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An Evolutionary Naturalist Realist Doctrine of Perception and Secondary Qualities

In this paper I outline an approach to perception that is characteristic of the position I call evolutionary naturalist realism (ENR hereafter), and sketch the way in which it supports a particular doctrine of secondary qualities. These doctrines I first set down in a thesis (Hooker, 1970). Elaborated, they form part of a book in preparation on the naturalist conception of *Homo Sapiens Sapiens.*

§ 1. Meta-Philosophy and Theory of Perception

I have developed both the metaphilosophy and the philosophy of a consistent, thoroughgoing evolutionary and naturalist approach to *Homo Sapiens Sapiens*, especially to that activity of the species called science, elsewhere (Hooker, 1974, 1975a, b and c), and the reader must turn there for detail and defense. Suffice it here to note that two consequences of the approach are that philosophical doctrines have the same epistemological and normative status as do scientific theories, and that the primary aim of ENR philosophy is to construct the most adequate, coherent, 'global' conception of the universe possible.

From the ENR standpoint a philosophical doctrine of perception is a *theory* of the perceptual process which answers the following questions:

Q_1: What is the process by which we acquire perceptual information concerning the external world?

Q_2: What is the relationship between the character and content of the conscious perceptual experience and the perceptual process?

Q_3: What is it about the perceptual process that justifies our

calling the end-product perceptual *knowledge*, and knowledge *of the external world*?

Q_4: What is the correct account of those epistemic failures of perception: illusion and hallucination?

Historically, doctrines of perception have indeed had the orientation presupposed in these four questions and have usually dealt with the questions in the order stated. They have also changed with changing factual knowledge.

Contemporary students of philosophy can be forgiven for supposing that discussion of perception over the last two centuries has been dominated by arguments concerning the nature and existence of sense data (sensations, elementary perceptions, etc.), and that, despite such lavish attention, the issues involved are still somewhat obscure. In fact, the motives for introducing sensory items between the world and perceptual knowledge of the world seem to have been mixed. Roughly speaking, such sensory items have been required to play one or more of the following four roles. R_1: they are the representatives to consciousness of the entities in the external world; R_2: they are the component parts of conscious (phenomenal) content; R_3: they are the sources of knowledge concerning the external world; R_4: their possession is the ground of the justification of our knowledge concerning the world. Not all these roles have had equal weight in philosopher's minds when they wrote of such sensory items; very likely some were not even consciously considered as such. Still, the motives for each role are plain enough: each worthy philosophical doctrine of perception is supposed to address itself to questions Q_1-Q_4, and the introduction of sense data in their various guises was designed to answer these questions.

This is to approach perception with epistemology foremost. But those who have done so have typically chosen their ontology to suit their epistemological ends. Behind the epistemic approach lie some tacit and undefended assumptions that show great power in determining the character of the resulting doctrine. Five of these are:

A_1: The mind is epistemically transparent to itself.

A_2: Conscious awareness is propositional awareness, i.e., epistemic states are propositionally defined states.

A_3: The acquisition of perceptual knowledge demands an act of conscious apprehension, i.e., a particular concep-

tual content must come 'before' consciousness and be examined.

A_4: Sensory items, i.e., conceptually distinguishable contents, are individuals of the ontology, i.e., are objects.

A_5: Perception is veridical if and only if what is before the mind is an exact replica of what is in the world.

The first of these assumptions one associates especially with Descartes—is has run through philosophy of mind ever since, a deadly thread. From it, together with Cartesian scruples about the certainty of true knowledge, the second, third, and fourth assumptions follow naturally (the fourth aided by Lockean representational theory). And from these assumptions (coupled to a confusion of "sense data are the direct objects of knowledge" with "empirical knowledge is of objects; what is represented to consciousness in perception are the conditions of objects"), we obtain the last assumption.

ENR rejects all five of these assumptions. The arguments that lead to them, when there are any, are a tissue of falsehoods and non-sequiturs. This, because scientific evidence runs against them and arguments for them logically require metaphilosophical premises that ENR rejects. (Both these claims are reviewed in my book, mentioned in the introduction to this chapter; cf. Hooker, 1975a.) I shall not take time here to rehearse the well-known objections to the main alternatives to a direct realist doctrine of perception, i.e., to phenomenalism and representative realism (see e.g., Armstrong, 1966, 1968; Sellars, 1963; Smart, 1963), nor to their common model of the structure of mind, the inner scanner model (there is not the slightest neurophysiological evidence for this functional structure to the brain).[1]

What picture shall we adopt of the senses? The senses are aids to survival. They are our evolutionary heritage in the field of information-gathering about the environment. Physiologically, the human brain developed about the primitive visual perception center. Actual survival value, however, has ranked at least as high for other senses (e.g., smell, touch) in the case of some species as it has for vision in *Homo Sapiens*. Evolutionary development produces an ever-changing array of "sense"; from the point of view of adaptation there is no reason to believe that the senses are at all limited in their possible forms, except by the very general character of the

environment and the organism (cf. also Grossman, 1974; Thomas, 1975). By contrast with this casual pragmatism, one might easily gain the impression from the way philosophers often write about the specifically human senses that they were divinely given, ineluctable servants of the passing play of consciousness, theater directors for an inner *son et lumiere* (etc., etc.) an alternative to which could not be imagined.

How then shall we conceive of the senses? First as *systems*, second as *information-processing* systems, and third as *environmentally oriented*. The senses are environmentally oriented, information-processing systems, i.e., *perceptual* systems. Roughly, our perceptual systems receive a pattern of physical stimuli, select and abstract from it (i.e., transform it), and feed it to the entire central nervous system for action.[2] At some point in this process conceptualization and consciousness set in.

According to my view of concepts as information-processing structures (Hooker, 1975d), conceptualization sets in early, e.g., at the retina; some of it will be genetically programmed ('hard') and some learned ('soft'); any boundaries between 'hard' and 'soft' drawn on linguistic grounds will be arbitrary, for language as such is not central to brain function (Hooker, 1975d).

The naturalist must still face the question of the relation of consciousness to perception.

Contemporary materialists have not fared well trying to answer the question. So strongly embedded is the inner-eye model of consciousness that most materialists seem to have assumed themselves to be on the horns of a dilemma: either admit consciousness and with it all the epistemic and scientific difficulties of the inner-eye model (especially for the materialist account) or eschew consciousness as a distinctive element of perceptual life at all. Most materialists seem to have chosen the second horn of the dilemma and eschewed any reference to distinctive conscious states. There is a second assumption, also arising out of the general history of philosophy, that aids in driving the materialist to avoid or denude consciousness; it is the belief that if one admits a distinctive conscious experience, a rich phenomenal life, one is bound ultimately to reject a materialist account of mind. It seems to be assumed that one can do justice to the distinctiveness of conscious experience, if at

all, only by introducing special qualities of a special mind which turn out to have a quite ethereal nature to them.

For my part, I am sufficiently convinced that the phenomenon of consciousness is important enough that one ought to face it head on and not attempt to eliminate it. However, I also do not accept either of the assumptions just discussed. Following the earlier discussion, the view I am inclined to accept is that consciousness is only one limited aspect or phase of neurological functioning. This view is supported both by neurophysiological research and by comparative species studies; the former having begun to unravel the extent and importance of the undergirding subconscious neurological functions of the central nervous system (CNS) and the latter by displaying a cohering pattern of neurophysiological development that is associated with a gradual and late development of consciousness.[3]

The evolutionary approach to the central nervous system and hence to consciousness quite generally suggests three theses that run counter to most philosophical presumptions, namely, that (1) language, (2) consciousness, (3) personal unity are peripheral to nervous function. These theses are based upon the late evolutionary appearance of all three characteristics and the presumption that the older, more common functions of the nervous system continue to characterize its basic structure and function in later developments. One wants to give an evolutionary/neurophysiological explanation of language ability as a specialization of information-processing ability generally, of consciousness as a specialized phase of nervous function, of personal unity as an abstracted reflection at some 'higher' functional level of the relative integration of the subsystems of the nervous system. Although the levels of ignorance, ambiguity, and controversy are all high in this area, it currently seems to me that all the scientific evidence, e.g., that from aphasia, subconscious function, schizophrenia, brain-bisection etc., supports these theses.[4]

Therefore, I shall assume a unified mind-brain and 'fuse' the corresponding descriptive sentences (cf. Dennett, 1969). In my view there are no *objects* of conscious-awareness, there are only certain indissoluble experiences which we describe as 'My-being-consciously-aware-of-(that)-_____'. The experience is indissoluble in that one cannot remove the hyphens in this phrase to identify an object of awareness and a distinct subject that is aware. There *is*, in most ex-

periences, a legitimate object of awareness, namely the situation of which the organism is directly *perceptually* aware (cf. below § 2), but that awareness is of the world, it is not of the experience of the world. Conscious-awareness is an *experience had*, it is not an awareness *of* any objects, nor is it, in the special sense I have reserved for the terms here, an awareness *that* anything (but more about the conceptual content of the experience shortly).[5]

Not surprisingly, the ENR approach to perception does not sit well with the epistemological approach. A central tenet, then, of my view of perception is that perceptual experience is the end-product of a process. Consider again what is the raw physical information reaching the perceiver's senses. It is not a set of beautifully polished *data*, a set of visual pictures of the world for example. It is, rather, the kinds of information a television camera or tape recorder receives: a more or less systematic pattern of fluctuations of physical magnitudes.[6] The perceptual process reflects a radical process of *selection* and *abstraction*. Moreover, the knowledge that is gained in perception, and the resulting content of the conscious perceptual experience, is a function not only of the state of the perceived world but also of the perceiver's processing capabilities, memory state, current situation, interests, and so forth. This point is a commonplace of everyday experience (cf. the chicken sexer who sorts without a conscious description and the inexperienced person who cannot; the altered perception of familiar situation often had upon waking in gloomy light, etc.) and has been strikingly demonstrated in laboratory and anthropological fieldwork (cf. Gregory, 1966; Snyder & Sendon, 1952; note 2 references).

Now, this view of perceptual data places the notion of *data* in its proper context. *It is only of the end-products of this perceptual process, i.e., the beliefs that are formed, that we can sensibly say that they are data*. A datum is something from which an inference can be made. It is not until incoming information has been abstracted, conceptualized etc., and trained into something resembling propositional beliefs that anything properly called data emerges. For only then can inferences (from this data) be made. But the original perceiving is then already complete, so clearly it is not itself a process of inferring to the world from some kind of perceptual data. The world is directly perceived, that is, we acquire noninferential

knowledge of it through the senses, and *after that* inferences may be made. Perception results in the acquisition of knowledge and beliefs concerning the world; such knowledge and beliefs may form the basis for further inferences about the world, that is, they can act as data. To repeat: the objects of perception are not data, data are to be found, if anywhere, in the *results* of perception. Sense data theories of perception, then, locate data in the wrong place in the perceptual process.

From the point of view of the ENR approach, we might well reconstrue sense data as theoretical entities and identify them with some features of the nervous process; but this would be more or less arbitrary. Certainly it is extremely unlikely that all four roles for sense data mentioned earlier could be fulfilled at all, let alone by the same entities, and the resulting divisions will probably not be theoretically interesting.

The foregoing discussion should have made it clear in just what way I believe a scientifically adequate theory of perception and mind requires the rejection of all five assumptions of the epistemological approach. The importance of the role of the subconscious/unconscious in mental functioning and our ignorance of it is evidence enough that A_1 is false. Language is peripheral to nervous function, and the transformations occurring in the nervous system can be expected to be richer and nongrammatical in form. So A_2 is false. Consciousness being a phase of nervous function in a nervous system dominated by unconscious processes, perception does not require a conscious act at all, nor is there plausibly a subject/object structure to conscious processes. So A_3 is false. The nervous system processes information in a manner dependent jointly upon environment and organism. Thus sense data, if we choose to introduce them as theoretical entities, will be structural features of nervous-system states, not objects of any sort, and not in any sort of subject/object relation to consciousness. Perception depends on structure-preserving mappings, not identities; it depends on the extraction of information to make *identifications* rather than achieving identities. So A_4 and A_5 are false.

This last remark deserves a little elaboration because of the role A_4 and A_5 have played in the philosophic treatment of illusion and hallucination (cf. e.g., Robinson, 1975 and § 3). Perception is the

organism's key to action. What is extracted in perception, how it is encoded, and what the mind itself supplies is a function of the priorities and information the organism has accrued. There is a large accumulation of evidence that the ways we perceive the world are indeed constructed in this fashion (cf. references to the psychological literature herein). The features of the world that are mapped and the way they are mapped into the existing informational state of the organism are idiosyncratically selected according to the organism's ends, in the light of its capacities; thus we expect no identities, only transformations and embeddings appropriate to making appropriate identifications for action. And this position provides a proper framework for understanding illusion and hallucination (see § 3 below).

Now is the time to discuss the nature of the relations and content of perception.

§ 2. Perceptual Relations and Perceptual Content

Perception is directly of the external world (perception is first for survival). When the causal relationships involved are of the appropriate sort and the perceptual processing is also appropriate, I shall say that the perceiver acquires *directly* knowledge concerning the properties and state of the object concerned. Thus for a person A to be directly perceptually aware of X (where X may be an object, scene, and so on), that is, for A to directly perceive X, is for A to stand in an appropriate causal relationship to X such that there is caused (by X) to arise in A appropriate knowledge and/or belief states concerning X's state or properties. If either knowledge of X is gained in this process or all beliefs acquired in this process concerning X are true, the perception is veridical; otherwise it is partially or completely illusory.[7]

No hyphen appears in "perceptually aware" to contrast it with "consciously-aware" introduced earlier. Perceptual awareness is subject/object in structure, conscious-awareness is not. To be directly perceptually aware of something is for two kinds of "appropriate" qualifiers to be fulfilled: (1) the causal process must be an appropriate one, i.e., that specified by the best scientific theory of veridical perception,[8] (2) the knowledge and beliefs must be appropriate, i.e., they must be those that are the immediate culmination of the

perceptual process, again as specified by our best scientific theory of the process (when we have it), rather than later deductions made from these, from memories, and so on. The 'directness' or immediateness of direct perception consists, then, in the scientific specification of causal relevance. It should not be thought of as some peculiarly clear 'eyeball-to-eyeball confrontation' with the world—as if indirect perception means *indistinct* perception. Nor is there anything else involved in the direct perception of the world than the *overall* relationship specified above. Moreover, my definition of direct perception does not involve reference to conscious experience. This is deliberate, because we need to allow for subliminal and other forms of unself-conscious perception. That is, it is not that direct perception cannot involve conscious experience—it does quite often—but only that it need not do so.[9]

To do justice to traditional concerns and our experience it is necessary to include an explanation of the relation of the content of conscious perceptual experience to the whole perceptual process. Here I can offer no more than a sketch.

Conscious perceptual experience certainly has a content. It is doubtful if this content is really adequately captured in any propositional formula. (Consider, e.g., the experience of looking at a new aesthetic work marking a creative breakthrough.) But the appropriate propositional formulas capture what is linguistically expressible and usually dominate attention. (Cf. "I see a black cat" and the experience of seeing the relevant situation.)[10]

Whence comes this complex description, why is this the way we choose to describe our experience?

At least part of the answer lies in the fact that, fundamentally, our entire perceptual/conceptual situation is goal-centered and directed toward external objects and situations, our language and sense organs have evolved in this setting. Our belief formation goes much deeper than our conscious-awareness and it seems reasonable to suppose that that deeper structure is the wellspring of speech responses as well as of conscious experience. Thus it is not too surprising that we describe our perceptual activity in terms of external situations. Such descriptions simultaneously reflect our dominant interests, inform others of our current beliefs and intended activity, and inform them in the only relevant and intersubjective terms we

have, namely those dealing with the particular external situations that are the subject of our beliefs and focus of our activity. (Correlatively, we do not possess a very detailed phenomenal language for describing our private experience. It should be noted, though, that there are occasions when we are so intent on directing attention to the qualities of our perceptual experience that we introduce a specifically phenomenological vocabulary. Such situations are typically aesthetic, as witness the vocabularies for discussing wines, music, paintings, and so on. Our ability to develop such a vocabulary when forced to shows that we should not attach more importance to the form of our normal perceptual descriptions than it can carry.)

At the present stage of development of neurophysiology nothing very precise can be said concerning the relation of the conscious phases of information processing to the whole process. Very roughly, some hypothesis of the following sort seems required: The perceptual-processing states in general, and the belieflike states formed in the perceptual process in particular, determine, or are a major factor in the determination of, the conscious phase of perception. If something like this were true neurophysiologically, it would give us a plausible basis for claiming what I shall now assert as part of my doctrine: *our experience in perception is the conscious-awareness (phase) of our perceptual awareness states*. The contents of our experience in perception are precisely those states that are caused to arise when objects are directly perceived. *The specific conceptual contents of our perceptual experiences then derive from the fact that such experiences are, centrally, conscious-awarenesses of belief-like states*, the descriptions with which we characterize our experience being precisely the statements of the corresponding beliefs concerned.

Thus if I now offer as a description of my perceptual experiences, "I see that the sun is eclipsed," or "I see the eclipsed sun," the knowledge state "The sun is eclipsed" is precisely the state caused to arise in me in my becoming directly perceptually aware of the eclipsed sun. In thus describing our perceptual experience, we are in fact identifying the central states, the conscious-awareness of which is the having of that experience.[11] And on my account of consciousness (§ 1), these conscious states are not themselves objects of an inner perception, we are simply consciously-aware of them.

This general line is surely at least plausible. Consciousness is some phase of the sequence of global nervous states induced in the perceptual process, and central among these latter are surely the knowledge and belief states formed. In any event I am prepared to stake my doctrine of perception on there turning out to be a correlative, adequate, neurophysiological description of nervous-system functioning.[12]

This account of our perceptual experiences explains how they can be just that, experiences, and yet also be correct or incorrect (correspond or fail to correspond with the world). The experience, qua experience, cannot be right or wrong, but the perceptual knowledge and beliefs that determine the content of the experience can be either right or wrong, can correspond or fail to correspond with the world. And this fact, together with the fact that the perceptual processing that plays a large role in determining the knowledge and beliefs acquired (and hence the experience had) involves our assumptions and expectations concerning the perceptual situation, explains how direct perceptual awareness, though yielding noninferential knowledge, nonetheless has a judgmental component or aspect to it.[13]

How, then, are perceptual claims justified? Given my metaphilosophy, the answer which I shall adopt should be clear: they are not justified, at least not in the certainty-granting sense usually demanded by philosophers. Perceptual claims are justified, ultimately, only relative to other perceptual claims. Let me elaborate. I hold that (1) there is a basic range of perceptual claims that we all habitually, and reasonably, do fall back upon as the ultimate justification of claims to empirical knowledge; and that (2) these claims are made within a characteristic range of perceptual situations where we habitually make correct perceptual judgments (for example, they might include simple visual situations such as seeing a table in normal circumstances); (3) these situations are precisely those under which, according to the realist doctrine of perception and our scientific knowledge of the processes involved, we are habitually directly aware of our environment, that is, we habitually acquire, through the senses, noninferential knowledge of that environment. To be thus supported is, I claim, a fundamental part of the true nature of empirical knowledge.

Finally, it is not hard to see how one can utilize the resources of this position to respond to two well-known arguments that prove troublesome for sense-data theories, the arguments from intransitivity and indeterminateness of perceptual judgments. The arguments can be found e.g., in Armstrong (1961). The first argument is to the effect that a sequence of perceptual stimuli may be indiscriminable when taken pairwise successively but discriminable when n-place-separated comparisons are made, $n \geqslant 2$; but according to the sense-data theory the sense data will have to be pairwise successively identical and identity is transitive. The second argument is to the effect that many perceptual experiences are indeterminate in various respects (e.g., how many stripes on the tiger?), yet the corresponding sense datum, being an image or replica of the object perceived, must be everywhere determinate. Once the sense-data model is dropped in favor of an information-processing model, these phenomena cease to pose difficulties; encodings may be such that pairwise successive stimuli are encoded as identical but not n-separated successors and of course efficient encoding, given the organism's priorities, may often call for indeterminate encoding (that it is a tiger is usually more important than the number of stripes shown). The point is that whatever conceptualizations, i.e., processings, are most appropriate to the organism's priorities and capacities can be employed and these may cut across any replicating or imaging boundaries. Identification, not identity, is the issue. Which brings me directly to the phenomena of illusion and hallucination.

§ 3. The Nature of Illusion

The external world is directly perceived when the appropriate causal relations exist between the world perceived and the perceiver. The external world is *adequately* perceived when the appropriate perceptual skills are brought to bear in the processing of incoming physical information. Such perceptual processing may be either well adjusted or maladjusted, that is, appropriate or inappropriate to the perceptual situation.

There is good reason to believe that there is still some flexibility in the processing techniques we actually employ. The evidence is contained in the psychological references cited earlier. Simple ex-

amples occur when, upon wakening or entering ill-lit and unfamiliar surroundings, we first "see" one scene (respective examples being a nearby pencil as distant and tree-sized, a blowing scarf as a running cat) and then correct our perceiving as more information flows in. We adapt our processings, within evolutionary constraints, to suit our needs and situations.

This last remark gives the clue to the nature of illusion. There are times when we encounter situations for which our processing techniques are inadequate, and yet we do not correct those techniques for one reason or another (the situations are sufficiently difficult to correct for, or rare, or unimportant, or uninteresting, and so on). Under these conditions we experience *perceptual illusion*. We prefer, or are compelled, to explain away these illusions rather than to remove them by correcting for them in the perceptual processing.

Thus, for example, we have learned to correct for shape change as a function of orientation (at least for sufficiently small, sufficiently close, objects). There are no illusions in these cases except, significantly enough, when we are *unfamiliar* with the *type* of object involved. But we have not learned to correct for shape change as a function of refractive index, so that objects immersed in fluids are usually seen as undergoing a shape change.[14]

The existence of illusions and hallucinations has always been an important problem for direct realist doctrines of perception. Their occurrence makes it clear that if we sometimes do perceive the external world directly, we do not always do so when undergoing perceptual experience (hallucinations), and we do not always perceive it accurately when we do perceive it directly (illusions). From this it seems to follow that what we are directly aware of in perception, under *all* circumstances, is never the external world but something else—a sense datum, for example. So it seems that direct realism must be abandoned. The argument may be stated as follows:[15]

P_1: Sensory illusions and hallucinations are logically possible (in fact they occur).

P_2: Veridical perception is indistinguishable, qua perceptual experience, from sensory illusion and hallucination.

P_3: In sensory illusion and hallucination I am always perceiving something.

P_4: Because in sensory illusion and hallucination what I perceive is not identical with anything existing, what I perceive in these cases is never the external world.

P_5: Therefore, what I perceive in veridical perception is never the external world.

This argument is a more precise version of what is usually offered in argument. The first thing to note about it is that it is *invalid*. It would be formally valid if, but only if, the indistinguishability of P_2 implied indistinguishability in *all* respects. But as it stands, P_2 asserts *perceptual* indistinguishability only, and the indistinguishability of two perceptual experiences does not imply the identity in kind of the objects (if any) of those experiences. Only the pernicious belief that our perceptual experiences must be fully identical with the objects of those perceptions allows this gap to be bridged. To be a formally valid argument, either the phrase "qua perceptual experience" would have to be deleted from P_2 (but who, then, would accept P_2?) or an additional premise would have to be added, a premise roughly to the effect that in all perceptual experience there is always an object that is identically that described by reports of perceptual experience. But this latter is among the claims rejected in this paper.

What the direct realist claims is that veridical and illusory perception *are* distinct from hallucinatory experience precisely because in the former cases we are directly perceiving the external world and in the latter case we are not. And the doctrine claims that illusory perception *is* distinguishable from veridical perception precisely in terms of the adequacy of the perceptual processing applied, the accuracy of the beliefs formed, and so on. This vital flaw in the argument has tended to go unnoticed, however, because philosophers of perception have tended to make the identity assumption.

I reject P_3 for the case of hallucinations (and after-images). I claim that in hallucinatory experience we may be aware, *consciously-aware*, of many things, but we do not perceive, are not *perceptually aware* of anything. To have an hallucinatory experience of X is to be in the same internal states as one would be in were X to exist and one were veridically perceiving X, except that these states on this occasion have purely (or predominantly) *internal* causes.

Moreover, the account of perception I have offered also leads directly to the rejection of P_4. P_4 is acceptable only if it is also ac-

cepted that if the external world is perceived at all, the content of perception is identical with what is perceived. It is clear that in my account of illusion I reject this assumption, the world may be inadequately perceived as well as adequately perceived, but in both cases it is the world that is perceived. Here is a second point at which the argument rests on this pernicious identity assumption. Once this assumption has been rejected, the existence of illusions ceases to become a problem. Illusions are accounted for as inadequate perceptual adjustments on our part. It is not that identity fails in these cases (it never did hold anywhere) but that we prefer to explain these situations away rather than attempt to correct for them.[16]

In order to reveal this ubiquitous argument in all its presumptuous regalia, let me attempt an even more explicit formal statement:

P_1: Sensory illusions and hallucinations are logically possible (indeed they occur).

P_2: Veridical perception is indistinguishable to the mind from illusory and hallucinatory perception, qua perceptual experience.

A_1: The mind is epistemically self-transparent.

A_3: Perception logically requires a consciously examined content.

A_4: Perceptual contents are objects, i.e., individuals of the ontology.

C_1: What is before the mind in veridical perception are objects of the same role, type, and status as are those objects before the mind in illusory and hallucinatory perception.

A_5: Perception is veridical if an only if what is before the mind is identical with what is in the external world.

P_3: The contents of illusory and hallucinatory perceptions differ from the actual external situation presented to the perceiving subject.

C_2: The objects before the mind in illusion and hallucination are not objects in the external world.

C_3: What is before the mind in veridical perception are not objects in the external world.

P_4: The objects of perception either belong to the external world or belong internally to the mind.

C_4: What is before the mind in veridical perception are objects in the mind.

Although I accept P_1, P_2, P_3, and, let us say, P_4 (this is what makes the argument plausible, when the other premises are suppressed), I reject A_1, A_3, A_4, A_5, and the conclusions C_1, C_2, C_3.

Now we are in a position to use my doctrine in an attempt at a new-old resolution of the problem of the secondary qualities.

§ 4. The Problem Stated

Contemporary science (especially biochemistry and neruophysiology) make a naturalistic materialism an increasingly plausible doctrine.[17] The position has always been attractive because it is one expression of the drive for unity in science. Central to this conception of unity is the adoption of some form of realist doctrine of perception and a naturalistic materialistic account of mind.

It is in this general context that I am attempting to offer an account of secondary qualities. Certainly they are intimately bound up with doctrines of mind on the one side and doctrines of perception on the other. For the primary/secondary quality distinction is just the distinction between those properties of the immediate objects of perception that belong to objects in themselves (these are the primary properties) and those properties that belong only to our perceptions of those objects (these are the secondary properties). But this means that on the one side the nature and status of the primary/secondary distinction hinges on the doctrine of perception adopted and on the other side, since perceiving is a mental activity and perceptual states are mental states, the nature and status of secondary qualities themselves depends crucially on the doctrine of mind adopted. The problem thus raised for secondary qualities is well known: in contrast to the primary properties, secondary properties play no explicit role in any of the naturalistic sciences, hence form no part of the characterization of the naturalistic ontology, either of the external world or of the mind-brain, yet they play a central role in the description of conscious experience and the perceptual characterization of the world. (See e.g., Natsoulos' review of the psychological literature, in Nicholas, 1976.)

Since the secondary qualities will at the very least have to be smoothly integrated with those of the natural sciences, ENR has

essentially only three choices of doctrine: secondary qualities can be construed as (1) additional objective properties (a) of all physical objects, (b) of specific mind-brain processes, or (2) as reductively identical with complexes of primary properties (a) of physical situations generally, (b) of specific mind-brain processes, or (3) as nonexistent qua individual properties. Position (1a) commits its proponents to claiming the causal incompleteness of the scientific account of the causal perceptual process and introduces highly causally idiosyncratic, yet fundamental, natural properties. Position (1b) is entirely implausible on the prevailing evidence. Position (2b) strongly suggests an inner-screen representative realist account of the perceptual process. None of these positions sits well with ENR. Given the general, if tacit, assumption that (3) is to be rejected on phenomenological grounds (we experience the secondary qualities as individual properties), it is not surprising that materialists have tended to prefer (2a). Moreover, (2a) fits nicely with the prevalent assumption that purely functional, qualitatively denuded conscious states are necessary for a defensible materialism (see § 1).

But (2a) has a well-known difficulty associated with it: it is simply not the case, in general, that there are complexes of primary properties, or finite disjunctions of these, which correspond one-one with occurrences of secondary qualities (see, for example, Campbell in Rollins, 1969). And where the correspondence does obtain, there is reason to believe it merely a result of relative crudity of physiological response and/or evolutionary accident, rather than (2a) being in the right direction. Moreover, I believe the functionalist variety of topic-neutral reductionism advanced by materialistic defenders of (2a) fails of itself.[18]

This, then, poses the problem for ENR; for its solution it seems necessary to choose one of the alternatives (1)-(3), but none of them appear acceptable. I am going to state and defend a version of alternative (3). So far as I am aware no one has taken this alternative seriously since Broad laughingly dismissed Pritchard's statement of it at the turn of the century. Perhaps it will turn out that this was for good reason. Nevertheless, I attempted a preliminary defense in my doctoral dissertation (Hooker, 1970), and I attempt a more elaborate defense in my forthcoming book (see introduction). What follows is a sketch of that defense.

§ 5. A Solution Stated (1): Sensory Awareness and the Relations between the Primary and Secondary Qualities

Perception is fundamentally an information flow from environment to organism, where the information is sorted, processed, and used. Conscious perception is conscious experience of this information flow as it affects our internal states and processes. Now every information flow requires a medium, for information is just the structuring of some medium. The incoming physical patterns need to be represented by the organism in its media, so encoding principles are also required.

Consider normal visual perceptions. The physical, external medium of information flow is the electromagnetic field, and the encoding principles are physical laws referring to the behavior of both those fields and physical objects. The physical information is the fluctuation pattern of this field. Within the human body, the physical medium is the electrochemical substances making up the optical nervous system, and the encoding principles are laws referring to the structure and responses to electrical stimulation of the biochemical substances in the eye, optic nerve, and brain. The physical information is now the pattern of electrochemical changes.

There are, then, two internal components involved in any perceptual process, the encoding medium and the encoded information. We may be consciously-aware of both, though perceptually aware of neither. We experience this twin conscious-awareness as a perceptual field, i.e., as *primary structure embedded in a secondary medium*. If the media of all senses are distinct, we obtain the sensory commonness of the primary properties and the sensory specificity of the secondary properties.

When, for example, we are directly perceptually aware of our environment through vision, the medium of the information flow is the electromagnetic field, but we are not aware of the field. Internally, the medium of information flow is the electrochemical "field," and the encoding principles are determined by the physical structure of our retina, postretinal ganglia, etc. In being aware of objects in our environment we are not perceptually aware of, do not perceive the internal medium either. The encoding principles of our visual receptors, together with the nature of our visual neural subsystem, determines the resulting internal perceptual states, thus determining also

the special character of our conscious experience of these states. Our experience of (i.e., conscious-awareness of) our visual mode of *perceptual* awareness is unique to that sense. We experience the visual field as the embedding of primary (i.e., primary-qualitied) information (e.g., location, size, motion) in a secondary-qualitied medium (the medium of colors). The information is embedded (encoded) as color differences. I am self-consciously-aware of it as perception "through" colored shapes. The unique character of it as a *color* medium derives from the unique characteristics of the internal states that such direct perceptual awareness produces in me.

In short: the distinctive character of our experience of each of our five senses is due to our conscious-awareness of the characteristic inner perceptual states of each sense. The distinctive general character of the perceptual states of any given sense is in turn determined by the distinctive *mode* of perceptual awareness of that sense, that is, by the distinctive encoding principles and/or encoding media associated with that sense. We experience our sensory states as perceptual fields, i.e., as the embedding of primary-qualitied information in a secondary-qualitied medium.

To repeat: we do not perceive (are not perceptually aware of) perceptual fields. It is important to distinguish sharply between what it is that we are directly perceptually aware of and our experience of, i.e., conscious-awareness of, the direct perceptual awareness. *The perceptual states of which we are consciously-aware are not what is perceived.* Only the external world is perceived. And our conscious perceptual experience arises, not from *perceiving* (= being perceptually aware of) our perceptual awareness states, but from being *consciously-aware* of (experiencing) the perceptual awareness states arising as part of the perceiving of the external world.

In sum, to experience a secondary quality of sense S at time T is to be consciously-aware of, or experience, the T time-slice of the perceptual awareness states arising in consequence of our mode S of perception of the world.

Thus it should be clear that color experience, for example, is *no mere accompaniment* or perception but is an integral part of it. Color experience is the form of all conscious visual perception.[19] Similar remarks apply to the other senses and their unique characteristics.

This account explains how it is possible, for example, for (conscious) visual perception to involve both colors and shapes (as colored shapes) and yet the aspects remain quite distinct in status, the former being subjective and the latter objective. We distinguish sharply between the information encoded and the mode and medium of its encoding. The information is the origin of the objective component of visual experience, the mode and medium provide the origin of the subjective component of the experience. (Being aware of colors is bound up intimately with being aware of the character of the encoding medium.) Both components are consciously experienced together as the *embedding* of one in the other: we perceive colored shapes.

The account also explains why secondary qualities, but not primary qualities, are sense-specific, and how exactly they depend upon perception and alter as the conditions of perception alter. My account also explains why some secondary qualities are more closely associated with corresponding primary quality complexes than are others (the sensory receptor is cruder, thus producing a simple medium state/external state correspondence). And my account explains, finally, why primary, but not secondary, qualities play significant causal roles in the world and how black can be a secondary quality, though no perception of objects may be involved.[20]

§ 6. A Solution Stated (II): The Apparent Objectivity of Colors Explained

Our visual experience is, for the most part, that of perceiving colored bodies. Yet colors are not objective physical properties of bodies. How is this conflict to be resolved? Briefly, my reply is that our beliefs in this regard (namely, that colors are "on" the surfaces of bodies), are mistaken and our "seeing" illusory. That much of the reply is dictated by the theory of the nature and origin of the secondary qualities put forward above. The remaining question is: How did this situation come about? I shall argue that on any evolutionary (developmental) view of human perception, the situation as I have described it is a likely end-product.

We use visual perception to identify the shapes, sizes, positions, and motions of objects, and to gain some information concerning

their physical states (on fire, angry-with-X, etc.). The external primary information is encoded as differences in the state of the visual medium, and to this extent the epistemic intrusion of colors is unavoidable for us.

Least interestingly (for survival) we discover the colors of bodies in this way also, for colors are associated with few interesting causal processes. Their main function is to help as identifiers of objects ("The *yellow* brick in the corner . . . ," etc.). But though perceptual data concerning colors are the least important perceptual information, it is, on my account, intimately bound up with other perceptual data on whose acquisition our survival depends. It is reasonable to assume, therefore, that when the processing of visual sensory information that human beings employ was being developed, a processing was selected that accorded colors the same ontological status as the objects being perceived. Within the visual field, color differences often coincide with boundaries and are fundamental to visually guided function. Under life circumstances in which we place an enormous epistemic reliance on vision, and in which no great difficulties arise from such a choice or processing, the pressure to adopt it must surely have been overwhelming.

Perceptual processing techniques develop during the early years of each individual human being. But human beings are born with a neural organization already geared to certain kinds of processing as a result of countless years of evolutionary selection. Now the developmental theories of Piaget and his general school[21] emphasize ontogenesis. On Piaget's view, the newborn infant's perceptual world is a vast blur of sensory stimulation, out of which order is finally created as the cortex hits on the most effective methods of selection, abstraction, etc. In this process of highly successful interpretive development, it is entirely natural and plausible—in the face of the experienced inseparability of colors and geometric information, and an increasing degree of epistemic reliance on vision—to accord colors the same positive status accorded geometric properties. For the processing strategy that treats colors as objective properties of enduring external bodies is in fact largely successful.

On the other hand, there is now evidence that colors begin to be objectified in infancy.[22] This evidence suggests that ontogeny re-

capitulates phylogeny: that the human race as a whole (and perhaps prehuman species as well) have passed countless years of past experience on to us as hereditary structures.

Whether the phylogenetic or the ontogenetic viewpoint is correct, or to what extent each is correct, is of lesser importance here since the explanation of how colors came to be accorded objective status is the same for both viewpoints.[23]

There is no doubt that our primitive way of looking at the world has served us fairly well. It is true that colors are puzzlingly causally inert, unlike their geometric counterparts which play causally active roles in the world. It is also true that they show a variability and illusion-proneness not possessed by shapes and sizes. But, since physical conditions do not in general change much for man (that is, since physical conditions that produce stimulating new perceptual situations are in general absent), we have not had any serious reason to modify our primitive interpretive stance. But once we begin to investigate the situation carefully, the disparity between geometric and color components of visual perception becomes increasingly obvious. However, our general lack of difficulties under normal conditions reinforces our primitive adjustment.

In this connection the situation in regard to the other secondary qualities is illuminating. As a rough generalization the secondary qualities of a sense S tend to be attributed to external bodies as objective properties of those bodies just in proportion as the sense S involves, or is closely connected with, the tactile sense. Thus the tactile secondary qualities ("the rough surface" etc.) themselves are virtually always attributed to the surfaces of bodies.[24] Apart from the visual and tactile qualities that are attributed directly to external bodies, there are sounds, tastes, and smells. We do not universally say of any of these three that they are presented to us as intrinsic properties of external bodies. Such attribution becomes progressively less strained in the order: sounds, smells, and tastes. Tastes we most readily attribute to an external body, sounds least readily. In all three cases we more often than not speak about the associated object (if there is one) as the *cause*, or *source* (origin), of the sound, taste, or smell.

All of this is nicely consistent with the evolutionary view that the

fundamental objectively understood properties are the non-sense-specific primary properties, with the secondary qualities, which are sense specific, given an interpretation whose degree or character of objectivity depends upon their closeness of association with the primary properties. It is also illuminating to realize that the strength of our tendency to give to a particular group of secondary qualities such an interpretation depends upon the epistemic centrality or otherwise of the sense concerned. For this reason, it can be misleading to commence the analysis of the secondary qualities with colors and the tactile secondary qualities.

In the perception of colors and of tactile secondary qualities, then, we are under *systematic illusion* when we perceive them as "on" the surfaces of bodies. For illusion is nothing but inadequate and incorrect perceptual adjustment on our part.

§ 7. A Solution State (III): Defense against Criticism

The claim that there are no colored bodies (in the strict sense) and the concomitant claim that visual perception is systematically illusory may come as a shock to common intuition. But common intuition has more than once in recent times been shown to be mistaken. It has, indeed, been shown to be precisely what one would expect: the end-product of countless years of collective experience and countless episodes of individual experience, *at the scientifically unaided level*. It is thus natural to expect that, though our intuitive perceptual-conceptual adjustment will be the best suited to our experience, it will contain many errors of adjustment which only careful scientific investigation can reveal and which were, at a more primitive level, pragmatically justified as the simplest, most efficient way to organize experience. Such is the nature of what evidently are intuition's many errors concerning space and time, as revealed by modern physics. And such, I claim, is its error in the case of colors. As I have argued, our present way of seeing the world is, though incorrect, pragmatically the least confusing and simplest way of organizing our visual experience. That intuition is shocked to discover this fact is of no great importance. So long as an adequate scientific account of the perceptual situation is available and a reasonable account of the origin of perceptual error is at hand, the claims of intuition must be ignored.

By the same token, arguments against my doctrine of colors based on conceptual claims drawn from our everyday natural language can also be ignored. The conceptual system we possess evolves simultaneously with, and parallel to, our perceptual organization. Thus the conceptual framework may also be expected to contain conceptual reflections of those perceptual errors we develop in the course of maturing. Both are but differing aspects of the same organizational development. Therefore very often the conditions under which perceptual experience can be treated as illusory are also conditions under which conceptual organization can be treated as erroneous.[25]

No bodies in the external world literally possess secondary qualities. But "This is red," e.g., has not lost its truth value; it is true just in case the object referred to is perceived as red by the utterer of the statement.[26] It is clear that I shall have to regard talk about color properties, *qua genuine individual properties of bodies*, as, strictly, inappropriate. There are no colors, no real individual properties referred to by color terms; there are only *color experiences*. These are not experiences *of colors*, where distinct properties, colors, hold some relation to a conscious mind, but simply kinds of experience. The hypen in "color-experiences" signifies all this.

What I must maintain, therefore, is roughly the following: "This is red for S," S a perceiver, has a significant analysis in terms of the power of what is referred to by "This" to give rise to impressions-of-red in S, but "impressions-of-red" has itself no significant ontologically perspicuous analysis in which "red" occurs predicated of a logical subject. The connotation of "This is red" is determined ostensively. "S's having-an-impression-of-red" is true just when S is in some particular state; whether this state is physical or nonphysical is not thereby decided.

The same approach is to be taken to all of the secondary qualities. Thus although "This is C for S," where C is some secondary-quality term, has a significant analysis in terms of the power of what is referred to by "This" to give rise to *impressions-of-C* in S, "impressions-of-C" has no significant analysis—it is ostensively defined. "S's having-an-impression-of-C" is true just when S is in some particular state, whether mental or physical is not thereby decided.

The principal objection to my account lies in the belief that for secondary qualities in general, and for colors in particular because

of their apparent 'equality' with primary properties, there ought to be separately identifiable properties of *something* of which we can say "They are the secondary qualities."

This objection assumes the following principle, (P): No account of our experience is to be regarded as satisfactory that does not provide an ontologically realized 'archetype' for every phenomenally distinct aspect of our experience; that is, no account of experience is satisfactory that does not provide a distinguishable entity corresponding to a very distinguishable feature of our experience.[27]

Thus, in the case of colors, the argument would run: since colors are experienced as individual properties of objects, for every reductive identification of "S is having-an-impression-of-red" there should be a specific, separable identification of "red" *within* it. The intuitive idea is roughly as follows. In visual perception we can distinguish geometric properties of objects, states of objects, and (apparently) colors of objects. Now, by P, each one of these distinct aspects is to be assigned a basis in the ontology. Thus the geometrical properties are actual geometric properties of external objects and the states are actual states of external objects. Therefore, to complete the picture, the colors must be actual properties of something: external object, mental entity, or whatever.

The general principle P seems to have been implicitly adopted, in effect, by almost every philosophy of perception. In the case of colors, these archetypes are placed either in the external world (Objectivisms) or in the mind (Representative Realism or Phenomenalism). The very demand of *identity* between veridical perceptual experience and what is perceived (assumption A_5), adopted by most philosophies of perception, is tantamount to adopting P and the assumptions A_3, A_4, tantamount to the claim that there ought to be a special perceived object with the relevant secondary quality as property, make it plausible.

But why should this principle be adopted? In isolation it has nothing that I can see to recommend it. Moreover, I reject the assumptions, A_3-A_5, which have led so may philosophers (including materialists) to find P plausible.[28]

Consider the following, very crude, analogy: a liquid undergoes wave motion whose amplitude varies with time. The total wave motion is to be associated with a visual experience. Now the wave

motion can be reduced to the collective motions of the fluid particles and, analogously, the total visual experience can be reduced to an overall physical and/or mental process (involving, if necessary, the entire body and mind). In the reduction of the wave, the *phase* of the wave and the *amplitude* of the wave cannot be individually reduced to distinct structural properties; they are both complex functions of *the same thing*, the totality of particle motions; nevertheless, phase and amplitude are two conceptually distinguishable aspects of wave motion appearing in certain theoretical descriptions of it. Another illuminating example is provided by the aerodynamic descriptions of birds' wings. At the whole-systems level engineers distinguish the functions of lift and propulsion and in modern aircraft these are indeed provided by distinct design features (wing and engine). But birds' wings typically combine these two functions in the one wing movement, and descriptions presupposing their separation fail. Rather, to obtain an adequate theoretical description one must go to a more theoretically basic level of description, to direct applications of fluid or gaseous dynamics.

In the same way, though there must be *some basis* in inner states for secondary-quality experiences, this in itself provides no grounds for claiming that secondary qualities are reductively identical with properties of this basis (whatever it be), much less for claiming that secondary qualities are properties of some special class of inner states. It is perfectly possible, I claim, that an entire visual experience should be no more than an internal process and yet that there should exist no way in which to isolate every conceptually or experientially distinguishable component of the experience as a distinct and similar property of the process occurring.

True, the inner states will need to possess structures of the right kind to explain the perceptual processing that occurs; and they will need a dynamical structure correlative to the processing to explain the transmission of information from the world to the perceiver. However, that we distinguish geometrical properties, states of objects, and secondary qualities in perception gives us no warrant to believe that, in addition to the dynamical process, there must be distinct features of the process corresponding to these three categories and related analogously as they are related. Indeed, this belief betrays a profound misconception of the nature of the percep-

tual process; it assumes that perceptual realization of concepts is like building a literal internal copy of an external scene. Where perceiving is viewed correctly, as an information-processing activity, a perceptually instantiated concept means simply that an incoming pattern is processed in a certain manner; only abstracted structural information need be preserved, under any mapping that preserves the relevant structural relations. Only clinging to the assumptions $A_1 \rightarrow A_5$ (especially $A_3 \rightarrow A_5$) could make the misconceived view plausible.

This disposes of the main objection to the doctrine based upon assuming principle P. But considerations of a semantical sort may rekindle faith in the employment of P against my position. I shall consider two such objections. The first, and more naive, of the two simply asks what account I can give of the fact that predicates designating primary and secondary properties appear on a grammatical par in perceptual reports, yet I do not accord these properties the same ontological status. But an insistence that grammatical or syntactic structure always transfer to ontological commitment is just P again. I can see no compelling reason why the deep logical structures of sentences should reflect in their (model-theoretic) semantics the same features as the corresponding surface grammatical structures, indeed so much is implied in the recognition of deep structure underlying surface structure. Moreover, I hold the view that in many (possibly all) cases what ultimately dictates choice of deep structure, hence semantics and ontological commitment, is theory, theory of the subject matter involved. And in the present case there is theoretical motivation for a distinction in treatment between primary and secondary predicates, namely just the distinction between conscious-awareness, which is not subject/object in nature (if it were, there would have to be 'objects', i.e., some basis, corresponding to our awareness of colors), and perceptual awareness, which does have a subject-relation-object structure. Rather, we use secondary-quality descriptions to identify (both internal experiences and their causing situations), not to cite identities (between experience, as-object, and world).

There is, however, some specific semantic backing for the doctrine P, which gives rise to a second and sharper line of criticism. Consider the following sentences:

p: X has an impression of color.
q: X has an impression of red.
r: X has an impression of bright red.

We have r entails q and q entails p. Generally, sentences containing secondary-quality terms enter into a complex of logical relations because the secondary-quality terms they contain stand in certain determinate-determinable relations. It seems inescapable therefore that secondary-quality terms must appear as distinct semantic components of such sentences if any semantical account of these logical relations is to be given. Conversely, anyone who insists, as I do, on treating such sentences as semantical wholes can apparently offer no satisfactory[29] account of these logical relations (indeed, can apparently have little or nothing to say about the determinable-determinate hierarchy at all, in or out of sentences).

I can see no other way to make sense of the semantical role of the determinable-determinate structure but to grant the initial demand. Any move from this concession to the conclusion that there are individual secondary qualities qualifying some members of the ontology is, however, too fast and too unsubtle.

What I have stated is that hyphenated expression of the form 'X has-an-impression-of-ϕ have not *ontologically significant* analysis; more precisely, the ontologically perspicuous form of these sentences is 'X is in a state of kind K'. I shall now argue for two theses: (1) this latter ontologically perspicuous form regenerates the only relevant determinable-determinate hierarchy, and (2) this ontological analysis is compatible with a grammatical/semantical analysis of the earlier form that recognizes the distinctive semantical role of secondary-quality terms. These theses together constitute a rebuttal of the objection while granting its initial claim.

Of what kind are the states associated with having-impressions-of-ϕ? Recall that they have in common at least a certain structuring of the neurological medium. But such structurings themselves must instance a determinable-determinate hierarchy, since there will be more and less general structural properties and descriptions. (Consider, for example, "Medium varying sinusoidally" and "Medium varying sinusoidally with period T and wavelength L".)

Of course we are not consciously-aware of the character of the sensory states; rather, we seem to be aware only of the quality or

kind of experience that they cause in their conscious phases. Not surprisingly, the quality differences and similarities recapitulate part of the state differences and similarities, without being the same thing. It is useful, therefore, to replace the sentence p with "X is having a visual experience," q with "X is visually experiencing somewhere in the typically long wavelength-caused range" and q with "X is visually experiencing somewhere in the range typically caused by long-wavelengths with a high intensity." The point of these replacements is to emphasize that our secondary-quality talk is a way of identifying experiences that ultimately have their basis elsewhere than literal colors, namely in the neurological character of our sensory states. And this explains why their semantical structure is relevant; for their logical relations recapitulate sensory-state relations without being ontologically binding, because the recapitulation is accomplished through identifications, not identities (see § 3). Claims couched in secondary-quality language such as p, q, r identify sensory states K, K_q, K_r, but the logical form of the corresponding claims "X is in State K" is F(X)," which is the ontologically appropriate form.

Given that principles of deep structure analysis are theoretically motivated, it emerges that P gains whatever appeal it has from the silent assumption of one or more of $A_1 \rightarrow A_5$ (cf. the argument from illusion, § 3). With the rejection of these assumptions, P loses its attractiveness and with the rejection of P the intuitive core of the objection against my account is also done away with.[30]

My view of secondary qualities also brings with it a number of advantages in the form of plausible solutions to standard issues—issues which have often provided difficulties for other materialist positions. Thus for example, I am able to explain how a percipient's color experiences may be reversed without producing any difference in his/her behavior, survival value, and so on: the same external stimuli simply cause different (reversed) internal perceptual states *but with the same information encoded*. Moreover, I am freed from having to take a firm stand on the issue of whether perceptual experiences are distinct from the corresponding belief states that arise (contrast Armstrong 1961), though my own view is that such perceptual experiences are distinct from and richer than the corresponding linguistically defined belief states. I am able to explain, in principle,

the phenomenon of intersensory connectedness among secondary qualities (trumpet blast↔red, for example) by postulating media similarity and/or causal connectivity of the corresponding perceptual states. I am able to account for the causal inactivity (or irrelevance) of most secondary qualities (causal irrelevance of corresponding perceptual states) and also to provide plausible explanations of the few exceptions (correlation of causally active external factor and arising of appropriate perceptual state). Finally, I am able to account for the sense of exclusion we feel among secondary qualities of the same sort (nothing can be red and green all over, etc.) in terms of mutual exclusion among the corresponding perceptual states.

Space limitations preclude any expansion upon these advantages here or critical discussion of alternative doctrines of perception. I am content to re-emphasize the importance of a systematic and unifying conception of ourselves.

Notes

1. See references, note 3 below. I have not been arguing that no account of perceptual awareness involving mental states or entities (ideas, sense data) is acceptable. I have been arguing only that no account of perceptual awareness in which mental states or entities were *the immediate objects of perception* was acceptable—and that is a very different matter. There is no objection so far—and none to come—to saying that mental states or entities are involved in perceptual awareness, so long as they are not what is immediately perceived.

2. Such approaches to perceptual systems are now increasingly common and coherent; see, for example, Gibson (1967, 1968), Gregory (1966), Haber (1969), Kabrinsky (1966), Rock & Harris (1967), and especially Neisser (1967) vis-à-vis Neisser (1976) and the references in note 3 below.

3. If readers wish they can think of these phases of CNS states as the physical correlates of the nonphysical conscious states; the important thing is to get the relation between consciousness and other central nervous functions into the right perspective: consciousness is a minor phase of these other functions; it is not the central area in which all mental activities take place. (Let doubting readers recall the importance of the emotional subconscious since Freud, the phenomena of subconscious solution to problems not solvable while conscious ("sleep on it"), hypnotic effects, sleep learning, etc.). Moreover it is a phase of functions; it is not an arena—central or not—in which objects are presented and parade themselves. So far as I am aware, there is not the slightest evidence that consciousness, conscious states or whatever are sharply separated from other CNS processes, or that there is a special object-subject ('arena-audience') structure to conscious awareness. To the contrary, all the evidence seems to support the view adopted here of consciousness as an integrated phase of general CNS functioning. One of the several contributions of a generalized information-processing conceptual scheme for describing nervous functions is to break the grip on us of our ordinary English descriptions of mental functioning which are (naturally) biased heavily toward conscious functioning and which tacitly

build in the arena-object model. Another advantage is the sophistication possible in the discussion of analogue and digital communication.

On this general approach to the central nervous system and consciousness see, for example, Arbib (1972), Ashby (1952), Harnad et al. (1976), Jerison (1973), McCulloch (1965), Mackay (1956), Pribram (1971), Simon (1969), and Sommerhoff (1974).

4. Cf. e.g., references in note 3 and discussion in my book referred to in the introduction. Of course these considerations do not logically prevent one from separating out conscious activity as distinctively mental in some way that conflicts with materialism, or even of separating out a 'complete mind' (subconscious plus conscious components) as distinctively mental; but they suggest to me that a more plausible line to take is that consciousness is a phase of neurological activity, integrated into all other bodily processes in the fashion that modern analytical science and the utilities of survival suggest. Moreover, I believe that this view can be made satisfyingly compatible with the admission of a rich phenomenal life.

5. I want to point out, by way of achieving parity, an important way in which materialists who have even superficially plausible doctrines of perception make use of just this account of experience: when accounting for hallucinatory perception. For whatever a sense-data theorist might say about the reality of the dagger MacBeth saw, no materialist can admit that such a dagger occurs anywhere, inside or outside the head. In these cases, therefore, the perceptual experience cannot be construed along subject-relation-object lines. (A materialist, committed to the inner-scanner model might try to say that MacBeth inner-scanned a neurological screen which he saw, in disguise as it were, as a dagger; but there is the additional difficulty of developing an adequate notion of disguise here on top of the implausibility of the inner-scanner model.) Often this use of the no subject-object structure doctrine contrasts with a general preference for the inner-scanner model. Why the model is not entirely dropped can only be guessed at, as I have done.

6. That is, "physical information" is here intended in the sense treated by information theory. Incidentally, the fact that there is a retinal *image* formed in visual perception does not undermine my claims here, because our perception of that image is itself an end-product of a perceptual process whose starting point is physical information. The retinal 'image' is itself only a pattern of electromagnetic radiation, (and/or a pattern of chemical states in the retina—depending on the extension of the term). There are no corresponding images for the other senses, and none required.

7. The cumbersome formulation in terms of both knowledge and true beliefs is to show that my account of perception does not presuppose a completed epistemological doctrine; rather, the epistemology follows on the account of perception. I am not fundamentally concerned with developing a detailed epistemology in this study, and I do not analyze the relations between knowledge and belief.

8. It is not appropriate, e.g., for person B to perceive X and then report to A, or to allow A's sensory organs to be stimulated but to interrupt the neural development and cause A to have beliefs by some other means (e.g., probes), even though A may in these ways arrive at true beliefs concerning X, and other similar interruptions of the causal chain are ruled out.

9. I reject the argument that we can be aware only of the last link in the causal chain. Cf. Armstrong (1961, chapter 11), and Hirst (1959, pp. 282-82). Also, note that the proper 'units' of perceptual judgments are really whole situations ("There are no crows in the sky," "She's angry because he smiled"), not 'simple' properties of single objects. These latter judgments are sophisticated end-products of the development of perceptual judgment. Only the implicit atomism of the sense-data epistemology in ontology could lead us to think otherwise.

10. The mere fact that the experiences are describable using a sentence with grammatical subject/object structure does not in the least imply that the mental states involved must have a structural analysis in subject/object terms. The descriptions are not *of-the-visual-field* but *of-the-content-of* the visual field. The latter may well have this structure when pressed into propositional form; the visual field need not also be thereby construed as itself a complex object of the same sort.

11. I believe that in offering these descriptions we are offering only a *definite description* of the mental states involved by describing the conditions under which the particular (veridical) perceptual experience can be had, for I believe that such states can only be ostensively *defined*. Note that it would have been incorrect to drop the adjective "belieflike" in favor of just "belief," for it is often the case that we are both perfectly well aware that a particular situation is illusory or hallucinatory and yet continue to be under illusion or hallucinated. On the pure belief acquisition model of perception we should then be entertaining contradictory beliefs, a belief that the world was in a particular condition (e.g., that a particular stick immersed in water is bent), and a contrary belief that the former belief is false (e.g., that the stick is in fact straight). Of course, one could simply grasp the nettle and claim that the beliefs we form in perception are simply not under our voluntary control, so it is not surprising that we sometimes find ourselves forced to hold contradictory beliefs. Perhaps so, but we surely do not feel the sense of tension in these cases that we do in other circumstances when it is pointed out to us that our beliefs are contradictory. In these cases we know very well which statements are true and the persistent recurrence of the perceptual experience becomes merely a nuisance.

Armstrong (1961) comes closer to the actual phenomenological situation when he speaks of perceptual experience as constituting a *prima facie pressure* to believe, or to assent to claims that are being pressed upon us. That is, did we not have countervailing reasons to believe that the perceptual experience was illusory or hallucinatory, our perceptual experience would culminate in our believing that the world was the way it appears to be, and sometimes even when we do have these reasons the pressure to accept appearance as reality is nearly overwhelming.

We have plenty of leeway for a distinction between belieflike states and actual belief states in the neurophysiological model because of its present lack of detail; belieflike states are information states in the postconceptual stage of the processing which are (presumably) very like belief states, except that they have not yet been linked into the battery of systematic evaluative considerations that lead to the final decision to assent to, or dissent from, them. Tentatively I envisage them as states structurally similar to belief states, arising directly in the information processing of perception, and presented, as it were, to the nervous system at large as candidate belief (and knowledge) states for acceptance or rejection. In the normal course of events, these candidate states pass the various filtering procedures that are the neurophysiological operations corresponding to comparison with past examples, stored generalizations, etc., and become, or cause, full-fledged belief states. It is presentation of the belieflike states in combination with their habitual acceptance as belief states in normal conditions that constitutes the pressure to believe of which Armstrong writes. Only under special conditions will this normal process be prevented from occurring.

My theory thus explains how it is that our perceptual experience can contain elements known to be inaccurate, and yet we do not find this logically discomforting.

Of course, when all the details of neurophysiology are assembled it may well turn out that the correct explanation of this situation is rather more complex, and just possibly considerably different in structure, then the simple hypothesis I have offered. But it seems

plausible at this time that something along the lines I have suggested captures the appropriate phase of the correct structure of the perceptual process. In any event, as I said, I am prepared to stake my doctrines on there being the appropriate neurophysiological structures to back them.

12. In particular, other cortical states may also contribute to the quality of our conscious-awareness besides knowledge and belief states, for example, states of the sensory systems involved, memory states, and so forth; but these are not of immediate interest here. Precisely which states are involved, and how, is a problem for science to answer.

13. This feature of perceptual experience is discussed, for example, by Hirst (1959, pp. 238ff.).

14. This is probably because such situations occur but rarely in the experience of the young child when processing is most flexible, and are not important to him or her when they do so. If we lived beneath the sea like fish, I venture to suggest that shape constancy under changing fluid conditions would be something which we would all master very quickly. There would then be no more illusions of that type.

15. It is presented clearly, for example, by Armstrong (1961, chapter 1) and by Ayer (1961). It is argued very persuasively by Price (1964).

16. It can be seen, therefore, that there are two points at which I reject the move from "I seem to see an X" to "I see a seeming X," where that move might seem plausible (namely, under illusory or hallucinatory conditions). I reject it for the case of hallucinatory perception and deny that there is any *object* of the perceptual experience at all. I reject it for the case of illusory perception and claim that the object of perception is the usual external physical object or situation, but perceived inadequately. The move has no plausibility by itself at all in the case of veridical perception. The reply shows, for example, how I would reply to similar moves of Price (1964). A final remark: of course in some sense of the word every doctrine of perception that expects to offer an account of transformation of information from the world to human heads must posit structural transforms of the external world in the head, of some sort or other, and these might be called representatives of the world in the mind (= head). On this basis my own doctrine has been labeled Representative Realism by some. But, used in this way, the label is so general as to be useless: it applies to every plausible doctrine of perception whatever, and entirely fails to do justice to the historical doctrine so named whose epistemology, ontology, and psychology are so radically opposed to my own.

17. I call the materialism naturalistic because all the natural sciences are included as possibly equifundamental for our understanding of the nature of the physical world. Such materialism, although richer than its original mechanical version, is also less sharply demarcated from some of the older opposing positions.

18. This claim cannot be argued here, but see, e.g., the arguments cited by Smart (1963, p. 81) and Armstrong (1968, pp. 257-60), Bradley (1964), and Sellars (1963).

19. This is not a Kantianlike remark to the effect that a colored medium is logically necessary for visual perception. To the contrary, that the visual medium is a color medium is dependent upon the facts of our constitution, namely, that our visual perception has the encoding principles and medium that it does as a matter of fact have. Things might well have been otherwise. It is hoped that we shall someday be able to give an explanation of why there are just the colors there are, in terms of the character of the encoding medium and encoding principles, and perhaps we shall be able to change the qualitative medium of visual perception in consequence of that understanding.

20. For consistency and completeness we may also suppose that conscious-awareness itself has an evolutionary explanation. Roughly, the explanation is that the higher inte-

gration levels characteristic of conscious mind-brains are more efficient feedback control devices than a larger number of lower-level unconscious subsystems (especially when abstract symbolic manipulation is involved—see references to literature in § 1).

21. See Piaget (1929, 1951, 1954, 1971), as well as Berlyne (1957) and Gessell (1940, 1949).

22. See, for example, Bower (1966), Gibson & Walk (1960), and Rock & Harris (1967).

23. A point to be stressed is that the choice of a particular processing is *not* to be regarded as a choice of inference rules, or as a projection of inner features out in the world. Thus to so process visual information that colors are accorded an objective status is not to project anything (colors, for example) out into the world. The word "projection" suggests a quite misleading picture of the entire process. It suggests that we first perceive the colors internally and then project them out into the world, rather like a movie projector. This is an erroneous picture of conscious perception. There is no inner perception and no consequent projection. There is simply a *way* of perceiving, i.e., a manner of processing information and the conscious experience of that way of perceiving. But what is directly perceived in this way of perceiving is the enduring external world.

24. In light of my comments, it can be seen, however, that we actually have to do here with a *double* attribution. There is the attribution of physical properties to the surface: roughly, having a surface geometry such that variations in depth are larger than δ and occur over areas larger than ϵ. And there is the reference to the tactile (secondary) quality experience which touching that surface causes us to have. So few are the tactile illusions encountered in everyday life, however, that these two aspects tend not to be distinguished.

25. One must take the *fact* of the current conceptual scheme seriously, to be sure. But this attitude may find expression in an explanation of how the scheme came to embody the errors which it does embody. Natural language as a mature individual possesses it is the end result of the trial and error process of adjustment, collectively of the human race over the centuries and individually of that person's personal and social experiences. As with our perceptual organization and the rest of our more conscious beliefs in general, it is not guarenteed free of error or inadequacy, or the possibility of revision.

26. This simple statement is often complicated by an implicit pragmatic content, referring beyond the immediate sensory situation, which such statements often carry. That is, the utterer is usually making a claim about a body's *standing* color, not its transitory color (cf. Campbell in Rollins, 1969). But this is an inessential complication here.

27. The real situation is probably more closely reflected in the conjecture that we are driven to demand such an *individual* basis for colors because of their *appearance* of objectivity. But only something like the above principle, which does in any case have a grip of its own upon philosopher's minds, is strong enough to support the demand.

28. Let me call attention to the ambivalent attitude of contemporary materialist philosophies to principle P. On the one hand, these philosophies conform to the principle by attempting to reduce all distinguishable experienced qualities to distinguishable properties of the external world. But on the other hand, they are forced to deny (implicitly) the principle (just as I would do), when it comes to hallucinations, for materialists deny that there is, strictly, any object of the hallucinatory perceptual experience. Rather, they simply assert that the total hallucinatory experience is reducible to an internal process alone. Thus it is somewhat perverse for materialists to press the above objections against my position, though they often do so. Contemporary materialists place great emphasis on the ability to say what any given hallucination was *like—phenomenologically like*. The typical formula is "it (the hallucination) was like the veridical perception of . . ." This ability tends to create the (spurious) feeling that the *nature* of hallucinations has thereby

been adequately accounted for. But if there is any gap at all, there is as much or more of a gap in the account of materialists as there is in my account, and no amount of talk about *phenomenological similarities* can wipe out the (concealed) problem of accounting for the *ontological dissimilarities* that exist. For we have in hallucinatory experience a *perceptual* experience and yet we are perceptually aware of nothing; this is as much of a problem for materialists (who hold a direct realist account of perception), as it is for anyone else. In fact it is more of a problem for those who hold to P, for P is violated in the case of hallucinatory perceptual experience but not, apparently, in the case of veridical perceptual experience. What must be done, at minimum, is to show that though P may be violated in hallucinatory experience it must remain valid everywhere else. This has never been done—or even attempted—to my knowledge. Nor, in view of my reasons for rejecting P, can I see how it could be successfully attempted. (Note also that the specification of phenomenological content by the use of the quoted formula above is a device which I and anyone else can also use.)

29. I have in mind as unsatisfactory an unexplained postulation of all of the requisite logical relations among claims of the form p, q, r treated as wholes.

30. There are other ways to defend P, of course; among these the most powerful known to me is that of Sellars. For an articulation, examination, and rejection of his argument, see Hooker (1977).

References

Arbib, M. *The metaphorical brain.* New York: Wiley-Interscience, 1972.

Armstrong, D. M. *Perception and the physical world.* London: Routledge & Kegan Paul, 1961.

Armstrong, D. M. *A materialist theory of the mind.* New York: Humanities Press, 1968.

Ashby, W. R. *Design for a brain.* London: Chapman and Hall, 1952.

Ayer, A. J. *The problem of knowledge.* Baltimore, Md.: Penguin Books, 1961.

Berlyne, D. E. Recent developments in Piaget's work. *British Journal of Educational Psychology*, 1957, 27, 1-12.

Bower, T. G. R. The visual world of infants. *Scientific American*, 215 (December, 1966), 80-92.

Bradley, M. C. J. J. C. Smart's 'Philosophy and Scientific Realism'. *Australian Journal of Philosophy*, 1964, 42, No. 2.

Dennett, D. *Content and consciousness.* London: Routledge & Kegan Paul, 1969.

Gessell, A., et al. *The first five years of life.* New York: Harper, 1940.

Gessell, A., et al. *Vision: Its development in infant and child.* New York: Harper, 1949.

Gibson, E. J., & Walk, R. D. The visual cliff. *Scientific American*, 203 (April, 1969), 2-9.

Gibson, J. J. New reasons for realism. *Synthese*, 1967, 17, 162-72.

Gibson, J. J. *The senses considered as perceptual systems.* London: George Allen & Unwin, 1968.

Gregory, R. L. *Eye and brain.* New York: McGraw-Hill (World Univeristy Library), 1966.

Grossman, N. Empiricism and the possibility of encountering intelligent beings with different sense-structure. *Journal of Philosophy*, 1974, 61, 815-21.

Haber, R. N. *Information-processing approaches to visual perception.* New York: Holt, Rinehart and Winston, 1969.

Harnad, S. R., Steklis, H. D., & Lancaster, J. (Eds.), *Origins and evolution of language and speech.* New York: New York Academy of Sciences, 1976.

Hirst, R. J. *Problems of perception.* New York: Humanities Press, 1959.

Hooker, C. A. Systematic philosophy and the secondary qualities. Ph.D. dissertation, York University, Canada, 1970.

Hooker, C. A. Systematic Realism. *Synthese*, 1974, 26, 409-97.

Hooker, C. A. Systematic philosophy and meta-philosophy of science: Empiricism, Popperianism and realism. *Synthese*, 1975, 32, 177-231. (a)

Hooker, C. A. On global theories. *Philosophy of Science*, 1975, 42, 153-79. (b)

Hooker, C. A. Toward an adequate conception of scientific rationality. To appear. Invited paper for an international workshop on the Philosophy and Methodology of Science, Kronberg, July 1975 (c)

Hooker, C. A. The philosophical ramifications of the information-processing approach to the brain-mind. *Philosophy and Phenomenological Research*, 1975, 36, 1-15. (d)

Hooker, C. A. Sellars and the elimination of sensa. *Philosophical Studies*, 1977, 32, 335-48.

Jerison, H. J. *Evolution of the brain and intelligence*. New York: Academic Press, 1973.

Kabrinsky, L. *An information processing theory of vision*. Urbana: Ill.: University of Illinois Press, 1966.

Mackay, D. M. An information-flow model of human behaviour. *British Journal of Psychology*, 1956, 46, 30-43.

McCulloch, W. S. *Embodiments of mind*. Cambridge, Mass.: M.I.T. Press, 1965.

Nicholas, J. *Images, perception and knowledge*. Dordrecht, Holland: Reidel, 1976.

Neisser, U. *Cognitive psychology*. New York: Appleton-Century-Crofts, 1967.

Neisser, U. *Cognition and reality*. New York: W. H. Freeman, 1976.

Piaget, J. *The child's conception of the world*. New York: Harcourt, Brace Jovanovich, 1929.

Piaget, J. *Language and thought in the child*. New York: Humanities Press, 1951.

Piaget, J. *The construction of reality in the child*. New York: Basic Books, 1954.

Piaget, J. *Insights and illusions of philosophy*. New York: Meridian Books. 1971.

Pribram, K. *Languages of the brain*. Englewood Cliffs, N.J.: Prentice-Hall, 1971.

Pribram, K., & Baron, R. The holographic hypothesis of memory structure in brain function and perception. To appear in R. C. Atkinson, D. S. Krants, R. C. Luce, and F. Suppes (Eds.), *Contemporary developments in mathematical psychology*.

Price, H. H. Appearing and appearance. *American Philosophical Quarterly*, 1964, 1, 3-19.

Robinson, H. J. *Renascent rationalism*. Toronto: Macmillan, 1975.

Rock, I. & Harris, C. S. Vision and touch. *Scientific American* 1967, 216, 96-104.

Rollins, C. N. *Contemporary philosophy in Australia*. London: George Allen & Unwin, 1969.

Sellars, W. *Science, perception and reality*. London: Routledge & Kegan Paul, 1963.

Simon, H. A. *The sciences of the artificial*. Cambridge, Mass.: M.I.T. Press, 1969.

Smart, J. J. C. *Philosophy and scientific realism*. London: Routledge & Kegan Paul, 1963.

Snyder, F. W., & Sendon, N. H. *Vision and spatial inversion*. Wichita, Kansas: University of Wichita Press, 1952.

Sommerhoff, G. *The logic of the living brain*. New York: Wiley, 1974.

Thomas, W. J. Communication Without Sensory Overlap. *Journal of Philosophy*, 1975, 62, 256-57.