

How We Make Our Ideas Clear:
Empiricist Epistemology for Empirical Concepts
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I am going to give a beginning sketch for an empiricist epistemology of empirical concepts that is prior to the epistemology of empirical judgment. But first I want to convince you that we need such an epistemology.

I will start with the claim that it is most natural to naturalism to affirm a very robust theory of reference and truth for thought. Certainly, neither verificationist truth, nor any sort of transcendental idealism should satisfy the naturalist. Next I'll offer a rather abrupt argument that a strong theory of reference and truth, when coupled with naturalism, implies either meaning externalism or its epistemological equivalent. But meaning externalism has recently been under heavy attack on the grounds that it implies that thinkers themselves are in no position to know either what they think or whether they genuinely think at all, and indeed, the best-known externalist theories do seem to have this consequence. What is needed to counter this entirely reasonable complaint against meaning externalism, I will argue is, first, an adequate account of what constitutes knowing what one is thinking of and, second, an adequate non-holist empiricist epistemology for empirical concepts. This must be an epistemology different from and prior to traditional empiricist epistemologies, which are all epistemologies either of judgment or of theories taken as wholes. The main part of the essay is devoted to the latter task.

As a naturalist, I must understand my own self and mind as well as those of others to be part of nature. Thought, including my own thought, must be discovered in nature, rather than helping to establish nature. What constitutes nature, in the sense of being part of or composing it, cannot at the same time constitute nature, in the sense of grounding or establishing it. Similarly, I must know my own mind, and its relation to the world in knowing, in accordance with the same general epistemic principles as those by which I know of other items and relations in the natural world. This does not mean that my access to knowledge of myself must be through the same channels as my knowledge of others or of the nonhuman world. It does not prohibit my having a different and special way of gathering information about myself. But the knowledge that I have of myself must be true belief and must be epistemically grounded under the same definition or description of true belief and epistemic grounding as for knowledge of the rest of nature. I cannot suppose, for example, that my knowledge of certain modes or aspects of myself, such as knowledge that I am conscious, consists simply in being in these modes or having these aspects, for I cannot suppose that my knowledge of other parts of nature consists in this.

The requirement that I should know myself under the same description of knowing as for knowledge of other kinds of things is more stringent than one might at first suppose. Compare Kant, for example. He makes great strides towards naturalism by describing knowledge of the empirical self in much the same way he describes knowledge of the rest of the empirical world. But this empirical self turns out not to be the same as the knower who wields the categories, furnishes pure intuitions and has a constructive imagination. No way, for example, could Kant come to terms with Darwin, who places the genesis of cognition itself in nature. Or, compare Putnam's "internal realism." Here, even if our final and best "theory of the world" were to understand thinkers in the natural world to be representing that world with corresponding mental structures, still the truth of this best theory would be only verificationist truth, not the sort of truth depicted by the theory. Compare Wittgenstein of Philosophical Investigations. He describes language in the world as a set of tools used by language communities for the regulation of life and culture. But he also puts language to work constructing the very world it inhabits, indeed, founding objective sameness and difference in that world. Knowledge of this founding language cannot be the same as knowledge of languages that are found in the world. Compare Quinean truth, which equals,

merely, whatever stage we happen to have reached on Neurath's ship in the process of historical construction and revision of theory. Theory construction, according to Quine, is driven by physical energies, afferent nerve hits and operant conditioning, that is, it takes place in the world described by 1950's science. But rather than trying to show how the combination of these frugal resources can indeed effect discovery by the thinker of the 1950s world in which it is occurring, Quine argues that it need not do any such thing. Nothing beyond accident of tradition and accident of current nerve encounters guides theory toward one temporary homeostatic equilibrium rather than any of innumerable others. Kant's transcendental ego, Putnam's transcendental theories, Wittgenstein's transcendental language, and Quine's thinker unable to locate himself in the place Quine found him in are none of them attractive to the naturalist.

Perhaps it does not follow directly that naturalism requires robust correspondence truth for thoughts on empirical matters. Dennett and the Churchlands, for example, and some Gibsonians and other perception-action theorists, doubt that thought involves reference, in any ordinary sense, at all. They doubt, at least, that there are distinct mental representings constituting the sorts of propositional attitudes we naively suppose ourselves to have. Should these views prevail, however, our knowledge of our own meanings would seem to be more in jeopardy than under the threat of ordinary externalism. Without further apology, then, I adopt a realist attitude toward the attitudes.

As remarked above, the mind and its contents are among the natural objects, and knowing about other natural objects is not constituted by the presence of these objects directly within or before the conscious mind. It follows that knowing about something that is within or before the conscious mind also cannot consist simply in the fact of this withinness or beforeness. Should the mind have things directly within or before it, this having, taken simply as such, would not constitute the occurrence of any propositional attitude toward those things.¹ This leaves no motive for supposing, for example, that empirical knowledge has its foundation in thoughts of sense data. Moreover, there is good empirical evidence gleaned from child development studies that our original knowledge concerns objects and properties in the outer world, and that conceptual grasp of mental events is quite long delayed.

What follows might be termed "reference externalism" concerning the original objects of reference.² The original or most immediate objects of reference are not before the mind but in the natural world. Reference externalism implies, first, that there is no a priori guarantee against reference failure for original reference. The mind-internal portion of the act that executes a reference to an external object is not logically dependent on the existence of that object but could exist apart from it, so presumably it cannot be known a priori that this act has a referent. Nor does the point depend on assuming a causal or historical account of the relation of thought to referent. It follows just as surely if the aboutness of thoughts is some sort of internal relation such as likeness or picturing or, of course, if it is achieved using a Fregean description. Second, reference externalism implies that there is no a priori guarantee against reference duplication for original reference, no guarantee against unknowingly

1. The point is Sellarsian, of course, though my defense is only partly the same as Sellars's (Sellars 1956).

2. I am ignoring the possibility of a quasi-Russellian position that we do not actually think of these external objects at all, but judge them to exist employing prior thoughts of their properties. I argue against internalism for thoughts of external properties below.

referring over again to exactly the same thing in two separate thoughts. Third, given some views of reference at least, it follows that there is no a priori guarantee against equivocation in reference, against thinking of two things as if one, merging them in thought, perhaps treating thoughts of them as a univocal middle term during inference.

These fallibilist results neither surprise or disturb us. Reference externalism, as distinct from externalism concerning meaning or intension or sense, has often been taken for granted since the demise of phenomenalism. For the meaning internalist, however, this sanguine attitude toward reference externalism must rest on the assumption that reference to external objects is never direct. It is always mediated either by prior thoughts of properties and relations, that is, by descriptions, or else by "narrow meanings" and/or indexical modes of presentation, these being kinds of meaning not affected by failure of reference. Consider first mediation by prior thoughts of properties and/or relations.

Just as with external objects, we cannot take properties of external objects to be in or directly before the mind. That would not be a "natural" place for the properties of external objects to be! So the same concern as for thoughts of external objects argues that it should not be known a priori whether there really is any external property being thought about or attributed when a judgment (or apparent judgment) about properties of objects in the external world is made. The mind-internal portion of the act that is the thought of an external property is not logically dependent on the reality of that property, so this act cannot be known a priori really to attribute a property at all, rather than to be an empty thought. For example, much recent discussion has concerned whether or not our thoughts of colors are of objective properties, and we no longer believe that either "dephlogistonated" or "bilious" (applied in its original sense to a person's temperament) correspond to real properties.

We are left then with narrow meanings and/or indexical modes of presentation in thought.³ Meaning internalists who take thoughts of external objects and natural kinds not to be descriptive take them to be either simply indexical, or to have "narrow meanings," that is, their meanings correspond to functions from the external context of the thinker to referents, these functions being determined, for example, by the thoughts' causal or conceptual roles.

One might still doubt that it was possible to know a priori when one was entertaining a narrow mode of presentation, hence when one was meaning anything at all. That there are possible contexts into which an item might be put that would lend it a referent hardly shows either that it now has a referent, or that it now has a referential semantics, indeed, that it now has any meaning at all. For any vocable there are possible contexts in which it would have a referent, for example, the context of a surrounding language community that used it as a proper name. It does not follow that every vocable is semantically indexical nor has any meaning at all. Context can turn an indexical word into a word that refers, or leave it empty, and context can turn a sound into a meaningful word, or leave it empty. Similarly, context -- for example, having the right history -- might also turn a barren mental state or event into a semantic one, or it might be unable to do so, depending on your theory of thought content. Moreover, a naturalist will suppose it an empirical matter which theory of thought content is true. Such a theory must explain, for example, how energy impinging on the perceptual-cognitive systems can result in thought that guides appropriate physical actions. Exhaustively a priori knowledge of the meaningfulness of one's thoughts thus seems out of the question.

Indeed, on naturalist premises, no theory of mind could ever assuage the insistently bleak Cartesian skeptic about either meaning or truth. But, in Kantian spirit, we do want a theory of mind that shows how evidence is possible for the adequacy of our concepts. The theory that besides "wide meanings," meanings that are vulnerable to emptiness, duplication and equivocation, there are also "narrow meanings," those aspects of wide meanings that reside in the head, introduces soothing terminology but has no bearing on the basic problem.

3 That there are, in fact, no mental indexicals is argued in (Millikan forthcoming b).

For the narrow meaning theorist, it is as though in place of thinking, say, grass is green, I think, this is thus, but still possess no way of knowing whether the mental fingers accompanying these demonstratives are pointing to a stuff and a property or merely to empty space. Whether any of our thoughts are about real objects or properties remains a matter between the mind and the world. It is the initial introduction of wide-meaning externalism that causes the problem, and this is not changed by claiming that something else besides wide meaning might be labeled "meaning" too. Naturalism implies either meaning externalism or its epistemological equivalent: we do not have a priori access to the contentfulness, in any substantial or nontrivial sense, of our own thoughts.

The complaint is that meaning externalism deprives us of incorrigible access to the contents of our own thoughts and that this result is untenable. This claim is right, I believe, in one important respect. It is wrong in others.

(1) Externalism does indeed imply that we cannot tell by a priori means alone (a) when our thoughts are empty of content, (b) when we are thinking double, that is, when psychologically separate thoughts of ours bear exactly the same contents, (c) when we are equivocating in thought, representing two different contents with only one thought. The externalist owes us an account of how these various things can be discerned empirically -- an empiricist epistemology for empirical concepts. That is what the remainder of this paper will mostly concern.

(2) Externalism also implies that we cannot "know what we are thinking about" on a strict Russellian reading:

...for it is scarcely conceivable that we can make a judgment or entertain a supposition without knowing what it is we are judging or supposing about....the meaning we attach to our words must be something with which we are acquainted...[but] Julius Caesar is not himself before our minds.... (Russell, The problems of Philosophy, p. 58.)

On the other hand, I hope it is fair to say that few today will accept Russell's picture of what it is to know what one is thinking about. If one is thinking about an external object, knowing what one is thinking of cannot be having the object of thought within or before the conscious mind nor, a fortiori, can it be simultaneously holding one's thought, or a thought of one's thought, before one's conscious mind on the one hand and comparing it with its object, also held before the mind, on the other. What on earth then could knowing what one was thinking about possibly be? Not only the externalist, but the contemporary internalist as well, owes us another interpretation of what it is to have command of what one is thinking about. I will not give arguments for a position on this issue here, having done so at some length elsewhere (Millikan 1994, 1997), but I will briefly sketch my position. This will help to clarify the status of the epistemology of concepts to be offered below.

(3) Externalism introduces no new difficulties, however, that the internalist does not also have concerning the transition from having a thought to correctly representing to oneself that one has that thought. Barring the Cartesian position that mind is epistemically transparent to itself—that the knowing of things mental just equals the being of these things—externalist and internalist have exactly the same problem of explaining how one acquires concepts of the mental and successfully applies them to oneself.⁴ If what thought is about is determined

4. I am grateful to Keya Maitra for focusing my attention on this point. More generally, it is dismaying how many contemporary discussions of the nature of consciousness, qualia, intentional attitudes, and so forth ignore the question how one gets from the supposed presence of this or that within the mind or consciousness to propositional knowledge of that

within thought itself, that does not help us with how thought reflects on itself, how it comes to know itself as object (see also Gibbons 1996). Of course the externalist cannot tell a priori that a second order thought, a thought about the content of a first order thought, has content if she cannot tell whether the first order thought has content, but that is the original problem over again, not something new.

The only problem the externalist alone is obliged to address then is (1): how do we know when our thoughts are empty, double, or equivocal.⁵ But first I propose to say just a word about (2) as well: what constitutes knowing what one is thinking about.

What it is to know what one is thinking about is to be able to recognize when one is

presence. Russell himself was a prime offender, of course.

5 Bill Lycan has asked me about one sort of "switching" problem agonized over in contemporary literature. Suppose that I have been living on earth but wake up on Twinearth one day. After a time, many suppose, what used to be my thoughts of water will metamorphose and become thoughts of twater. Then when I think that last year I thought that twater was wet I will be wrong, for in fact what I believed last year was that water was wet. This is taken to be a problem for the externalist about correctly representing to oneself what thoughts one has.

An unargued and rather peculiar assumption made by most philosophers who discuss this and many related issues is that if two objects are different then one must have different thoughts of them. But this is what a consistent externalist will deny. Equivocation in thought is a very common occurrence. Each semester when I acquire a new class of freshmen I go through it again, making embarrassing mistakes because I have got Johnny and William or Susan and Jane mixed together in my mind. If they abduct me to Twinearth I will soon have an equivocal thought of water/twater and I will be wrong when I believe I used to think that water/twater is wet. My thought did not used to be equivocal. The same thing may happen right here on earth if I know Dr.Peters for some time before meeting, unbeknownst to me, his identical twin, Dr. Peters. If the internalist denies that this sort of mistake is possible, as Bill Lycan himself would put it, "He's a liar."

thinking of it again. I cannot compare my thought directly with its object, but I can compare one thought with another. The kind of "recognizing" involved in recognizing one is thinking of the same again is not, however, making a judgment about one's thought. Knowing what one is thinking about does not require thinking about or even possessing a concept of thought. Rather, we recognize sameness of content in our thought in the process of making amplificatory mediate inferences, for these always involve middle terms. For example, moving from Bill is older than Sam and Sam is older than Tom to Bill is older than Tom requires recognizing sameness of content of two thoughts of Sam and of two thoughts of older than. Likewise, moving from If p then q and p to q involves recognizing sameness of content for p. Moving from perception of Bill plus the wish to congratulate Bill to movement toward Bill also involves recognizing sameness of content. I have argued that since there is no reason to suppose that any particular kind of duplication of form in thought automatically indicates duplication of content, this kind of recognition is by no means automatic, as the ubiquitous analogizing of thought to language easily misleads us to suppose. Rather, there is a serious question in every case how we come to recognize when thoughts and/or perceptions are of the same. This question is the same as the second part of question (1) posed above for the externalist. So it is time to get down to business. How do we make our ideas clear? How do we make them nonvacuous, nonredundant and unequivocal?

Traditional empiricism holds that our abilities to think of external objects and properties are acquired with the help of experience. From there it should be a short step to the view that ongoing experience is also used in testing and perfecting these abilities. The externalist challenge is to develop a theory of the nature of empirical concepts that explains how this testing and perfecting is possible, indeed, how it manages to be highly effective and efficient. Instead, the best known externalist theories of how thought gets its content make a complete mystery of this matter. To ground our meanings, they seem to suggest, we would need to make prior judgments about causal or historical relations of our thoughts to their objects. Or we would need to judge that the conceptual roles of our thoughts matched corresponding relations among their objects. Such demands are regressive, of course, requiring prior grounded concepts of the same objects—also prior grasp of a true theory of meaning and reference for thought.

Yet I think that a better externalist theory is surprisingly close at hand. With just a tug and a tweak, it falls right out of the central 20th century American tradition of philosophy of science and language, beginning with the familiar story about theoretical terms told at mid-century, for example, by Carnap, Hempel and Sellars.⁶ On this story, theoretical terms, such as "mass" "temperature" and "atom," acquire their meanings, first, from the place each holds in (what can be reconstructed as) a formal system containing postulates and rules that fix their intra-theoretical relations to other theoretical terms and, second, from their inference relations to observation sentences, or to sentences in a prior theory already anchored to observation. These latter rules correlating theoretical with observational sentences were termed "bridge principles." In opposition to Carnap and earlier verificationists, Hempel then claimed that it was not possible to separate either the intra-theoretic laws or the bridge principles of such a theory into two distinct kinds, meaning postulates or matters of definition on one side, empirical postulates or matters of experience on the other. For example, the meaning of the

6. In "Empiricism and the Philosophy of Mind" (Sellars 1956), Sellars lists among advocates of this view also Norman Campbell, Reichenbach and Braithwaite. A simple exposition of the theory is in Hempel (1966) Chapter 6.

geologist's term "hardness" is determined partly by the intra-theoretic law postulating harder than as transitive, but also by the bridge principle that if one mineral scratches another it is harder than the other. Together these two principles imply that the relation x scratches y is transitive, a fact that is clearly empirical, yet neither principle is more definitional of the geologist's concept hardness, nor more an empirical fact about hardness, than the other. "Theory formation and concept formation go on hand in hand; neither can be carried on successfully in isolation from the other. ...If...cognitive significance can be attributed to anything, then only to entire theoretical systems" (Hempel 1950, 1965, p. 113). A more familiar quote is from Quine, who takes concepts of ordinary observable objects to be like theoretical concepts: "Statements about the external world face the tribunal of sensory experience not individually but only as a corporate body" (Quine 1961, p. 49). In Quine, this thesis is again tied to the rejection of a clean distinction between changing your meanings and changing your empirical beliefs, between the analytic and the synthetic.

One result of this mid-century doctrine was a disastrous semantic holism. The meaning of each empirical concept was taken to be determined only through its position in a wide inference network containing numerous other concepts, indeed, perhaps all of one's concepts. But another result was the implicit emergence of the first genuinely empiricist epistemology of concepts. If empirical meanings cannot be disentangled from empirical theories, then if theories can be some more and some less adequate so can concepts, and the adequacy of an empirical concept will be tested through ongoing experience, not a priori. But because of the holism, this empiricist epistemology of concepts is not useful against current attacks on meaning externalism. It suggests that we would need to arrive at the end of Peircean inquiry before knowing whether any of our concepts are adequate, hence before knowing whether we are genuinely thinking about anything at all. We need, I suggest, to take the baby from the bath, keeping the thesis that meanings are tested empirically but discarding the holism. Another look at the classical theory of theories suggests how this can be done.

The paradigm bridge principle bridging from observation to theory was taken to correspond to an operation either determining a theoretical property or measuring its numerical value. As a theory matures, it was supposed, typically it accumulates more and more operational bridge principles of this sort. For example, one would expect geologists to accumulate more ways of determining hardness than by scratching, as there are numerous different ways to measure temperature, distance, volume, pressure and mass. Given the Hempelian position, none of these operations will be more central than others in determining the meaning of the theoretical concepts they collectively define. Take, then, any such set of operational bridge principles helping to define a single theoretical proposition and consider it in isolation from the rest of its encompassing theory. Consider, for example, all the known ways of determining that certain thing's temperature is 40 degrees centigrade. Surely the convergence of all these ways to the same result when applied to the same physical object attests to the reality of the property temperature 40 degrees centigrade quite independently of our knowing any intra-theoretical laws about temperature. The objectivity of concepts such as temperature or mass or length is strongly evidenced quite separately from theories employing these concepts. Or better, one's readiness to judge the same proposition true on multiple observational bases itself constitutes a sort of mini-theory, namely, the theory that if p then p, for exactly that one proposition. The mini-theory is confirmed when a variety of empirical methods consistently converge on this single result.

It will be objected perhaps that new operations determining interesting physical properties typically are known to determine them only through the application of theory. But surely, here it does help to distinguish the context of discovery from the context of justification. How a measuring method is discovered and how it is explained are neither of them relevant to confirming its accuracy. That the measure is good, that it correlates with other measures, is fully compatible with failure of the theory that predicts and attempts to explain this fact.

For non-theoretical concepts, the ability to make the same perceptual judgment from different perspectives, using different sensory modalities, under different mediating circumstances such as different lighting and acoustic conditions, offers similar evidence for the objectivity of the concepts employed in these judgments. Holism is easily avoided in the epistemology of concepts so long as there exist empirical propositions, each of which can be judged by a variety of independent methods not employing prior empirical concepts, making possible an independent test of the concepts contained in that particular proposition. It is not the job of empirical concepts to help predict experience. We do not predict our experience. We predict what we will read off our experience, namely, that since p then p. We do not predict the appearances of things. We could not possibly do so, for we cannot predict the ever-changing conditions under which we observe them. We predict only objective facts.⁷

It is important in this context not to entangle the epistemology of concepts with the epistemology of judgment. Consider, for example, the following passage from Wilfrid Sellars:

...if [having the concept of green] presupposes knowing in what circumstances to view an object to ascertain its color, then, since one can scarcely determine what the circumstances are without noticing that certain objects have certain perceptible characteristics—including colors—it would seem that one couldn't form the concept of [such things as] being green ...unless he already had them. It just won't do to reply that ...it is sufficient to respond when one is in point of fact in standard conditions to green objects with the vocable "This is green." Not only must the conditions be of the sort that is appropriate for determining the color of an object by looking, the subject must know that conditions of this sort are appropriate...one can have the concept of green only by having a whole battery of concepts of which it is one element." [Sellars 1956, p. 275.]

Sellars's basic concern here is not that one couldn't in point of fact learn to respond discriminatively to green objects with the vocable "This is green" in standard conditions without already having a battery of concepts. Rather, it is that one couldn't know that anything was green without this. His concern is to ensure that suitable observation judgments indeed express "knowledge" in the sense that they can be "placed in the logical space of reasons, of justifying and being able to justify what one says" (Sellars 1956, p. 299). But there is no cause to suppose that the process of fashioning and honing adequate concepts presupposes the ability to justify the judgments that use these concepts. Knowing about the conditions under which one's perceptual and cognitive systems will work properly is not required for learning how to use them properly any more than knowing about the atmospheric conditions required for breathing properly is required for breathing properly. The epistemology of concepts is prior to and not the same as the epistemology of judgments. Nor is it a criterion of adequacy for an epistemology of concepts or, more broadly, for a theory of mind, that it can lever a person out of skepticism. There is no compulsion to suppose that human minds are so built that we can't possibly fall into epistemological black holes that can't subsequently be reasoned out of. The question we need to answer about our concepts is how we do it, how we make them clear (compare: how we focus our eyes) not how we can know

7 On this particular point, Quine (1960) seems to have had it the right way around: "Our prediction is that the ensuing close range stimulations will be of the sort that vigorously elicit verdicts of stonehood. Prediction is in effect the conjectural anticipation of further sensory experience for a forgone conclusion (p. 19).

that we have succeeded in making them clear. Just as knowing what one is thinking of is not making a judgment about one's thought (p. 00 above), knowing when one's thoughts are clear is not making a judgment about one's thought, nor is it knowing how to justify one's thought. Sellars' final conclusion that "one can have the concept of green only by having a whole battery of concepts" does not follow from the premises he offers.

The mechanisms of perceptual constancy that enable us to perceive, for example, the same color, shape, voice, or moving object as being the same one through a great diversity of intervening media and various kinds of distortions and static—via very diverse proximal stimulations—these mechanisms exemplify our ability to make the same perceptual judgment in a variety of ways. So does our ability to use different senses to confirm the same judgment perceptually. Given a variety of ways to observe the same state of affairs, none of these methods is definitional of the concepts employed, just as on a Hempelian view, no bridge principles leading from observation into theory are more definitional of the theory's concepts than others. None of our ways of making the same judgment is distinguished as a or the infallible method of judging its content. Each is but a practical ability, more or less reliable, to identify the perceptually presented situation correctly. Each relies either on normal conditions obtaining for correct use of one's perceptual mechanisms, or on normal conditions for observing that these normal conditions obtain. Or better, being more careful, the most usual reliance is on normal conditions obtaining for the support of successful epistemic action—ways one knows how, physically, to maneuver oneself into conditions normal for making accurate perceptual judgments of a given kind.

Highly consistent convergence of independent methods to the same judgments serves as strong testimony to the objective univocal sources of these judgments. For example, I check my perception by moving in relation to the object, by employing others of my senses, by manipulating the object, to confirm a constant result. In so doing I not only verify my original result, but also confirm the more general abilities that constitute, in part, the subject and predicate concepts on which my judgment rests. I confirm them again when I find that another person has arrived at the same judgment as I, another way of making judgments being to believe what one is told.⁸ Emptiness in empirical concepts shows up characteristically in lack of variety in the perspectives from which they can be applied. Equivocation shows up in the emergence of contradictions systematically correlated with perspectives taken. Redundancy shows up just as Leibniz said, with the accumulation of coincident properties and the absence of contrary ones.

In *Word and Object*, Quine defines stimulus meaning as having two parts, "affirmative" and "negative," and he claims that "[t]he affirmative and negative stimulus meanings of a sentence (for a given speaker at a given time) are mutually exclusive" (Quine 1960, p. 33). This exclusivity results naturally from the fact that "stimulus meaning" is defined by reference to overt affirmations and denials of a sentence coupled with the assumption that a speaker won't affirm and deny the same sentence at the same time. Quine also remarks that "many stimulations may be expected to belong to neither" the affirmative or negative stimulus meaning. Notice that this "neither" category will, technically, cover cases of total confusion as well as more ordinary "can't tell" cases such as those Quine explicitly includes as "poor glimpses." The effect is that Quine overlooks the most interesting cases relevant to concept formation, namely those in which contradiction bypasses theory and appears directly at the level of observation. These are the cases having the most leverage for testing meanings, but they are invisible given Quine's tools of analysis.

How can contradiction bypass theory and appear directly at the level of observation?

8. That believing what one is told is much like perceptual judgment and does not normally rest on inference is argued in (Millikan 1998a, 1998b).

Easy cases are two thermometers, whether of the same or different construction, placed in the same medium but reading different temperatures, or an object that shows different weights when placed on different scales, or on the same scale, one minute from the next. So, you say, something must be wrong with at least one of the thermometers, or with the scale. Apparently they are not good measures of temperature and weight. But the only evidence we have that there are such objective properties as temperature and weight at all is that there exist ways of making thermometers match consistently and ways of making scales that weigh consistently. We can, of course, turn to our theories about the causal properties of temperature and weight to explain why thermometers and scales agree when they do and why they don't agree when they don't. We may also turn to theories when it is necessary to repair or calibrate our thermometers and scales. But having adjusted the thermometers and scales, whether by employing a theory, or by trial and error tinkering, or by sheer accident, no theories are implicated in the use of these instruments to confirm the objective adequacy of our concepts of temperature and weight. Similarly, making a prediction that a certain proposition will come true as a result of performing an experiment and later judging perceptually that it has indeed come true is a way of testing not only the theory but the objectivity of the concepts involved in the judgment. And these two are independent tests. That the concepts have been reaffirmed as objective does not depend on the theory itself being true. The method of prediction used may work for a reason independent of the particular theory, as ancient astronomical predictions often proved accurate for good reasons but not for the reasons the astronomers thought at the time.

Most people purchase their thermometers and weight scales knowing nothing of the principles of their construction and operation. This does not make these people's concepts of temperature and weight less well epistemologically grounded than those of the scientist. It does not give them less reason to place trust in the objective meanings of these concepts. Similarly, all of us were natively endowed with perceptual systems whose principles of operation scientists are barely beginning to fathom. Trust in the objective reference of judgments made using these systems is warranted in so far as we agree each with ourselves in these judgments: if p then p. What feels cubical looks cubical, and continues to look cubical from different angles and distances. What sounds as if in front of me looks to be in front of me and can be attained by reaching in front of me—like measuring temperature with a mercury thermometer, a gas thermometer and a bimetal metallic strip. Nor are even the most basic perceptual self-agreements logically necessary. Muller-Lyer arrows measure the same length but look different lengths. After watching a waterfall closely and continuously for a minute or two, if the eyes are then fixed on a stationary object it will appear to be at once moving and stationary. There is a way of focusing one's eyes on a pair of spots, one red and one green, such that there appears to be only one spot that is both red and green all over. That the affirmative and negative stimulus meanings of any perceptual judgment are mutually exclusive is not a necessary truth but a matter of experience, and a continual reaffirmation of the objective meaningfulness of the empirical concepts used in making the judgment.

That concepts are tested and honed in ways that do not entangle them with theories does not imply, however, that they can be tested singly or one by one. Adequacy in concepts is tested by whether their employment makes stable judgment possible. But no judgment employs only one concept. To make the same judgment again, one must recognize its subject or subjects as being the same again and also the properties or relations it attributes as being the same. Both subject and predicate terms must be adequate if stable judgment is to result. Equally important, that a judgment is stable implies that it might have been unstable, that one might have fallen into contradiction instead. Adequacy in concepts can be tested only if one can recognize contradiction in judgment. And this requires the capacity to recognize the complements or contraries of predicates. Let me explain.

Consider Quine's observation that many stimulations may be expected to belong neither to the affirmative nor negative stimulus meaning of an occasion sentence. One

important reason is that the mere absence of affirmative stimulation does not constitute negative stimulation. Most obvious, I cannot make either an affirmative or a negative perceptual judgment if I fail to recognize its subject. If I don't see the rabbit at all, I can't judge it to be white or not to be white. Less obviously, failing to perceive that the predicate of a proposition applies to its perceived subject does not warrant judging it not to apply. I may feel the apple in the dark, know it is an apple, even know which apple it is, but I cannot judge its color by feeling. I may strike a match and look at the apple, but still not be able to see its color clearly or at all. Not observing that the apple is red does not equal observing that it is not red. To tell that it is not red I must be able to tell what other color it is instead, that it is some contrary of red or, more generally, that it is nonred, the complement of red. Having concepts of the contraries and complements of predicates is required if negation in judgment is to be possible, hence if contradiction in judgment is to be possible. To judge that it is not blue, you must be able to judge that what you are seeing is its being grey, not, say, its being in shadow. To judge that it is not round you must be able to judge that what you are seeing is its being elliptical, not, say, its being at an angle.

It follows that subject concepts can be tested and honed only along with at least some applicable predicate concepts and also complements of these. It also follows that Quine was at least close to right about the empirical status of at least one law of logic, the law of noncontradiction applied to empirical judgment. It is an empirical matter that we can carve out concepts of objects along with concepts of properties and their contraries such that the object concepts are suitable to be subject terms for empirical judgment, each consistently taking just one contrary from each of a series of predicate contrary spaces. Just as it is an empirical matter whether anything real has Euclidean structure, it is an empirical matter that there exist objects to judge about that have properties discernable as stable over a variety of perspectives.

In Sellars's famous myth of the necktie shop, Jim teaches shopkeeper John to use the language of "looks" and "seems" after the installation of electric lights has caused John to misjudge the color of one of his neckties:

"But it isn't green," says Jim, and takes John outside.

"Well," says John, "it was green in there, but now it is blue."

"No," says Jim, you know that neckties don't change their colors merely as a result of being taken from place to place."

"But perhaps electricity changes their color, and they change back in daylight?"

"That would be a queer kind of change, wouldn't it?" says Jim.

"I suppose so," says bewildered John.

(Sellars 1956, pp. 270-71)

Here Jim convinces John to recalibrate his ways of judging color contraries, of making negative color judgments, by appealing to stability of judgment across change in perspectives and conditions as an ideal. Still, his argument for misperception rather than change of color seems rather weak. What really is the evidence that the necktie does not itself change when placed under incandescent light, that the distal stimulus is constant despite the proximal variation? Isn't that a matter of stability in distal causal properties, hence a matter of law, hence of theory? But the evidence against distal change need not digress through theory. Unless other ways can be found of observing this supposed change, unless other perspectives can also reveal it, there is no evidence for its reality. Evidence for the objectivity of objects and properties can only be obtained by triangulation, triangulation in that there is variety in the nature of the evidence for them. I have argued that triangulation can be achieved through variety in perception alone, and it can also be achieved by the use of theory. Presumably neither route is possible in the case of the necktie's change of color.

The myth of the necktie shop raises another and broader question, however, concerning what kinds of properties can be expected to be stable over what kinds of

perspectives and for what categories of objects. Animals regularly change their shapes over short stretches of time whereas most other physical objects do not. The material gold, as discovered in different places, has any of innumerable shapes and sizes, but is stable with respect, for example, to density, color, malleability and resistance to corrosion. The frog species Rana pipiens, as observed in different places and different times, is quite stable with respect to adult size, with respect to the variety and placement of its inner organs, and pretty much all of its behavioral characteristics, but not, say, with respect to shape (postural attitude) or the contents of its stomach. Acquiring concepts of these various substances must involve some understanding of which predicate contrary spaces are correlative to them. This entails some grasp of categories of substances, of "substance templates" (Millikan 1998b) such as person, animal, animal species, plant, plant species, mineral, and so forth, the members of each being recognizable in advance, not as having the same properties as one another, but as determinate with respect to the same determinables or contrary spaces. Thus the claim that theories need not be involved in the development and testing of empirical concepts does not imply that no concepts are interdependent.

On the other hand, the ability to reidentify many basic kinds of objective identities, as these are variously proximally manifested, is required to guide practical as well as theoretical activities. The practical use of the capacity to reidentify important individuals, kinds and stuffs long predates theoretical conception, probably ontogenically as well as phylogenically. In order to accumulate knowledge over time how to deal with any individual or kind or stuff, also in order to apply what has been learned, an animal must be able to reidentify it over various encounters under a variety of circumstances. And the test of the practical adequacy of each concept may be entirely independent of grasp of any other concepts, thus providing a certain sort of foundationalist base for the conceptual abilities later employed in theoretical knowing.⁹

9. I have left many relevant things out of this short talk, many of the most crucial things, I'm afraid. In other places I have defended the ontological claims implicitly involved (1984 ch. 14-17, 1998a, 1998b, forthcoming a). I have discussed compatible theses concerning conceptual development (1998a, 1998b) including the role of practical learning (1998a, manuscript). I have discussed the way we extend and test our conceptual abilities through involvement in language communities (1998a, 1998b,).

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