

TONY CHADWICK ESSAY PRIZE 2004 RUNNER-UP

THE SHAPE OF MULTICOLOURED WATER

by Geoff Oliver

Introduction

In this essay I shall argue that the objects in this world are not coloured. I shall assume that perceptions are real and that there is a world that exists independently of us. I shall also assume that the story that physicists tell us about colour perception is true; i.e. the story about packets of electromagnetic radiation (photons) being generated by light sources, interacting with objects and entering the human eye. My claim is that, with respect to colour, the nature of the relation between objects and perceptions is misunderstood and that there is no justification for saying that objects are coloured.

I shall be motivated by the thought that if a metaphysical theory has something to say about the physical world then what that theory says must accord with the physical facts. In the words of David Hume ¹:

Nature will always maintain her rights, and prevail in the end over any abstract reasoning whatsoever.

In the first section of this essay I shall argue against colour being an intrinsic property. In the second section I shall argue that the role that objects play in causation does not justify attributing colour to the objects. I take it that if the arguments within the two sections are successful then I will be justified in denying that the objects are coloured.

In the final section of this essay I shall suggest why we find it so difficult to believe that objects might not be coloured (following Hume's example of trying to explain why we believe in a necessary connection between cause and effect) – this might not be particularly philosophical, but is, I think, extremely interesting.

To provide a little background information and to give some initial plausibility to my project I am including a couple of sentences from Mackie's book on causation²:

It is one thing to ask what causation is 'in the objects', as a feature of the world that is wholly objective and independent of our thoughts, another to ask what concept (or concepts) of causation we have, and yet another to ask what causation is in the objects so far as we know it and how we know what we do about it.

In the introduction he also makes the following point:

But it is always possible that our causal statements should, in their standard, regular, and central uses, carry meanings and implications which the facts do not bear out, that our ways of speaking and reasoning about the situations or sequences which we recognize as causal should (explicitly or implicitly) assert of them something which is not true.

Section1: Argument against colour being an intrinsic property

If there is an external world that exists independently of us then it is clear that we are not in immediate or direct (spatial or temporal) contact with the physical objects to which we attribute colour. That this is so is not usually obvious to us; light travels so quickly that we are not usually aware of the process by which light travels from a source to an object and on to the eye. However, the nature of the physics involved does become apparent when one considers a distant electrical discharge. First we see the lightning and later we hear the thunder. The physicist can tell a story about this (sound travels much slower than light). The story entails that perceptions are located in the human brain. It also entails that objects will not cause colour perceptions in the absence of light or in the absence of a human observer. Now if this is correct, two things follow.

Firstly, colour cannot be an intrinsic property of objects, for clearly normal colour perception depends on the presence of photons and a human sensory system (An intrinsic property is a property that does not depend on the existence of anything else other than the object under consideration).

Secondly, if colour is not an intrinsic property of objects then all plausible theories of colour perception must involve causation.

Section2: Arguments against causal theories

Causal theories can be expressed in different ways, but I shall take it that what the causal theorist is claiming is that it is the surfaces of objects that cause colour (in a causation as it is 'in the objects' sense). In other words there is something about the objects that causes colour. I shall assume that 'the something about the object' is a property or a set of properties (with appropriate values) that are necessary and sufficient to cause colour perception in a normal human being (looking at the object) when the object is illuminated by a normal light source.

Argument 1: The logical argument

There appears to be a serious flaw in the logic of the causal theorist's position. If it is true that objects are not intrinsically coloured, and for the sake of argument that it is accepted that colour attribution is justified by causation, the implication is clearly that colour does not reside with the objects. And if colour does not reside with the objects it must reside elsewhere. And if colour resides elsewhere what justification is there for saying that it is the objects that are coloured? It seems to me that what we should be saying is that it is 'our perceptual picture of the world' that is coloured.

Argument 2: The oddness argument

Related to Argument 1 is the problem of the oddness of causal theories. It is a feature of this world that energy can be converted from one form to another. A consequence is that a cause may have completely different properties from an effect. So in the case of a motorcar, for example, the chemical energy of the petrol is converted into heat energy and kinetic energy. Within the causal system that is a motorcar, it is the clutch that causes the car to move forward (if the clutch had not been lifted the car would not have moved forward). Now think about the clutch removed from the system. Does it have the property of causing motion at some specific angle to its surface – surely not.

Thus a surface that causes a particular colour may have no properties in common with our perception of that colour. Under such circumstances to attribute colour to the objects just seems

incredibly odd and it is not the sort of thing we do in any other area of language use that I can think of. An egg is caused by a chicken, but to suggest that such a relation provides a justification for saying that a chicken is an egg is very implausible (they are different things). Neither do we make such peculiar use of language in connection with other sensory modalities. We do not say that a tuning fork is a musical note!

Argument 3: Perception is complicated

This is the first argument in a series that are of a different type to those of arguments 1 and 2 in that they explore the consequences of an effect being caused by different causes and a single cause giving rise to a number of effects.

Experiments have shown that perception is more complicated than normally supposed. A colour perception; e.g. a particular shade of red may be caused by surfaces with different physical properties. Under certain circumstances tiles with identical surface properties can appear to be completely different colours. I think these facts can be accommodated by causal theories, but they do make the theory a little untidy and also point the way to further problems for such theories.

Argument 4: The multiplicity of causal chain types

The plausibility of the causal theorists' claim that objects are coloured seems to depend on colour causing being restricted to the objects. Well this isn't the case coloured lights for example appear to be coloured, but in some cases at least, there are no coloured surfaces involved (in this case photons are passing directly from light source to the eye). The causal theorist can perhaps get around this difficulty by extending the criteria that define what a coloured object is. So while a light is powered it causes colour and appears to be coloured. When it is switched off it does not cause colour and does not appear to be coloured. This is not looking too difficult for the causal theorist, but there are more difficulties to face up to.

Rainbows are caused by raindrops (if the raindrops had not been in such a position in the sky the rainbow would not have appeared). Now this is much more difficult for the causal theorists. Here we have an example of an object that causes a range of different colours that does not appear to be coloured. If the causal theorist is to be consistent he must insist that raindrops are multicoloured or allow that there may be several different types of causal chains that give rise to colour experience.

Neither option is attractive. If the causal theorist goes with the first option one of the great advantages of the position is lost; i.e. the compatibility of the position with common sense. To claim that raindrops are multicoloured would generally be considered to be somewhat eccentric. Adoption of the second position is equally unattractive because if there are several different types of causal chain (this essay has identified three so far - and there are others) that give rise to colour it is difficult to see quite what justification could be given for attributing colour only to the objects in one type of chain. Insisting that it is the objects that are coloured leaves the causal theorist open to the charge that his position is the same as the naïve realist; i.e. it is red because it always appears red.

To make things even more difficult, one could argue that it was the shape of the raindrops that caused the colours of the rainbow. If the water had not been drop-shaped it would not have caused a rainbow. It follows that the conceptual cause of rainbows is the shape of the water drops – which is even more bizarre.

Argument 5: The significance argument

Arguments 3 and 4 have made use of the fact that there are a number of different types of causal chain (involving different types of object) that give rise to colour perceptions. This argument concerns the significance of colour causation with respect to just one type of object; i.e. objects such as desks, pens, ring binders, fire extinguishers etc. For the sake of this argument earlier objections to causal theories are set aside.

Those that subscribe to causal theories are apt to say things like ‘surely it’s true that objects cause colour’ or ‘is it not self evident that objects cause colour – this object looks red, that object looks blue, if colour is not an intrinsic property then surely it must be acceptable to say that objects cause colour and the fact that objects cause colour is adequate justification for attributing colour to the objects’.

The causal theorist would hold that the truth of his statement was decisive. Surely the causal theorist cannot be wrong if what he claims is self-evidently true. Perhaps surprisingly, not necessarily so. Wilfrid Hodges’ book *Logic*³ includes a small section headed ‘Misleading Statements’. This section is largely concerned with the ambiguity of words such as ‘some’ and all (when there are none). What is quite clear from this section of Hodges’ book is that true statements can be misleading. Consider an electrical power socket switch that is normally attached to a lamp. It seems that one could say that such a switch causes illumination. However, the same switch could be used to activate a heater, a stereo system, a dishwasher, computer or power-saw. Within an appropriate circuit the same switch could start a car or demolish a building. With a little ingenuity our switch could be used to cause just about anything. So while it is true that a switch causes illumination it is also very misleading, if no mention is made of all of the other effects it could cause.

A supporter of causal theory is likely to respond that there is a serious disanalogy here. A switch is designed to cause a large number of different effects. A coloured surface on the other hand always causes colour sensations (when suitably illuminated and observed by a human observer). There are two things to be said in reply to this objection.

Firstly, switches and objects that reflect and absorb light are physical objects. For a physical object to be known as a physical object it must be detectable. A detector can be considered to be a switch. A switch can cause just about anything. Therefore any physical object (given a long enough causal chain) can cause just about any effect (an idea neatly captured by Heath Robinson’s cartoons). So a ‘coloured’ surface could act as a switch and could be the cause of a wide range of physical events and processes. Now, if the ‘colour’ of a surface can cause a large number of different effects what justification can there be for ignoring all but one?

Secondly, the reason that we always experience colour in the way that we do is that we are embedded in a causal system from which we cannot escape. Whenever we are in the vicinity of a normal light source the space around us is filled with photons. If we open our eyes we will see coloured surfaces.

Argument 6: The anthropocentric argument

Another issue that must be mentioned briefly is that of anthropocentrism. Even if there were adequate justification for saying that objects are coloured with respect to the human population this would not justify attributing a specific colour to an object. It seems very likely that other

animals see things differently to us (this is just another example of a particular cause giving rise to a number of different effects, i.e. it is a variant of Argument 5, but perhaps with an ethical component). If this is so, no species is justified in attributing a property to an object on the basis of its own particular perceptions of that object.

Section 3: Factors contributing to the misunderstanding of colour

There appear to be two factors that play a part in sustaining a misunderstanding about the nature of colour. Probably the most significant is the nature of the physical / mental causal system that we are all embedded in when experiencing colour (through the normal light source – object – human causal chain). I suspect that the next significant component is the type of psychological effect discussed by Hume in relation to necessity and cause and effect.

I do not think our concepts and language related to causation can be blamed for causing misunderstanding; however perhaps they can be blamed for not making our predicament clear to us. Mackie opens Chapter 6 of *The Cement of the Universe* with a quotation from Bertrand Russell:

The law of causality... is a relic of a bygone age, surviving like the monarchy, only because it is erroneously supposed to do no harm.

Well, at least with regards to causation, I think Russell is absolutely right. Mackie, it must be said, has no sympathy for Russell's recommendation for replacing our current causal language.

The physical condition

In the first draft of this essay I was able to identify ten separate physical conditions that had to be satisfied in order that the misunderstanding of the nature of colour be sustained (e.g. the speed and ready production of vast numbers of photons, the fact that photons pass through air with little interaction and the fact that the photons that do not enter a human eye do not cause any noticeable effects. That all of these conditions are satisfied initially suggests that the world has been designed to misinform us; however, when the theory of biological evolution is taken into account the design concern is considerably diminished. What can still be said is that the exercise of working through the physical requirements, realising that there are so many of them and then (of course) discovering that each requirement is satisfied, is a rather a startling process. It is as if the world was designed by a master magician; his big trick being to create the illusion that the objects of the world are coloured.

The psychological factor

Hume's psychological claim is that we are led into the belief that there is a necessary connection between cause and effect as a result of repeatedly experiencing a cause followed by an effect – a belief that is not justified by the evidence. He obviously considers this to be a potent psychological force, for he suggests that even when one understands what is going on it is impossible for a person not to behave as if there is a necessary connection.

If repetitions of cause and effect have a strong psychological effect think how much more powerful the psychological impact would be of a causal system that provides an effect that is essentially continuous over time and through space. This is exactly the type of psychological effect that we are all subject to with regard to colour perception. Whenever, and from whatever angle, and for however long, I look at my red pen it always appears to be red.

Conclusions

The physics of this world and human psychology combine to create the greatest illusion of all time. The objects are innocent.

References

1. David Hume, *Enquiries: An Enquiry Concerning Human Understanding*, Section V, Sceptical Solution of These Doubts, Part I, Oxford University Press, 1975.
2. J L Mackie, *The Cement of the Universe*, Preface to the Paperback Edition, Oxford University Press, 1980.
3. Wilfrid Hodges, *Logic*, Section 7, Misleading Statements, Penguin Books, 1977.