvious refinement would be that, in the case of observational concepts, there are certain very basic, a priori characteristic principles, such that grasp of these *and* possession of the relevant recognitional capacity suffices for understanding, but no such sufficiency condition holds for non-observational concepts. Of course, there are principles which are a priori characteristic of 'tomato' and of 'geiger counter'. For instance, it is a priori, I suppose, that 'tomato' is a natural kind concept; and it is a priori that geiger counter is an instrument which is sensitive to intensity of particle emission by substances undergoing radioactive decay. So it is not implausible that in at

least a very large number of cases where a recognitional competence, based on unaided observation, would not be miraculous, it would be possible so to construct a list of constitutive principles that possession of the recognitional competence, if conjoined with grasp of those principles, would suffice for understanding (though in the case of examples like 'geiger counter' it would not, as noted, be necessary). The proposal would be, however, that, in the case of observational concepts, the list would be austere and minimal; there would be no need for any principles to feature save those which, like 'Being red is a characteristic of objects which they may retain while unperceived', are characteristic of any quality which an object may be recognized, by observation, to possess.

I shall not, however, pursue this proposal any further here, nor venture a comparison with Peacocke's proposal, which makes no explicit play with the notion of a recognitional capacity. My purpose is only to illustrate a certain attractive kind of proposal – and then to point out that any proposal of this sort is at once too weak and too strong for the purposes of subverting the main argument of this paper. *Too strong*, because, as noted earlier, there is absolutely no reason why anything worth regarding as an observation statement should be formulated exclusively in some restricted basic vocabulary. The crucial feature is that the conditions of warranted assent to such a statement be independent of background theoretical commitments; if there can be such statements at all, there is no evident reason why they may not be formulated using vocabulary borrowed from theories but now divorced from commitment to the beliefs they involve. *Too weak*, more important, because recognitional capacities, like any capacities, are going to be *fallible*; background circumstances may frustrate the exercise of any ability whatever, and our conception, with respect to any particular capacity, of the kind of circumstances which are favourable to this exercise is, generally speaking, going to be a flexible and empirical one. So there is inevitably going to be a lacuna, it seems, which empirical theory may come to fill; our idea of what kind of circumstances may frustrate the exercise of an ability will be subject, every time, to (sometimes considerable) theoretical refinement.

That, of course, is exactly what happened, as illustrated earlier, in the case of 'red'. 'Red' ought to be an observational concept if anything whatever can be made of the notion. And it is plausible to hold that possession of the ability to recognize red things, coupled with grasp of an appropriate yet minimal set of constitutive principles, is indeed both necessary and sufficient for understanding 'red'. So the observationality of 'red', in the sense which an account along the above lines might deliver, is quite consistent with just the kind of theoretical contamination of the judgement, 'That is red', which we are trying to avoid.

The problem, *nota bene*, is not restricted to my particular proposal, but is essential. Observation statements *have* to be such that their truth-values may, under appropriate circumstances, be determined by observation. If

there are no statements fitting that description, then the traditional category is simply a confusion through and through. But if there are such statements, the difficulty must remain that any ability to determine truth-value by observation has to be a fallible ability. And there is consequent ineliminable space for theoretical conditioning of our understanding of the kinds of circumstance in which its fallibility will out.

There are two natural defensive thoughts at this point. First, consider again the rapidly receding yellow-seeming star. The example illustrates that a considerable theoretical corpus can intrude into the gap between looking F and being F, even when F is a concept as intimately related to observation as determinate colour concepts intuitively are. But what of the yellowish appearance itself? The star's *looking yellow* is a public state of affairs, accessible to any appropriately placed observer. Might we not preempt any kind of theoretical conditioning on the transition between appearance and reality by restricting our most basic reports of observation to those which, using concepts like 'looks yellow', are expressly designed to record public *appearances*?[17]

The second defensive thought is that the example of the star is, after all, somewhat extraordinary. It involves an extraordinary object travelling at extraordinary speed extraordinarily far away. It accordingly does nothing to suggest how ordinary judgements of colour, concerning nearby, middle-sized, surveyable, more or less stationary objects, in normal daily conditions, are similarly theoretically conditioned. We have been presupposing that observationality and theoreticity should be properties of *types* of judgement – characteristics which they have or fail to have simply in virtue of the concepts which they involve. The possibility has therefore been overlooked that they are, rather, properties of *uses* of judgements; that tokens of one and the same semantic type, for instance 'That is yellow', may sometimes be theoretically conditioned and sometimes not. *Occasional* theoretical conditioning is, indeed, evident in quite ordinary contexts – we don't need anything as recherché as the star. Consider, for instance, the judgement 'That is yellow', made of an item in a sepia photograph by an experienced photographer. But while it is an empirical matter how yellow objects tend to look to an observer from whom they are receding at galactic speeds, or how yellow things look in a sepia photograph, that is not a reason to view it as an empirical matter how (relatively) stationary yellow objects tend to look to a normal observer under normal conditions.

The defensive proposals are thus, first, that when empirical theory conditions our conception of the justifiability of an inference from appearance to reality, we may nevertheless objectively but pre-theoretically describe the *appearance*; and, second, that such theoretical conditioning may in any case be restricted to a *proper sub-class* of the contexts within which tokens of some particular observation report, identified as a type, are liable to be made. If both these proposals can be made good, then a large

class of observational claims about how matters really stand (contrast: appear) are in fact not theoretically conditioned in the fashion illustrated by the star example; and even in cases which are, it is possible, by retreating to the level of public appearance to formulate an objective judgement in determining whose conditions of proper assent empirical theory has no part.

But there is an apparently fatal objection to both proposals. Empirical theory conditions not just the transition between public appearance and reality, but also the transition between subjective appearance and public appearance. Something can look yellow *to me* of which it would be incorrect to say that it looks yellow *tout court*, because of some abnormality in my cognitive function in the circumstances. And the notion of normal cognitive function is, plausibly, wide open to theoretical conditioning. Such functioning can be disturbed by hypnosis, hallucinogenic substances, and illness; and the claim that a subject is suffering from one of these influences, or from another of a similar sort, is something for which we can readily conceive of empirical–theoretical support, of various degrees of sophistication. So we cannot, it would seem, by retreating to statements concerning public appearances, succeed in discharging theoreticity. Statements about how things publicly appear still have the feature that the conditions of proper assent to them are a function of background empirical–theoretical belief. If I have reason to believe that a certain substance which we have both swallowed is hallucinogenic, and you do not, then I may perfectly properly refuse assent to your perfectly justified claim, that you can see a star which looks yellow. Similarly, those contexts – if there are indeed some – in which we are not in the market for theoretical disruption of the transition from public appearance to reality – contexts where the idea of experience, or empirical theory teaching us that the public appearances are misleading is excluded a priori – need carry no guarantee against cognitive disfunctioning. Even if there are circumstances in which an object's public appearance is an a priori reliable indicator of its real colour, for instance, there may be none in which we are a priori reliable cognizers of an object's public appearance.

Could we perhaps take the first proposal a stage further back – seek to find the subject matter of theoretically unconditioned observation statements not in the domain of public appearance but in that of *subjective* appearance? The paradigm of an observation report would then be: not a report of how things appear but of how they appear to a single individual. No advantage is gained if such reports have to be open to public scrutiny. For my reasons for thinking that a particular star looks yellow to you have *either* to be based upon an opinion about the public appearance of the star – and so potentially conditioned by just the same kinds of theoretical consideration – *or* based on what I take to be your sincere, comprehending and lucid avowal that that is how the star strikes you. But my belief that you are, in the circumstances, sincere, comprehending and lucid, is open to all sorts of defeating empirical–theoretical considerations, and hence, directly or indirectly, one whose

conditions of proper assent will, once again, be a function of background empirical–theoretical beliefs. I, for example, may perfectly properly take you to be sincere although a consultant psychiatrist recognizes in you symptoms of a severe personality disorder which, in the circumstances, enjoin circumspection about what you say.

There is the alternative, it is true, of viewing such reports as subject to appraisal *only* by the relevant subject of experience. That would be to regard the language of observation utilized by each theorist as private, and thereby to take the issue I have raised into very familiar though highly contested territory. Here I merely record the opinion that there is no prospect of salvaging any worthwhile objectivity by that strategy.[18]

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Notes

This paper is also published in David Bell and W. Vossenkuhl (eds), *Wissenschaft und Subjektivität* (Berlin: Akademie Verlag, 1992).

1 The classic discussion of this example is E. Zahar, 'Why did Einstein's programme supersede Lorentz's?', *British Journal for the Philosophy of Science*, vol. 24 (1973), pp. 95–123 and 233–62.

2 Of course, the idea of cognitive adventure is out of place unless the realist can defend the belief not necessarily that scientific theoretical truth is epistemically constrained but that it is at least very often certifiable by sound scientific method. Cf. my 'Scientific Realism, Observation and the Verification Principle', in Graham Macdonald and Crispin Wright (eds), *Fact, Science and Morality* (Oxford: Blackwell, 1986), pp. 247–74.

3 Viz. the unconformability of the 'problematic' discourse to the canon of factual significance incorporated in the Verification Principle.

4 P. T. Geach, 'Ascriptivism', *Philosophical Review* 69 (1960), pp. 221–5.

5 An interesting recent example is provided by Simon Blackburn's moral 'Quasi-realism' as canvassed in Chapter 6 of his *Spreading the Word* (Oxford: Oxford University Press, 1984). See also his 'Morals and Modals', in Macdonald and Wright, op. cit. note 2, and 'Attitudes and Contents', *Ethics* 1988, pp. 501–17.

6 For details of this complaint in connection with Blackburn's work, see my 1987 Gareth Evans Memorial Lecture, 'Realism, Anti-realism, Irrealism, Quasi-realism' in *Midwest Studies in Philosophy* vol. XII, eds. French, Uehling and Wettstein (University of Minnesota Press, 1988), pp. 25–49; and Bob Hale's 'The Compleat Projectivist', in *The Philosophical Quarterly* 36 (1986), pp. 65–84. Also Hale's 'Can there be a Logic of Attitudes?', forthcoming in John Haldane and Crispin Wright (eds), *Reality: Representation and Projection* (Oxford: Oxford University Press, 1993).

7 See, for instance, her 'The Cognitive Claims of Metaphor', in *Metaphor and Religion, Theolinguistics 2*, ed. J. P. van Noppen (Brussels, 1984). Also, with M. A. Arbib, *The Construction of Reality* (Cambridge: Cambridge University Press, 1987).

8 Davidson, 'What Metaphors Mean', in his *Inquiries into Truth and Interpretation* (Oxford: Oxford University Press, 1984), pp. 245–64.

9 Bas van Fraassen, *The Scientific Image* (Oxford: Oxford University Press, 1980).

10 It is another question, however, whether truth is ever *definable* as proper assertability. We are committed to no particular answer by the claim that minimal notions of truth and falsity come to characterize assertions for which notions of propriety, ignorance and error are in play. These matters are discussed much more fully in my Waynflete Lectures delivered at Oxford in the spring of 1991 and published as *Truth and Objectivity* (Cambridge, MA: Harvard University Press, 1992).

11 See Chapter 4 on 'Observational Concepts' of his *Sense and Content* (Oxford: Oxford University Press, 1983).

12 He writes 'All our language is thoroughly theory-infected. If we could cleanse our language of theory-laden terms . . . we would end up with nothing useful. The way we talk, and scientists talk, is guided by the pictures provided by previously accepted theories'. But 'that we let our language be guided by a given picture, at some point, does not show how much we believe about that picture. When we speak of the sun coming up in the morning and setting at night, we are guided by a picture now explicitly disavowed' (*The Scientific Image*, op. cit. note 9, p. 14).

13 Pictorially:

A: $H_0 \leftarrow O_0$; $\not{H}$; $\not{O}_1 \leftarrow H_2 \leftarrow O_2$; $\not{H}_3$; $\not{O}_3 \leftarrow H_4$ . . .

B: $\not{H}_0$; $\not{O}_0 \leftarrow H_1 \leftarrow O_1$; $\not{H}_2$; $\not{O}_2 \leftarrow H_3 \leftarrow O_3$ . . .

where $\leftarrow$ indicates direction of justification, and H_n, $\not{H}_n$, O_n, $\not{O}_n$ indicate that H_n, O_n respectively are or are not endorsed by A, B.

14 Witness the remarks, in his review of Wittgenstein's *Remarks on the Foundations of Mathematics*, on the objectivity of proof. See Michael Dummett, *Truth and Other Enigmas* (London: Duckworth, 1978), pp. 166–85 *passim*, and especially p. 184.

15 See Peacocke, op. cit. note 11 p. 91 and following.

16 See my 'Rule-following, Meaning and Constructivism', in C. Travis (ed.), *Meaning and Interpretation* (Oxford: Blackwell, 1986), pp. 271–97, especially pp. 276–80.

17 It is true that if 'looks yellow' is properly viewed as a semantic compound of 'yellow', and the latter is regarded as a theoretically 'penetrated' term, then 'looks yellow' should be so regarded too. But, as stressed, the presence in a judgement of theoretically penetrated vocabulary need not entail the theoreticity of the judgement in the sense with which we are exercised – the conditioning by theoretical considerations of the circumstances under which it may reasonably be assented to or dissented from.

In any case, it is open to question whether 'looks F' is the straightforward semantic compound which it seems. At least: an object's looking yellow needs to be distinguished from its looking *as if it is* yellow, i.e. its looking as a yellow object would. Judgements involving concepts of the latter sort express beliefs about the characteristics of really (as opposed to apparently) F objects, and will therefore be defeasible in the light of the same kinds of consideration that can intrude into the gap between looking F and being F. But that is not an obvious reason to say the same about the former.

18 My own reasons for cynicism about 'private language' are offered in 'Does *Philosophical Investigations* I, 258–60 Suggest a Cogent Argument against Private Language?' in P. Pettit and J. McDowell (eds), *Subject, Thought and Context* (Oxford: Oxford University Press, 1986), pp. 209–66.