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Flavors, Colors, and God

In this essay I will be presenting, and defending, an argument for the existence of God. It will not be a knockdown proof that would suffice by itself to settle the issue in favor of theism; at best it will contribute to a cumulative case. Knockdown proofs are rare in metaphysics; and while the existence of God is much more than a metaphysical issue, it is that also, and is like other metaphysical questions in this respect. But even where there are no absolutely conclusive demonstrations, considerations for and against can still be found. We can look for theoretical advantages and disadvantages, as we may call them, of a metaphysical position. Theoretical advantages of theism can be found in the possibility of theological explanations of facts otherwise hard to explain.

The argument I will present is quite simple in a way, and not particularly original. It is a version of the argument from consciousness which was Locke's principal argument for theism,[1] and which has recently been so ably revived by Richard Swinburne as to claim a whole chapter of response in J. L. Mackie's apology for atheism.[2] Nonetheless, I think that it is still a neglected argument, and that some of its strengths can be brought out in new ways, first by placing it in a historical context, and second by concentrating on one particular aspect of consciousness.

1. The Question

Why do red things look the way they do (and not the way yellow things do)? And not less important, why do red things look today the way they

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looked yesterday? Why does sugar taste the way it does (and not the way salt does)? And not less important, why does sugar taste today the way it did yesterday? These are instances of a more general question, but to discuss it we will need a general term for such things as the look of red and the taste of sugar. The usual term is 'phenomenal qualia', or 'qualia' for short.

Philosophers have debated much about the nature of phenomenal qualia. Are they properties of the mind, or of states of mind, or of something else that might be called a "sense datum" or "idea"? I don't think we have to know, for present purposes. It is enough that we know that experiencing the appearance of something red, the appearance of something yellow, the taste of sugar, the taste of salt, the smell of a rose, the smell of hydrogen sulfide, are kinds of experience that differ from each other in ways that cannot be analyzed in a definition, but with which most of us are vividly familiar. Kinds of experience that differ in those ways are, or are associated with, phenomenal qualia. (Some philosophers deny that there are any such things. I'm sure they are wrong. I will come to them in section VI, but will ignore them for the time being, in the confidence that everyone will recognize what I am talking about.)

Now I can state my general question: Why are phenomenal qualia correlated as they are with physical qualities?

II. The Obvious Attempt at a Scientific Explanation

One's first reaction to this question may be to think that the answer to it is well known and does not involve God. Red things look the way they do because they reflect red light (or more accurately, certain wavelengths of light) to our retinas, and that sort of light affects part of the retina, causing it to transmit certain electrical signals to the brain, setting up a certain pattern of electrical activity in the brain, which causes us to see red. Similarly sugar tastes the way it does because its chemical composition affects certain taste receptors in the tongue in such a way that they send electrical impulses to the brain that result in a certain pattern of electrical activity in the brain, which gives us the sensation of a sweet taste.

I assume that these scientific accounts are at least approximately true. The trouble with them is that they do not answer the question that I am asking. For suppose that the experience of seeing red is caused by brain state R, and the experience of seeing yellow by brain state Y (both R and Y being patterns of electrical activity). This correlation of the appearance

of red with *R*, and of the appearance of yellow with *Y*, is an example of precisely the sort of thing I am trying to explain. That is, it is an example of the correlation of phenomenal qualia with physical qualities or states. We have merely explained one mental/physical correlation in terms of another.

Why does *R* cause me to see red? Why doesn't it cause me to see yellow—or to smell a foul odor? We do not imagine that *R* is itself red, or *Y* yellow. It is hard to conceive of any reason why a particular pattern of electrical activity would be naturally connected with the peculiar kind of experience that I call the appearance of red, rather than with that which I call the appearance of yellow. Indeed, it is hard to conceive of any reason why a pattern of electrical activity would be naturally connected with either of these appearances, rather than with no phenomenal qualia at all. Let us be clear that I am not denying that *R* and *Y* are in fact constantly *correlated* with the experience of red and yellow respectively. I am also not denying that *R* and *Y cause* me to experience red and yellow, respectively. What I want to know is why these relationships between brain states and phenomenal qualia obtain rather than others—and indeed why any such regular and constant relationships between things of these two types obtain at all.

The search for explanation does not normally stop with the discovery of a correlation. On the contrary, science mainly seeks to explain not particular events, but correlations and other general facts. If I want to find out why my car won't start this morning, I go to a mechanic, not a scientist. But I might go to a scientist to find out why water regularly boils at a lower temperature in Denver than in Los Angeles.

It is difficult, however, to see how science would even try to explain the correlation between phenomenal qualia and brain states (or whatever other physical states the qualia are most directly correlated with). For what science is geared up to do is to find laws governing physical states, described in terms of properties that are geometrical or electrical or at any rate quite different from phenomenal qualia. Whatever mechanisms of that sort we discover, the problem of why precisely these flavor experiences or color experiences should be associated with just those physical states will remain essentially the same.

III. The Aristotelian Explanation

At this point we might be tempted to say that we cannot imagine what *any* explanation of the correlation of phenomenal qualia with physical

states would look like; and that might lead us to suspect that the request for an explanation of it is misconceived. The history of Western thought comes to the aid of our imagination at this point, however, enabling us to see what a solution to our problem might look like. The first solution we will examine is surely false, but it does at least make sense enough to show that there is something here that in principle invites explanation.

It is part of the Aristotelianism that dominated Western thought in the later Middle Ages.[3] One difference between Aristotelianism and modern thought is this. We do not think there is any quality in physical objects that resembles the peculiar qualities or qualia that make the difference between experiencing red and yellow, or between the taste of sugar and salt. We believe that those experiences are caused by physical properties of bodies that are not at all like our phenomenal qualia. But the typical opinion of Aristotelian Scholastics was that phenomenal qualia are similar to, and produced by, physical qualities that we perceive in bodies by means of the qualia. There is a qualitative "form" in the sugar that is like the quality of the taste of sugar that makes it different from the taste of salt. The quality of the appearance of red that makes it different from the appearance of yellow resembles a form or quality that is present on the surface of a typical ripe apple.

On this Aristotelian view, the answer to the question, why phenomenal qualia are correlated with just those physical qualities with which they are in fact correlated, is straightforward. They are the same (or, at any rate, similar) qualities, present materially in the bodies that are perceived, and immaterially to the mind that perceives. This correlation is not arbitrary but natural, perhaps almost self-explanatory.

Of course it's not quite as simple as that. We want to know how the redness gets from the apple to the mind. Redness, Scholastics thought, exists on the surface of the apple as a qualitative "Form." Forms function as properties of things, but that is not their only role in Aristotelian theory; they are also causal agents. They operate by something like infection. Forms or qualities spread from things that have them to things that previously did not. Heat transfer provides a good case for this conception of causal interaction. If a heated rock is placed in cool water, the form of heat is imparted to the water from the rock; or, more precisely, the form of heat in the rock causes a new, similar form in the water.

Something like this happens in sensation, which is, after all, a causal process. If I place my hand in hot water, a sensible form of heat is transmitted from the water to my hand. From there it is transmitted through my body to the place at which it is made present to my mind as a feeling

of warmth. In seeing red there is an additional complication, for the red surface of the apple is not in immediate contact with my body. For this reason vision requires a "medium," something transparent, like air, to which a form, typically called a "sensible species," of red is initially imparted and through which it is transmitted to my eye. From the medium the form of red enters the liquid in my eyeball; thence it is transmitted through my body to the appropriate place to become present to my mind. Thus I see red. The feature of this causal history that explains the connection between physical states and phenomenal qualia is that similar forms of red are present at every stage of the process: on the surface of the apple, in the medium, in the eyeball, and in or to the mind.

This theory is fantastic, you will object. Aren't these sensible species and media too bizarre to be taken seriously? That is my initial reaction too. But if we think about them carefully, trying to set aside the prejudices engendered by our own education, I believe we can see that in their own context these Aristotelian ideas are no more bizarre or incoherent or absurd than the quanta and quarks of modern physical theory. In fact there is something very commonsensical and directly experiential about the Aristotelian theory. Can't you *see* the "form" of whiteness on the surface of this piece of paper? Of course you are not accustomed to call it that, but doesn't the peculiar quality of whiteness known only by sight appear to you to lie on the surface of the page?

Nonetheless we have good reason to reject the Aristotelian account of these matters. Its rejection, in the early seventeenth century, was an important part of the beginning of modern science. Galileo wanted to develop a *mathematical* science of nature. "Philosophy," he wrote, meaning what we mean by 'science',

> is written in this grand book, the universe, which stands continually open to our gaze. . . . It is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures without which it is humanly impossible to understand a single word of it.[4]

But the Aristotelian physics of qualities was relatively unamenable to mathematization. If we consider them purely in themselves, and as phenomenal qualia (or qualitatively identical with phenomenal qualia), leaving out of account everything we now know or believe about physical qualities that are correlated with them (such as wavelengths of light), the qualities of red and yellow, or (worse yet) the qualities of sweet and green, stand in no obvious or easily measured geometrical or arithmetical

relationship to each other. This point will become important later in our argument. It was also a motive for rejecting the infection conception of causation and the idea that the whole diverse array of sensible qualities are causal agents in nature.

One well-known type of causation lent itself magnificently to mathematical treatment. *Mechanical* interactions, in which bodies affect each other by impact, by virtue of their motions and their mutual contact, can be described and explained in terms of sizes, shapes, and motions which can be treated geometrically and arithmetically. Galileo, Descartes, and other seventeenth-century natural philosophers proposed to reduce all causation in nature to purely mechanical interactions. That would make geometrical properties, plus motion and rest, the sole causally relevant properties of physical objects.

The mechanistic theory was applied to the action of physical objects on our sense organs, and of the sense organs on the central nervous system, as well as to other causal interactions in nature. Sight, for example, was explained in terms of mechanical action on the retina by light, conceived as either a stream of minute particles or pressure in a subtle circumambient fluid. From the retina, visual data were transmitted by mechanical operation of the nerves to the brain. There, notoriously, things got more complicated—but more of that later.

It follows from this theory that even if resemblances of our phenomenal qualia are in physical objects, they do not *cause* our sensations. But in fact the whole idea of such physical resemblances of the qualia was given up as explanatorily superfluous—and worse, as something for which no mechanical explanation could be given (and for other reasons that were found). Thus the Aristotelian explanation of the correlation between the qualia and physical states was relinquished.

The progress of modern science has vindicated the rejection of Aristotelianism. Our science is no longer mechanistic in the seventeenth-century sense. It admits electrical charge, for instance, alongside size and shape, as a causally relevant physical property. But it has no use for Aristotelian "forms," nor for any sort of physical resemblance of phenomenal qualia. The Aristotelian solution of our problem is no longer a live option. Even if we adopted a "common-sense realism" about flavors, colors, and other "secondary qualities," as some contemporary philosophers have proposed, we would not thereby revive the Aristotelian scheme of causal explanation; and we would still face the question of how to explain the correlation of flavors, colors, etc. (in the objects as well as in the mind) with the electromagnetic states that modern science seems to have discovered.

IV. The Theological Alternative

In this rejection of Aristotelianism something interesting happened to those peculiar qualities we experience in seeing red and yellow and tasting sugar and salt. They were "kicked upstairs," as M. R. Ayers has put it, into the mind.[5] Galileo concluded that "tastes, odors, colors, and so on, are no more than mere names so far as the object in which we place them is concerned, and that they reside only in the consciousness."[6] Since the existence of the phenomenal qualia is so evident in sensation that it can hardly be denied, they are seen as features belonging exclusively to the mental realm, and absent from the physical. One of the ways in which the mind/body problem is more difficult for modern thought than for Aristotelianism is that there is for us no affinity between the mental and the physical with respect to these qualities and it becomes an unsolved problem again *why* phenomenal qualia are correlated as they seem to be with physical qualities.

How did early modern thinkers propose to explain this correlation? Theologically, for the most part. Descartes ascribed it to the arbitrary action of God, though he thought the mind/body relations that actually obtain had been designed by God with certain ends in view.

> The nature of man could indeed have been constituted by God in such a way that that same motion in the brain [which in fact causes me to feel a pain in my foot] would have presented whatever else you please to the mind. In particular, it could have displayed itself, insofar as it is in the brain, or insofar as it is in the foot, or in some place in between, or finally anything else whatever. But nothing else would have been as conducive to the preservation of the body.[7]

Locke dwells extensively on the need for theological explanation at this point:

> . . . the production of Sensation in us of Colours and Sounds, *etc.* by impulse and motion . . . being such, wherein we can discover no natural connexion with any *Ideas* we have, we cannot but ascribe them to the arbitrary Will and good Pleasure of the Wise Architect.[8]
>
> 'Tis evident that the bulk, figure, and motion of several Bodies about us, produce in us several Sensations, as of Colours, Sounds, Tastes, Smells, Pleasure and Pain, *etc.* These mechanical Affections of Bodies, having no affinity at all with those *Ideas*, they produce in us, (there being no conceivable connexion between any impulse of any sort of Body, and any perception of a Colour, or Smell, which we find in our Minds) we can have no distinct knowledge of such Operations beyond our Experience; and can reason no otherwise about them, than as effects produced by the ap-

> pointment of an infinitely Wise Agent, which perfectly surpass our Comprehensions.[9]

The cautious Locke does not flatly assert that there cannot be a nontheological explanation; but he thinks a theological explanation is the only one that is accessible to us, and he seems quite prepared to embrace it.

This is in agreement with Locke's views about the relation of physical qualities to consciousness in general. He states, "Matter, *incogitative Matter* and Motion, whatever changes it might produce of Figure and Bulk, *could never product Thought.*"[10] Motion, shape, and size cannot explain the existence of thought. Neither can the geometrical structure of a system of bits of matter, "For unthinking Particles of Matter, however put together can have nothing thereby added to them, but a new relation of Position, which 'tis impossible should give thought and knowledge to them."[11]

The rejection of Aristotelianism thus left the most typical of early modern thinkers with a system of physical states of affairs and a system of mental states of affairs, utterly diverse from each other and correlated only by the will and power of God. The supernaturalism of this view of the world was not unnoticed in the seventeenth century, and was not unwelcome to most of the founders of modern thought. Aristotelianism in its less theological forms, on the other hand, offered the possibility of a more integrated naturalistic world view that would not need to appeal to voluntary acts of God to explain the interaction of corporeal and mental nature.

It was an audacious move to give up that possibility of integration by rejecting Aristotelianism and splitting the world into physical and mental states of affairs between which no natural connection could be seen. This has clearly been such a good move for the progress of science that we can hardly doubt that it has brought us closer to the truth. But we may wonder whether this step would have been taken in a culture in which theism was not taken more or less for granted, as it was in seventeenth-century Europe. Without a theological explanation of the correlation between phenomenal qualia and physical states, would it have seemed plausible to reject the Aristotelian doctrine of their affinity? At any rate, a theological explanation of the correlation was the main one that was offered; and I think it is the only promising one that has been proposed. It is a theoretical advantage of theism that it makes possible such an explanation.

A brief digression is in order before we conclude our historical survey. In this discussion of seventeenth-century thought I have focused on thinkers who were dualistic in their view of the relation between physical and

mental states of affairs. There was of course also an important idealistic movement in early modern philosophy, represented by Leibniz and Berkeley—a movement to which I personally am very sympathetic. Idealism seems to solve our problem. Physical and mental states are correlated as they are because the physical states are constructed out of the mental ones. But this only accentuates another problem. Why do our perceptual states occur in the order in which they do? This cannot be explained in terms of the action of bodies, for bodies are constructed out of the very perceptual facts to be explained, according to the idealist. And it certainly is not plausible to regard it as sheer happenstance that our perceptions are such that we can regard them as representing an orderly world. Early modern idealists had recourse to a theological explanation at this point, and I do not think any other plausible explanation is available.[12] Idealism has at least as much need of God as dualism, and cannot offer an atheistic escape from the problem of phenomenal qualia.

V. The Impossibility of Any Scientific Explanation

The hardest philosophical work in this paper has been reserved for the final two sections, in which I must deal with the two main objections to my argument. The first is an objection to my claim that there is no prospect of a plausible alternative to a theological explanation of the correlation between phenomenal qualia and physical states, and in particular to my claim that natural science cannot provide such an explanation.

Many people, including many theologians, are deeply prejudiced against any theistic argument based on a claim that science cannot explain something. Immensely (and rightly) impressed by the success of modern science in explaining the phenomena of nature, they judge it reasonable to assume that any remaining "gaps" in the scientific explanation of the world can in principle, and very likely will in fact, be filled by the continuing advance of science. A "god of the gaps," postulated to account for things that science cannot yet explain, seems to them a monarch of an inexorably dwindling realm, and doomed to be dethroned. Shouldn't the track record of science lead us to assume that there is a purely natural, nontheological explanation of the correlation of phenomenal qualia with physical states—an explanation that scientists can, and probably eventually will, discover?

What I have to make clear in opposition to this objection is that it is not just that science has not *yet* found an explanation for the correlation between qualia and physical states. Science is headed in the wrong di-

rection for finding such an explanation, and it would be silly to expect science to turn in another direction.

Here it will be convenient to follow Richard Swinburne in distinguishing between two types of explanation. "Scientific explanation" is explanation in terms of laws of nature. "Personal explanation" is explanation in terms of the powers and intentional actions of voluntary agents.[13] If such a deep structural feature of at least the conscious part of nature as the correlation of phenomenal qualia with physical states is to be explained by the action of a voluntary agent, the agent will pretty well have to have such knowledge and power, and such a creative role, as to count as a deity. So, assuming that the only available types of explanation are the scientific and the personal, the alternatives to a theological explanation of this correlation will be to leave it a brute, unexplained fact (which seems pretty implausible), or else to explain it by a law of nature.

What would a law of nature have to look like in order to explain this correlation? Many seventeenth-century thinkers would have said the law would have to indicate a "perspicuous," intuitively intelligible connection between the phenomenal and physical states. It also seemed to them unlikely that there could be such a connection. That is part of what Locke was saying in the passages I quoted in section IV. These views still seem rather plausible to me, and perhaps there is an echo of them in Swinburne's statement that "brain-states are such different things qualitatively from experiences, intentions, beliefs, etc. that a *natural* connection between them seems almost impossible."[14] But I will not insist on this line of argument, for perspicuity and intuitive satisfaction are widely distrusted as criteria of success in scientific explanation.

A more universally accepted requirement for adequacy of a scientific explanation of a correlation is that the law in terms of which it is explained must be more *general* than the correlation. The explanation will thus embed the correlation in a more comprehensive and powerful theory. In order to be general enough to explain the correlation, the law must correlate things that do or could occur more widely than the terms of the correlation to be explained. In this and other ways it must present a *simpler* view of the universe than we have with the correlation unexplained. And of course the explanation must not be circular: It must not presuppose any of the facts to be explained. These requirements will be enough for my argument.

For it seems impossible to obtain the requisite generality. Suppose again that *R* and *Y* are patterns of electrical activity in the brain that cause the phenomenal qualia of red and yellow, respectively. A more *general* law that explained these correlations would not mention *R* or *Y* or the specific

qualia of red and yellow. It would be stated in terms of other, more general characteristics of physical and conscious states. But it would imply that a physical state whose description (in the more general terms) *R* uniquely satisfies is correlated with a conscious state whose description (in the more general terms) is uniquely satisfied by the phenomenal quale of red. Here we stumble on the first difficulty in the way of obtaining the desired generality: Are there such general descriptions that are uniquely satisfied by the various phenomenal qualia?

I can think of two ways of trying to obtain descriptions of particular phenomenal qualia in more general terms, on which a sufficiently general scientific law could operate. Neither will do the job. The first would be to try to analyze the qualia as structured complexes of a small number of simpler elements common to all or many of them. For example, it has been claimed that the phenomenal quale of orange is composed of qualia of red and yellow. Experimental evidence can be cited in support of this claim.[15] Perhaps the evidence could sustain an alternative interpretation; but the main point to be made here is that even if the phenomenal quale of orange can be constructed out of qualia of red and yellow, that will not go very far toward a solution of the problem. For the qualia, or phenomenal hues, of red and yellow are generally acknowledged to be simple rather than complex, and we still want an explanation of their correlation with physical states.

This objection might be avoided by a much more ambitious analysis of phenomenal qualia. Leibniz held that though we are unable to explain what red is, or what any other phenomenal quale is, except by exhibiting it, "yet it is certain that the concepts of these qualities are composite and can be analyzed, as is obvious since they have their causes."[16] His opinion seems to be that our perceptions of the so-called secondary qualities, such as colors, smells, and tastes, are confused perceptions of their physical causes, which on his mechanistic view are to be understood in terms of primary qualities, such as size, shape, position, and motion, of minute particles of matter. He argues for the analyzability of phenomenal qualia explicitly on the ground that it provides a solution to our problem.

> It is also the insensible parts of our sensible perceptions that make there to be a relationship between these perceptions of colors, warmths, and other sensible qualities and the movements in bodies that correspond to them; whereas the Cartesians, with our Author [Locke], penetrating as he is, conceive the perceptions that we have of these qualities as arbitrary—that is to say, as if God had given them to the soul according to his good pleasure without having regard to any essential relationship between these perceptions and their objects: an opinion that surprises me and seems rather un-

> worthy of the wisdom of the author of things, who does nothing without harmony and without reason.[17]

On Leibniz's view there is a natural affinity between the phenomenal qualia and their physical causes, in that the former are representations (albeit confused) of the latter. There is an obvious similarity between Leibniz and Aristotelianism on this point. The natural affinity makes it easy to state a general law governing the correlation between the qualia and physical states (although Leibniz thinks it is indeed God who gives the law effect). The general law is that each perceiving substance has perceptions representing the state of its organic body (and indirectly representing other things insofar as its body, as affected by them, represents them too).

But Leibniz's theory still is liable to the objection that many (at least) of the phenomenal qualia seem quite simple. Indeed, I think this objection is fatal to the theory. We can simply see and taste that the phenomenal qualia of red and sweet are quite different from any perception of sizes, shapes, and motions as such, and do not have the structure of such a perception. Perhaps if our sensory powers were more acute, we would perceive the shapes of sugar molecules instead of tasting their sweetness as we now do; and that might be in some sense a less "confused" perception than we actually have. But it would be qualitatively different from our present sensation of sweetness. It would not be the phenomenal quale whose actual correlation with sugar stimulation of the tongue we are trying to explain.

If the analysis of phenomenal qualia as complexes of simpler qualities cannot plausibly be carried far enough to solve our problem, there may be another way of trying to obtain identifying descriptions of the qualia in sufficiently general terms. If they cannot be broken up into more fundamental elements, it might still be possible to find patterns of resemblance among them that would enable us to arrange them on a scale and assign a unique numerical value to each phenomenal quale. Phenomenal pitches of sound, even if simple, can be ordered on a scale; and practised persons with "perfect pitch" can assign quite definite proportionate values to the "distances" between pitches on the scale. Phenomenal hues of color, likewise, might be assigned real numbers according to their position in the spectrum. This suggests that our general, explanatory law could take the form of an algorithm for finding the numerical value of the corresponding phenomenal quale, given a numerical value determined by certain quantities in a physical state.

A law of this sort could presumably be put in the form,

L: If $F(p) = S(q)$, then p causes q,

where p ranges over suitable physical states of affairs, and q over phenomenal qualia and perhaps over conscious states in general.[18] $F(p)$ will be a non–ad-hoc function from physical properties of p to mathematical values, and $S(q)$ an independent, non–ad-hoc function from q to mathematical values from the same range. It is convenient to think of these values as real numbers, but in principle they could be ordered n-tuples of real numbers; ordered triples might be required as values of $S(q)$, for example, in order to represent the relations of color qualia in hue, brightness, and saturation. The functions must be non–ad-hoc, or the law will not explain the phenomena, but merely restate them. And $F(p)$ and $S(q)$ must be mutually independent, in the sense that for a given p and q, the values of F and S can in principle be determined without knowing whether p and q are correlated; otherwise the explanation would be circular.

Two difficulties confront this approach, one associated with $F(p)$ and the other with $S(q)$. We will begin with the former. In order for the law to have the requisite generality, p must range over a sufficiently broad class of physical states of affairs. It will be easier to understand this in an example. Suppose we are trying to explain the correlation of phenomenal qualia with patterns of electrical discharge in the brain. In this case perhaps p would range over all electrical discharges in the universe. If p ranged only over those electrical discharges that occur in the brain, then a law in terms of p would merely restate, and not explain, an important part of what is to be explained here. For we would still want to know why phenomenal qualia are correlated with electrical discharges in the brain, and not with others.

Let's assume that $F(p)$ is the voltage of p. That is not plausible, but it will provide a clear and simple initial illustration. Then the general law says that each mathematical value of $F(p)$—that is, each voltage—is equal to the mathematical value assigned by S to a phenomenal quale, or perhaps some other conscious or mental state, that is caused by, and found in association with, electrical discharges of the corresponding voltage.

The objection that will occur immediately to most of us is that this implies that all the electrical discharges in the universe are associated with phenomenal qualia, or with other mental states, as our brain states are associated with them. What, we may ask, do the spark plugs in the engine feel, as we start a car? Could we make them see yellow by supplying them with the appropriate voltage? This is a sort of panpsychism. It could conceivably be true. But it surely has *no more* intrinsic plausibility than theism, and a lot less explanatory power.

Perhaps, however, this panpsychist result is due to the crudity of identifying $F(p)$ with voltage. Any plausible account of $F(p)$ will be much more complicated. Might we not be able to find an acceptable account on which the value of $F(p)$ would turn out to be zero for all values of p that occur outside of central nervous systems? We could then interpret **L** as implying that if $F(p) = 0$, p has no associated mental state. To assume that this could be done in a plausible, non–ad-hoc way would be issuing a very large promissory note; but let us grant it for the sake of argument, and pass on to the difficulty associated with $S(q)$, which seems to me decisive.

There is no plausible, non–ad-hoc way of associating phenomenal qualia in general (let alone conscious or mental states in general) with a range of mathematical values, independently of their empirically discovered correlations with physical states. The independence requirement is crucial here. Assuming that there is indeed a correlation between phenomenal qualia and physical states, and a mathematical function $F(p)$ that expresses the variation in physical states with which variation in qualia is found to be correlated, we could of course just assign to each phenomenal quale q_i the value $F(p_i)$, where p_i is the physical state with which q_i is correlated. That would guarantee mathematical values to the qualia. But it would only *restate* the correlation of phenomenal and physical states; it would not *explain* it. For there would be a vicious circle in saying that q_i is causally correlated with p_i *because* $S(q_i) = F(p_i)$, when the only thing that attaches the value of $F(p_i)$ to $S(q_i)$ is the fact that q_i is causally correlated with p_i. In order for $F(p) = S(q)$ to *explain* the correlation of physical states with phenomenal qualia, $S(q)$ must be a mathematical expression of a dimension (or structured system of dimensions) that can be discerned in the qualia independently of the physical states, just as voltage (for example) is a dimension of electrical discharges that can be discerned independently of associated qualia.

How would we find such an independent dimension or way of associating phenomenal qualia in general with a range of mathematical values? We began with the suggestion that phenomenal pitches and hues could be assigned real numbers on the basis of their position on the scale and the spectrum. But what is thus begun cannot be carried to completion. For the sake of argument, let us set aside any doubts about whether there are colors (some browns, perhaps) that have no phenomenally natural position in a "color space" mathematically ordered on the dimensions of hue, brightness and saturation. Let us assume also that all the phenomenal qualia of sound can be assigned a phenomenally natural position in a "sound space" ordered on pitch, loudness, and perhaps one or more other

dimensions. The chief difficulty with this strategy is that these orderings cannot be extended to the other sensory modalities, and are not naturally integrated with each other.

It is much harder, in the first place, to find such an ordering among the qualia of any of the other senses. Is there a spectrum of odors? Is there an objectively valid, phenomenally natural order in which the flavors of chocolate, anise, and hazelnut—or sweet, sour, bitter, and salty—should be placed? As for the sense of touch, the degrees of phenomenal warmth and cold can be arranged in scales; but is there any natural continuum on which we would arrange the feelings of a moderate warmth, a moderate coolness, and a gentle stroking of the skin—all of approximately equal strength and agreeableness—in such a way as to represent the qualitative differences among them?

The problem, moreover, does not end there. For even if we had, from a purely phenomenal point of view, a single uniquely valid spectrum for each sensory modality, we would still face the mind-boggling problem of finding a mathematical relationship between the qualia of the different modalities. And without such a relationship, our law of nature will not explain why certain brain states produce phenomenal qualia such as red, yellow, and blue, and others produce qualia such as sweet, sour, and salty.

This is a crucial point. There are certain structural analogies between the current "opponent process theory" of the physiology of color vision and the spectral ordering of hues.[19] This may provide some explanation of why the pattern of neuron firings in the central nervous system that is actually correlated with the perception of orange is naturally more suited to that correlation than to a correlation with the perception of red. But that does not contribute to an explanation of why the actual correlation obtains, unless we take it as given that this electrical process in the central nervous system is part of a process of vision of colors. But what explains that given? My desire for an explanation on this point, obviously, will not be satisfied by any account that deals only with the physical side of the correlation, telling us why these electrical events in the nervous system are responsive to differences in reflected light. What I want to know is why this or any other pattern of electrical discharges should be correlated with color qualia rather than with odor qualia, or with no qualia at all.

If a law of the form **L** is to explain this, it is required, at a minimum, that the function $S(q)$ should represent a phenomenally natural ordering of *all* phenomenal qualia. But is there a unique objectively valid spectrum in which all phenomenal qualia are ordered? Or at any rate a unique phe-

nomenally natural order in which the taste of anise, perhaps, comes between blue and the smell of hydrogen sulfide? Surely not. There is no such comprehensive ordering that will generate a function $S(q)$ sufficiently nonarbitrary to serve as a suitable term in a plausible law of nature. The different sorts of phenomenal qualia are too diverse from each other for that.

Here we may recall that one important motive for kicking the phenomenal qualia out of the physical world and upstairs into the mind, in the seventeenth century, was that the qualia do not have the mathematical structures and relationships in terms of which the modern approach to science was setting out to interpret the physical world. Given the mathematical character of our science, the physical side of any general law correlating physical with phenomenal states must be expected to have a mathematical structure. But given that the system of phenomenal qualia does not have a similar mathematical structure, I do not see where we would find the common denominator between the phenomenal and the physical that such a law would require. This is what I had in mind in saying that science (for its own good and sufficient reasons) is headed in the wrong direction for finding an explanation of the correlation between phenomenal qualia and physical states.

VI. Materialism

Some may think that the real objection to everything that I have been saying is that I have been ignoring materialism. Aristotelianism explained the correlation between phenomenal qualia and physical states by identifying them. Materialism, it might be suggested, can do the same, but in a different way. Whereas the Aristotelian postulated a (causally efficacious) qualitative identity of phenomenal and physical qualities, the materialist can solve the problem by identifying the phenomenal qualia with their correlated brain states. Surely no problem remains of explaining the "correlation," if the correlated states are identical![20]

It is important, however, to be clear about what is being identified with what. The mind with the brain? I don't believe in that identification, but I can accept it here for the sake of argument. It is enough (indeed, more than enough) for my argument to say that there are phenomenal qualia, and that even if they are properties of brains, they are distinct from the physical properties of brains (or of anything else). That is, they are distinct from the properties studied by physics, such as geometrical and electrical properties.

For as long as that distinction of properties remains, we can still ask why brains that have those physical qualities also have these phenomenal qualia. Why don't they have other phenomenal qualia instead, or none at all? This is essentially the same explanatory problem that we started with, and the materialist claim that it is brains that are the subject of the phenomenal qualia does nothing to solve it.

This is not a novel insight. Locke is careful to state his theistic argument from consciousness in terms of a demand for the explanation of mental *properties,* rather than substances (being notoriously cagy about committing himself as to the identity or duality of mental and material substances). And Swinburne is quite explicit that his version of the argument depends only on a dualism of properties—though he is personally willing to accept a dualism of substances.[21]

Although these classic formulations of the argument from consciousness are stated in terms of a dualism of properties, I think that even that is more than the argument requires. For suppose a materialist claims that *R* and the phenomenal appearance of red are one and the same property of brains, identified as *R* on the basis of its place in the physical system, and as the appearance of red on the basis of the way it seems to us when our brains have it. We can still ask why *R* seems to us the way it does, rather than the way *Y* (the physical brain state which "is" the appearance of yellow) does. This is quite recognizably our original question, and it remains unanswered. And if the materialist replies (implausibly, to my mind) that the "way" *R* seems to us when our brains have it is identical with the physical property *R* itself, but allows that when our brains have *R* we have a "first-person" way of identifying it that is not available to others for "third-person" identification of *R*, then we can reinstate our problem as the question why this physical property is regularly identified from the first-person position in the way that it is, rather than in the way that the appearance of yellow is.

In order to block the theistic argument from qualia by providing a materialistic explanation of phenomenal/physical correlations, one would have to adopt a very radical materialism indeed, rejecting not only the dualism of substances, but also the dualism of properties, and even the distinction of first- and third-person aspects or ways of identifying the sensible qualities, as well as the notion of a way in which conscious states seem to us when we are in them, as opposed to their place in the physical scheme of things. Thus one would have to *eliminate* phenomenal qualia, or reduce them in a most extreme way to physical qualities. It seems to me that this sort of eliminationism or reductionism can be refuted by seeing red and yellow and tasting onions.

Of course I know there are eminent philosophers who espouse it. How can they believe it? Thomas Nagel has written that "the only motive [he] can see for accepting [such extreme] kinds of reductionism [of mental to physical properties] is a desire to make the mind-body problem go away. None of them has any intrinsic plausibility."[22] I agree with Nagel's judgment, but I would add that the desire to make the mind/body problem go away is not laughable. It is a motive that is highly relevant to the present discussion. David Armstrong, following J. J. C. Smart, has argued for a reduction of phenomenal qualia (as well as other mental properties) to physical qualities at least partly on the ground that if they are not reduced, we will be left with a mental/physical correlation that physical science probably cannot explain.[23] Armstrong makes no mention of a possible theological explanation of the correlation, but I think it is fair to say that a main motive of his reductionism, indicated in his argument, is a desire to obtain an integrated naturalistic view of the world. He wants a view that neither appeals to a supernatural explanation nor leaves a central correlation unexplained. In order to obtain this integrated naturalistic world view, he is prepared to deny what I take to be obvious facts about phenomenal qualia.

Theism seems a less desperate expedient. Perhaps, since the demise of Aristotelianism, the problem of phenomenal qualia is at least as intractable for naturalism as the problem of evil is for theism. It is interesting to note that "eliminative" solutions have been proposed for both problems: denying that there really are any phenomenal qualia or that there really is any evil, as the case may be. Eliminative optimism and eliminative materialism seem about equally implausible to me.

Notes

1. John Locke, *An Essay Concerning Human Understanding*, ed. Peter H. Nidditch (Oxford: Clarendon Press, 1975), IV, x (bk. IV, chapter x).

2. Richard Swinburne, *The Existence of God* (Oxford: Clarendon Press, 1979), chapter 9. J. L. Mackie, *The Miracle of Theism: Arguments for and Against the Existence of God* (Oxford: Clarendon Press, 1982), chapter 7. I have criticized Mackie's reply to Swinburne in a review of *The Miracle of Theism*, in *The Philosophical Review*, 95 (1986), pp. 309–16.

3. It should be emphasized that I am speaking here about Aristotelianism as it was understood in the later medieval and early modern periods, and not about Aristotle himself. My presentation abstracts from many disagreements within Aristotelianism about details of the theory of sensation, and would not fit all Scholastics equally well. For a clear account of an important period of the history of

the Aristotelian theory, see Anneliese Maier, "Das Problem der 'species sensibiles in medio' und die neue Naturphilosophie des 14. Jahrhunderts," in her *Ausgehendes Mittelalter: Gesammelte Aufsätze zur Geistesgeschichte des 14. Jahrhunderts*, vol. 2 (Rome: Edizioni di Storia e Letteratura, 1967), pp. 419–51.

4. Galileo Galilei, *The Assayer* (1623), trans. Stillman Drake, excerpted in Richard H. Popkin, ed., *The Philosophy of the Sixteenth and Seventeenth Centuries* (New York: Free Press, 1966), p. 65. I do not mean to imply that mathematization was as important to *all* seventeenth-century anti-Aristotelian physicists as it was to Galileo.

5. M. R. Ayers, "Mechanism, Superaddition, and the Proof of God's Existence in Locke's Essay," *The Philosophical Review*, 90 (1981), p. 237. Ayers's statement applies specifically to Cudworth; what can be said about Locke, as Ayers points out, is somewhat more complicated.

6. Galileo, *The Assayer*, p. 65 in Popkin, ed., *The Philosophy of the Sixteenth and Seventeenth Centuries*.

7. Bracketed words added. Sixth *Meditation*, in René Descartes, *Oeuvres Philosophiques*, ed. F. Alquié, vol. 2 (Paris: Garnier, 1967), p. 234. The references to the old standard edition and English translation are AT VII, 88/HR I, 197.

8. Locke, *Essay*, IV, iii, 29.

9. Locke, *Essay*, IV, iii, 28; cf. IV, iii, 6.

10. Locke, *Essay*, IV, x, 10.

11. Locke, *Essay*, IV, x, 16. I am here accepting the traditional reading of this passage, in conscious opposition to that of M. R. Ayers, op. cit. (*Philosophical Review*, 90), p. 245, which seems to me (uncharacteristically) forced. Ayers thinks that Locke is holding open the possibility that some sort of motion and mechanical operation of a system of matter might *be* its thought, and that 'however put together' here must be understood to mean 'however put together *by chance*'.

12. J. L. Mackie, in *The Miracle of Theism*, chapter 4, recognizes that Berkeley's theism is crucial to the plausibility of his metaphysics at just this point, and sees that this is the basis of a serious Berkeleyan argument for theism. Mackie's defense against this theistic argument is also an attack on Berkeley's immaterialism.

13. Swinburne, *The Existence of God*, chapter 2. Swinburne also proposes an alternative analysis of scientific explanation in terms of the powers and liabilities of bodies, but argues that it will commonly support versions of the same explanations as the analysis in terms of laws. And to the extent that it is not equivalent, I cannot see that it is likely to help us beyond the point that we want explained, which is that bodies in certain physical states have the power, and liability, to give rise to certain phenomenal qualia.

14. Swinburne, *The Existence of God*, p. 171f.

15. See C. L. Hardin, "The Resemblances of Colors," *Philosophical Studies* 48 (1985), pp. 35–47.

16. Leibniz, "Meditations on Knowledge, Truth, and Ideas," G IV, 422f. [*Die*

philosophischen Schriften von Gottfried Wilhelm Leibniz, ed. C. I. Gerhard, vol. IV (Berlin, 1880), p. 422f. A standard English translation is in Leibniz, *Philosophical Papers and Letters,* trans. and ed. L. E. Loemker, 2d ed. (Dordrecht: D. Reidel, 1969), p. 291.]

17. Leibniz, *New Essays Concerning Human Understanding,* Preface (G V, 49).

18. J. L. Mackie seems to think that naturalism requires something like this. Acknowledging that "it is hard to see how there can be an intelligible law connecting material structures, however we describe them, with experiential content," he says that the materialist or naturalist "has to assume that there is a fundamental law of nature which says that such content will arise whenever there is a material structure of a certain complicated sort, and that that content will vary in a certain systematic way with the material basis—a fundamental law, because the basic fact of occurrent awareness seems not to be analyzable into any simpler components, so that the law of its emergence could not be derived from a combination of more basic laws" (*The Miracle of Theism,* p. 127).

19. See C. L. Hardin, "A New Look at Color," *American Philosophical Quarterly,* 21 (1984), pp. 125–33.

20. An alternative materialist approach would use a strong conception of metaphysical necessity rather than identity. It would claim that each phenomenal state supervenes on its physical correlate by metaphysical necessity. The short answer to this is that it is not easier to see how these correlations could be metaphysically necessary than to see how they could be scientifically explained. If they were metaphysically necessary, there would surely have to be a reason why. And while there may in principle be grounds of metaphysical necessity that escape our understanding (as I have argued in chapter 14 of this volume), it is rather implausible to postulate them in the present case, given the apparent arbitrariness of the correlations. Grounds could of course be manufactured by stipulation, by defining the identity of the phenomenal qualia as depending on the identity of the physical processes that cause them; but this would commit the fallacy of *ignoratio elenchi* ("ignoring the stated issue"). For the term 'phenomenal qualia' was introduced specifically to signify qualities whose identity is completely determined by subjective experience. To stipulate that the identity of phenomenal qualia depends on the identity of physical processes is to change the subject and, in effect, to deny that there are any phenomenal qualia in the original sense. I will respond, below, to a straightforward form of such denial.

21. Swinburne, *The Existence of God,* pp. 164–6.

22. Thomas Nagel, *Mortal Questions* (Cambridge: Cambridge University Press, 1979), p. 194.

23. D. M. Armstrong, *A Materialist Theory of the Mind* (London: Routledge & Kegan Paul, 1968), p. 50. Noting the mismatch, on which I have dwelt, between the complexity of physical processes and the apparent simplicity of phenomenal qualia, Armstrong states that the existence of "laws connecting these incredible physiological complexities with the relatively simple mental events . . . fits in very ill with the rest of the structure of science."