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The Causal Potency of Qualia: Its Nature and Its Source ⋆

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Abstract. There is an argument (Medlin, 1967; Place, 1988) which shows conclusively that if qualia are causally impotent we could have no possible grounds for believing that they exist. But if, as this argument shows, qualia are causally potent with respect to the descriptions we give of them, it is tolerably certain that they are causally potent in other more biologically significant respects. The empirical evidence, from studies of the effect of lesions of the striate cortex (Humphrey, 1974; Weiskrantz, 1986; Cowey and Stoerig, 1995) shows that what is missing in the absence of visual qualia is the ability to categorize sensory inputs in the visual modality. This would suggest that the function of private experience is to supply what Broadbent (1971) calls the "evidence" on which the categorization of problematic sensory inputs are based. At the same time analysis of the causal relation shows that what differentiates a causal relation from an accidental spatio-temporal conjunction is the existence of reciprocally related dispositional properties of the entities involved which combine to make it true that if one member of the conjunction, the cause, had not existed, the other, the effect, would not have existed. The possibility that qualia might be dispositional properties of experiences which, as it were, supply the invisible "glue" that sticks cause to effect in this case is examined, but finally rejected.

Key words: causality, consciousness, disposition, epiphenomenalism, qualia.

1. Epiphenomenalism is False

Qualia are the properties of an experience, such as a sensation, mental image or emotional response, which we describe when we describe what it is like to have that experience. It has frequently been argued in recent years that qualia in this sense are causally impotent. That this cannot be so is shown by an argument which I first deployed in my 'Thirty years on – Is consciousness still a brain process?' (Place, 1988, p. 218), though I subsequently discovered that the same argument against epiphenomenalism had been used some twenty years earlier by Brian Medlin (1967, pp. 110–111). The argument takes as its premise the principle that for a

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report of an event to be a first hand report of that event, there has to be a direct causal relation between the perception of the event by the observer and the report that the observer makes. Since such reports are our only evidence for believing in the existence of phenomenal experiences in the case of others, it follows that if epiphenomenalism were true, we would have no grounds whatever for believing in the existence of phenomenal experiences and their qualia. It may be argued that this does not affect *my* assurance that the qualia of my experiences correspond to the description I give of them. However, if epiphenomenalism were true, no one else would have grounds to believe me; and what use is a private conviction, if no one else is convinced by it.

2. Neuropsychological Evidence for the Biological Function of *Qualia*

If qualia are causally potent with respect to the reports that are given of them, it is difficult to believe that something so rich and omnipresent should not have other functions besides triggering those reports. What those other functions are we can assert with some confidence in the light of recent and not so recent neuropsychological evidence.

In his book *Perception and Communication* Donald Broadbent (1958) drew the conclusion, on the basis of experiments with dichotic listening in which two different auditory messages are simultaneously fed into the two ears, that the function of selective attention is to protect the central processing unit in the brain from overload. As he puts it, this unit is "a limited capacity channel". In his (Broadbent, 1971) book *Decision and Stress* he suggests that the function of the selective attention mechanism is to generate what he calls the "evidence" on the basis of which the limited capacity channel "categorizes" the current sensory input. I have since suggested that we can equate this "evidence" with conscious experience and its qualia. This equation is supported by a number of pieces of neuropsychological evidence.

The first of these in order of publication is Nick Humphrey's (1974) study of the rhesus monkey Helen who had virtually the whole of her striate cortex (V1) surgically removed. The effect of this operation was that, although she was still able to use her eyes "to move deftly through a room full of obstacles and could reach out and catch a passing fly" (Humphrey, 1974, p. 241), "after years of experience she never showed any signs of recognizing even those objects most familiar to her, whether the object was a carrot, another monkey, or myself" (*ibid.*, p. 252).

What was missing in this case was not the ability to categorize as such, since the ability to categorize objects by sound, smell, taste or feel was unaffected. What was missing from the visual modality was the "evidence" on which such categorization is based. What was not clear at that stage, but became clear later, was that the "evidence" which was no longer available as a result of the destruction of the striate cortex is in fact the process of phenomenal/conscious experience and, above all, its properties, its qualia.

The evidence for this comes from two sources. One source is Larry Weiskrantz's (1986) study of the effect of striate cortical lesions in humans in his book *Blindsight*. This shows that in humans lesions of the striate cortex (V1) result in the abolition of visual sensory experience and its qualia in an area of the visual field which corresponds precisely to the area of the lesion. Although visual sensory experience and its qualia are abolished in the affected part of the visual field by the lesions of V1 and although the ability to identify and categorize objects in the "blind" field is lost,[1] just as it was in the case of Humphrey's Helen, many visual discriminative abilities remain intact. As in Helen's case, the most striking of these is the ability to reach out for and grasp objects presented to the blind part of the field. Helen's other remarkable retained ability, that of using vision to avoid obstacles in her path, is not reported in the human blindsight data that has been published to date, presumably because in all cases studied thus far, the lesion has only affected a part of one half of the visual field with the result that the need to avoid obstacles relying on "information" derived from the "blind" part of the field does not arise. However, I am reliably informed (personal communication from Dr. A. J. Marcel) that informal studies of patients with bilateral lesions of the striate cortex have shown that they too can avoid obstacles that they cannot "see".

Nevertheless, despite these striking similarities with the monkey data and the obvious anatomical similarity between the layout of the human and monkey brains, because until recently our only evidence of the presence and absence of sensory experiences and their qualia came from the verbal reports of human subjects, it was still possible to argue that such phenomena occur only in human beings. But with the publication in *Nature* of Alan Cowey and Petra Stoerig's (1995) paper 'Blindsight in Monkeys' and their follow up papers (Cowey and Stoerig, 1997; Stoerig and Cowey, 1997) we now have incontrovertible empirical evidence that lesions of the striate cortex in monkeys abolish visual sensory experience and its qualia in exactly the same way that they do in human subjects. Moreover, provided we can find some other discriminative response which is mediated by the alternative midbrain pathway comparable to the reaching for an object response in primates, we now have a methodology which should enable us to test for the presence and absence of visual sensory experiences and their qualia in other species.

3. Consciousness and the Zombie-Within

The conclusion that sensory experiences and their qualia are present in animals and the probability that their evolution extends back many millions of years reveals the claim that qualia are causally impotent and functionally irrelevant as the absurdity that it demonstrably is. What the blindsight evidence shows is that there

[1] There is evidence from a study by Marcel (1983) that a written word presented to the "blind" part of the field in blindsighted patients can influence the interpretation of a simultaneous auditorily presented word with more than one meaning. But there is no evidence that such stimuli are ever positively identified.

are two parallel input-output processing systems in the brains of all the "higher" mammals, probably all mammals and possibly all vertebrates. One, concentrated in the mammalian cerebral cortex, appears to coincide with the traditional concept of *consciousness*. It has the function of dealing with inputs that are *problematic* and thus in need of extensive "processing", either because they are unexpected or because they are significant relative to the organism's current or perennial motivational concerns.

In contrast to consciousness so conceived there is a wholly unconscious input-output system, mediated by structures in the midbrain, which I refer to (Place, forthcoming) as the "zombie-within". Its functions are (a) to separate the problematic inputs which it passes on for processing by consciousness from the unproblematic and (b) to deal with those which are unproblematic in that similar inputs have been frequently encountered and dealt with by consciousness in the past and raise no emotional/motivational concerns. These unproblematic inputs, are either ignored or routed to output as an automatic reflex.

In consciousness, as we have seen, the *first* step in the process of dealing with problematic inputs is to generate a sensory experience whose qualia will provide the "evidence" on the basis of which the organism can classify or categorize them into things of a kind for which a range of possible response strategies are available in its repertoire. The *second* step is to react emotionally both before and after categorization, so that in the *third* step a response may be selected that is appropriate both to the nature of the situation confronting the organism and to its emotional/motivational concerns with respect to it. Finally there is the process of response-execution.

In all these later stages conscious experience and its qualia play a role. What this role is in relation to emotional reaction is not altogether clear to me; but I suggest that it has to do with preserving a record of motivationally significant events as they occur in the organism's experience so that they can be readily recollected in the form of mental imagery when contingencies with similar motivational significance are encountered in the future. It is, needless to say, the occurrence of such mental imagery which constitutes, before evolution of language and linguistic thinking, the major contribution of conscious experience and its qualia to the process of conscious response-selection. Finally experiences and their qualia generated by the sensory feedback from the response and its environmental consequences play a vital role in the control of deliberate voluntary action as it develops.

4. The Causal Relation: Spatio-Temporal Conjunction

For our present purposes I shall mean by a causal relation a relation between a set of *causal factors* which are *immediate* in the sense that all are still present when or so long as the other term of the relation, the *effect*, exists or occurs. Causal factors and their effects are of two kinds: *states of affairs* which are extended over time and *instantaneous events* which occur at moments of time, but are not extended over

time. For the purpose of this analysis a *process* in which continuous change persists over time counts as a state of affairs, though its *onset* and *offset* are instantaneous events. All causally potent instantaneous events would appear either to initiate such a process of change or to mark its termination or completion.

Causal relations are of two kinds: *static* and *dynamic*. In a static causal relation a spatial relation between two or more spatially extended physical objects persists over time. In this case both the effect and its causes are all states of affairs. In a dynamic causal relation, the effect and one, but only one, of the causal factors (the "triggering event") is an instantaneous event. The other causal factors are states of affairs.

Both what we may call "the primary cause" in the case of a static causal relation and the triggering event in the case of a dynamic causal relation consist in a spatio-temporal conjunction between two or more spatially extended "physical" objects. This conjunction may consist in actual physical contact between the objects involved; but may consist, as the cases of magnetic and gravitational attraction in a degree of proximity sufficient to ensure a manifestation of the effect. There is also a similar spatio-temporal conjunction in both cases between the effect and its causes.

5. The Problem of Necessary Connection

However, as Hume first pointed out, spatio-temporal conjunctions, though necessary, are not a sufficient condition for the existence of a causal relation between one event or state of affairs and another in which it stands in such relation of conjunction. The spatio-temporal concomitance may, as we say, be purely accidental. Besides the spatio-temporal conjunction of objects and the spatio-temporal conjunction of events and/or states of affairs, there must also be what Hume calls "a necessary connection" between a cause and its effect.

This necessary connection is not a matter of logical necessity. Cause and effect are "distinct existences." It is always possible to describe them in some other way than as the cause of this or the effect of that. So described, there is no self contradiction involved in asserting that one exists and the other does not or *vice versa*. In *A Treatise on Human Nature* Hume (1739/1978) notoriously gave up the attempt to locate the necessary connection in the causal relation itself, and concluded that there is nothing to it but a disposition of the mind to expect the effect given the cause, due to repeated experience of the conjunction of the two in the past. In the *Enquiry Concerning the Human Understanding* (Hume, 1777/1902), he began to move in the direction of the right answer when he defines a cause as "*an object, followed by another . . . where if the first object had not been, the second had never existed*."

More recently this so called "counterfactual theory of causal necessitation" has been elaborated by such philosophers as Nelson Goodman (1955/1965), John Mackie (1962, 1974) and David Lewis (1973). To Goodman in particular we owe

the observation that, since we can never observe what would have happened if things had been different from they way they actually were or are, the truth of a counterfactual can only be established or "sustained", to use Goodman's verb, in so far as it is deduced from a universal law statement.

The difficulty with this view is that it tells us only what it *means* to say that an observed conjunction between cause and effect *had to be* as it was. It tells us nothing, as it stands, about what it is that is present in a causal relation that is absent in an otherwise indistinguishable accidental concomitance. The clue to answering that question begins to emerge when Goodman draws our attention to the fact that the universal law statement that is needed to sustain a causal counterfactual does not need to be universally quantified over the individuals concerned. A statement ascribing a dispositional property to a particular individual will do just as well, provided the occasion to which a causal counterfactual relates falls within the period over which the dispositional property exists. If a dispositional property exists, its existence makes true a universally quantified statement of the form '*If at any time* there exists an event or state of affairs of the cause type (the manifestation conditions of the disposition) and all the other causal factors are in place, an event or state of affairs of the effect type (a manifestation of the disposition) will exist.' Given a statement of this form, the required causal counterfactual can be deduced.

6. The Two Aspects of Causation: Spatio-Temporal Conjunction and Dispositional Properties

It follows from this that it is the existence of the dispositional properties of the objects involved in a spatio-temporal conjunction which makes the difference between a genuine causal relation of which the causal counterfactual is true and a mere accidental concomitance of which it is not. From this a number of consequences follow.

In the first place it becomes clear that in every causal relation the existence of the effect depends on two factors (1) the *spatio-temporal conjunction* of two or more objects, and (2), as C. B. Martin has argued (Armstrong *et al*., 1997, pp. 135–136), the *reciprocal dispositional properties* of the objects involved. Thus the event, whereby a portion of salt dissolves in a body of water and the state of affairs whereby it remains so dissolved both depend (a) on the immersion of the salt in the water, (b) the propensity of the salt to dissolve in water and (c) its "reciprocal disposition partner", the propensity of the water to dissolve the salt.

Secondly it explains another observation of Martin's (*ibid.*) that every effect is a manifestation of those dispositions.

Thirdly it supports my own claim (Armstrong *et al*., op. cit., p. 22) that since a spatio-temporal conjunction is a relation rather than a property, the only causally potent properties involved in causal relations are dispositional properties.

7. The Application of This Analysis to Experiences, *Qualia* and the Categorization of Sensory Input

What happens if we apply this analysis of causation to the case of conscious experience and its qualia? Here, as we have seen, we have a causal relation in which the experience stands as cause to the response of categorizing the current input in a particular way as effect. On this analysis, the cause, the conscious experience and its qualia, must consist of two elements, a spatio-temporal conjunction and the reciprocal dispositional properties of the components of that conjunction which determine the nature of the effect it produces.

In view of the aura of mysticism that surrounds much discussion of conscious experience, the suggestion that it involves some kind of spatio-temporal conjunction, comparable with the stone's striking the pane of glass or the earth's proximity to the sun, may seem strange. Yet the idea that the "evidence" on which the brain bases its interpretation of current sensory input is organized into temporally and, in the case of vision at least, spatially extended chunks or patterns has been familiar to psychologists since the early years of the twentieth century. I refer to the phenomenon of figure-ground organization as illustrated by Figure 1. Here we have a stimulus which generates two different qualia each of which generates a different interpretation or categorization of the stimulus. With the white as figure and the black as ground, it is interpreted as a vase. With the black as figure and the white as ground, it is interpreted as two faces looking at one another. What makes the difference is a shift in the spatio-temporal relations, not indeed between two spatially extended physical objects, but between two spatially extended patterns of neural activity in the brain.

However, if the pattern of figure-ground organization is the spatio-temporal conjunction that invariably precedes the response of categorizing the current input in a particular way, what is the disposition which ensures that, given the first, the second must follow? Can we say anything more about it than that is the disposition which is manifested in the way the input which is generating the experience/pattern-of-figure-ground-organization is interpreted or construed?

8. Qualia Cannot be Dispositional Properties

Since qualia are defined as properties of experiences, since by our initial argument they must be causally potent, and since by the subsequent argument dispositional properties are the only causally potent properties (as distinct from spatio-temporal relations) that there are, I was led to conclude in an earlier version of this paper that *they* are the dispositional properties that link experiences/patterns-of-figure-ground-organization to the interpretations they invite or suggest. What seemed to support this suggestion was the observation to which I and my old friend and

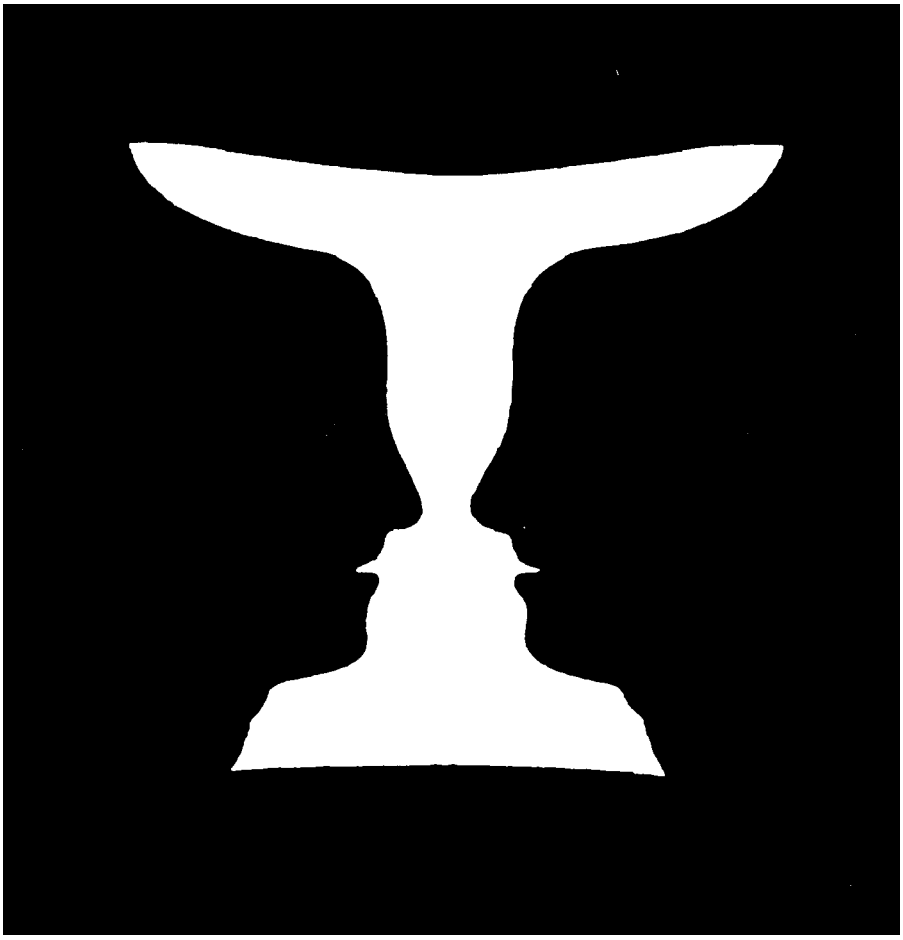

Figure 1. Figure-ground reversal (after Rubin, 1915).

former colleague, J.J.C. Smart have repeatedly drawn attention,[2] whereby the only way we have of characterizing a conscious experience is by citing the various possible interpretations of the current input which it suggests. That, I take it, is what we are doing when we describe an experience by means of a simile – "It's as if so-and-so were the case."

Against this supposition is the undoubted fact that dispositional properties, though in some sense they exist prior to and in the absence of their manifestation, produce no effect and leave no trace of their existence until such time as the

[2] I first made this point in my discussion of the "phenomenological fallacy" in the final two paragraphs of 'Is consciousness a brain process?' (Place, 1956). Smart (1959) made the same point in presenting his notion of "topic neutrality" in 'Sensations and brain processes.' As I pointed out in my contribution to J. Heil (ed.) *Cause, Mind and Reality: Essays Honoring C. B. Martin* (Place, 1989), both these contributions were influenced by an unpublished paper, now lost, by our then colleague C. B. Martin entitled 'Low-claim assertions'.

conditions for their manifestation are fulfilled. Qualia are not like this. They make themselves felt from the very moment that the experience whose qualia they are begins to exist. In the earlier version of this paper I tried to circumvent this objection by pointing out that the disposition to interpret an experience in some way seldom remains unmanifested for more than a moment. Nature, I argued, abhors an uninterpreted experience as much as it abhors a vacuum. But this will not do. It is the qualia whose nature invites the interpretation. They are the *bearers* of the disposition to interpret the current input that way, not the disposition itself.

But if that is correct, there is no longer any room for the distinction between a conscious experience and its qualia considered as properties of that experience. The qualia just *are* the experience, the pattern of figure-ground organization whose dispositional properties manifest themselves in the way the current input is interpreted and, in the case of a linguistically competent human subject, in the way the subject describes it.

9. Qualia and the Brain

Had it turned out that qualia are dispositional properties of experiences rather than the experiences themselves, it would have been possible to argue, in line with a great deal of traditional thinking, that they are not in fact one and the same thing as the brain states which underlie them and with which they are correlated. I have developed the argument for this view in a paper entitled 'The two factor theory of the mind-brain relation' (Place, 2000). The argument rests on the observation that, in all cases where the manifestation of a disposition is a matter of the interaction of the property-bearer with things external to it, the only features of the underlying structure of the property-bearer which are correlated with the existence of the disposition stand as cause to the existence of the disposition as effect. But, as Hume has taught us, if two things are causally related, they must be "distinct existences". They cannot be one and the same thing under different descriptions.

If this view is correct, as I am convinced it is, we left with the problem of explaining what it is that exists here and now so long as a disposition remains unmanifested, if, as now appears, what exists here and now in such a case is not one and the same thing as its structural underpinning. But since qualia are not dispositional properties of experiences, that is not a problem that arises in this case. If, as I have argued qualia are causally potent, they must *have* dispositional properties which determine what interpretation of the current input is selected by the pattern of figure-ground organization in which, on this view, the quale consists; but they are not themselves those dispositional properties. There is, therefore, in my view, no escaping the conclusion which I reached forty five years ago (Place, 1956) that conscious experiences, phenomenal experiences, "raw feels", qualia – call them what you will – just *are* one and the same thing as the brain processes with which they are correlated. There is no "hard problem" (Chalmers, 1996). As I put it all those years ago:

> . . . there is nothing that the introspecting subject says about his conscious experiences which is inconsistent with anything the physiologist might want to say about the brain processes which cause him to describe the environment and his consciousness of that environment in the way he does. (Place, 1956, p. 49)

References

Armstrong, D. M., Martin, C. B. and Place, U. T., Crane, T. (eds), 1996: *Dispositions: A Debate*, Routledge, London.

Broadbent, D. E., 1958: *Perception and Communication*, Pergamon, Oxford.

Broadbent, D. E., 1971: *Decision and Stress*, Academic Press, London.

Chalmers, D. J., 1996: *The Conscious Mind*, Oxford University Press, New York.

Cowey, A. and Stoerig, P., 1995: Blindsight in monkeys, *Nature* **373, 6511**, 247–249.

Cowey, A. and Stoerig, P., 1997: Visual detection in monkeys with blindsight, *Neuropsychologia* **35**, 929–939.

Goodman, N., 1955/(1965): *Fact, Fiction and Forecast*, 2nd edn, Bobbs-Merrill, Indianapolis.

Hume, D., (1739)/1978: L.A. Selby-Bigge (ed.), *A Treatise on Human Nature*, 2nd edn, P. H. Nidditch (ed.), Clarendon Press, Oxford.

Hume, D., (1777)/1902: L. A. Selby-Bigge (ed.), *Enquiries Concerning the Human Understanding and Concerning the Principles of Morals*, 2nd edn, Clarendon Press, Oxford.

Humphrey, N. K., 1974: Vision in a monkey without striate cortex: a case study, *Perception* **3**, 241–255.

Lewis, D. K., 1973: Causation, *J. Philos.* **LXX**, 556–567.

Mackie, J. L., 1962: Counterfactuals and Causal Laws, in R. J. Butler (ed.), *Analytical Philosophy*, Blackwell, Oxford, pp. 66–80.

Mackie, J. L., 1974: *The Cement of the Universe*, O.U.P., London.

Medlin, B., 1967: Ryle and the mechanical hypothesis, in C. F. Presley (ed.), *The Identity Theory of Mind*, University of Queensland Press, St. Lucia, pp. 94–150.

Place, U. T., 1956: Is consciousness a brain process? *British J. Psychol.* **47**, 44–50.

Place, U. T., 1988: Thirty years on – is consciousness still a brain process? *Australasian J. Philos.* **66**, 208–219.

Place, U. T., 1989: Low claim assertions, in J. Heil (ed.), *Cause, Mind and Reality: Essays Honoring C. B. Martin*, Kluwer, Dordrecht, pp. 121–135.

Place, U. T., 2000: The two-factor theory of the mind-brain relation, *Brain and Mind* **1**, 29–43.

Place, U. T., forthcoming: Consciousness and the zombie-within, in Y. Rossetti and A. Revonsuo (eds), *Dissociation but Interaction between Nonconscious and Conscious Processing*, John Benjamins, Amsterdam.

Rubin, E., 1915: *Synsoplevede Figurer*, Gyldendalska, Køpenhavn.

Ryle, G., 1949: *The Concept of Mind*, Hutchinson, London.

Smart, J. J. C.: 1959, Sensations and brain processes, *Philosoph. Rev.* **68** 141–156.

Stoerig, P. and Cowey, A., 1997: Blindsight in man and monkey, *Brain* **120**, 535–559.

Weiskrantz, L., 1986: *Blindsight*, Clarendon Press, Oxford.

Wittgenstein, L., 1953, *Philosophical Investigations* (English Translation by G. E. M. Anscombe), Blackwell, Oxford.