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Metaphysics as the Empirical Study of the Interface between Language and Reality[1]

The rules of syntax and semantics on conformity to which linguistic communication depends are construed as social conventions instilled and maintained by the error-correcting practices of a linguistic community. That conception argues for the revival of conceptual analysis construed as the empirical investigation of such conventions using the *ethnomethodological thought experiment* as its primary research tool, and for a view of metaphysics as the empirical study of the interface between utterances and the reality they depict.

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Connectionism and the resurrection of conceptual analysis

Over the past decade the notion that the brain is a digital computer has been increasingly abandoned in favour of the models based on the assumption that it is what the histological evidence shows it to be, a network of synaptically connected neurons. As I have argued elsewhere (Place 1992a), in the light of these developments the view that linguistic communication depends on a set of formal rules innately inscribed on the equivalent of a hard disk in the brain of every competent interpreter and speaker of a human natural language, no longer appears as plausible as it has done since it was first argued for by Chomsky (1965) in *Aspects of the Theory of Syntax.*

Instead, it becomes possible to revive the more traditional view that the rules of language to which speakers must conform, if they are to be understood, are social conventions acquired and maintained by the error-correcting practices of the linguistic community constituted by all competent interpreters and

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[1] An earlier version of this paper was presented to a conference on Metaphysics, Bled, Slovenia, 12th-16th June 1995.

speakers of the natural language in current use. It is the contention of this paper that the revival of the conception of language as a form of learned social behaviour also brings with it the possibility of resurrecting the philosophical methodology known as 'conceptual analysis.'

Conceptual analysis and ordinary language philosophy

Conceptual analysis is a method of philosophical enquiry which originated from what Wittgenstein (1953) calls "a grammatical investigation." It is particularly associated with the so-called "ordinary language" school of philosophy which flourished at Oxford between the end of World War II and the mid-1960's, and whose principal exponents were Gilbert Ryle, John Austin, Paul Grice, my own tutor in philosophy, and Sir Peter Strawson, as he now is, the only important member of the group still alive.

In his paper 'The meaning of a word' (Austin 1961) which is the nearest thing we possess to an exposition of the methodology of conceptual analysis, Austin makes it clear that conceptual analysis is derived from Frege's (1884/1950) principle that the meaning of a word is its contribution to the meaning of the sentences of which it forms part. It is an implication of this principle that in order to find out what a word means you need to study the kinds of sentence in which it can and cannot intelligibly occur, focusing in particular on those sentences where the word in question is, in Ryle's phrase, "on duty", i.e., sentences where the word is being used to talk about other things, rather than about the word itself and its meaning.

Conceptual analysis, so conceived, fell out of favour during the 1960's not because its principles or the conclusions based upon them had been shown it to be false. It fell out of favour

(a)   because the view that all the traditional problems of philosophy are conceptual confusions due to lack of attention to the way words are actually used leaves nothing for the philosopher to do other than engage in a purely lexicographic charting of word meanings, once these conceptual confusions had been cleared out of the way, and

(b)   because, quite wrongly in my view, the impression was created that conceptual analysis rejects as conceptually confused any deviation from ordinary ways of talking and is thus inimical to the kind of conceptual innovation that is the life blood of science.

Conceptual analysis as the empirical investigation of linguistic convention

In this paper I argue

(1)   that conceptual analysis is an empirical sociolinguistic investigation of the conventions on conformity to which the intelligibility of the speaker's utterance depends,

(2)   that conceptual analysis, so conceived, is the only research methodology available to the philosopher which gives him or her an expertise which is distinctively philosophical and can offer the prospect of making a positive and definitive contribution to the body of human knowledge, and

(3)   that armed with this research methodology, the philosopher has at his/her disposal a method of determining empirically the structure of the universe as it has impressed itself on the structure of the way we talk about it.

It will be apparent that this view of the nature of philosophical activity requires that we abandon the idea that philosophy is an *a priori* discipline akin to formal logic or mathematics. Instead it is to be thought of as an empirical sociological investigation of the universally applicable social conventions to which a speaker must conform if what she says is to be understood by any competent interpreter of the natural language she is speaking.

The ethnomethodological experiment[2]

The empirical study of social convention is a field whose methodology appears to someone with an admittedly superficial acquaintance with the relevant literature to be poorly developed and inadequately discussed. What seems certain is that information about the social conventions operating within a social group cannot be derived from statistical studies of the frequency of occurrence of a particular form of behaviour. Such studies are unable to distinguish between a type of behaviour such as sexual promiscuity which has high natural probability of occurrence for biological reasons, but whose incidence is reduced by the aversive social consequences of excessively conspicuous indulgence in it and a type of behaviour such as removing or putting on headwear or footwear when entering a place of worship which has a low natural probability of occurrence as a biological response, but whose incidence is vastly inflated by the aversive social

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[2]   this section is a summary of an argument laid out at greater length in Place (1992b).

consequences of the failure to conform to convention in this respect. Both types of behaviour can yield the same statistical frequency despite the fact that the social contingencies are operating in the opposite direction in the two cases. In this case, of course, our common sense understanding both of what behaviour is and is not biologically determined and of the contingencies of social reinforcement and punishment leaves us in no doubt as to the causal differences underlying two very similar statistical frequencies. But in other cases the existence and nature of the social conventions which constrain a form of behaviour may not be apparent, either because it is so familiar to a member of the group that the social forces maintaining it are ignored, or because, to an outsider, they are invisible. In such cases the only way to demonstrate the nature and existence of the social contingencies that either enhance or reduce the incidence of a particular form of social behaviour is to perform an *ethnomethodological experiment.*

An ethnomethodological experiment takes as its starting point the observation that under similar circumstances different individuals regularly emit the same kind of behaviour. From this observation we proceed to formulate the hypothesis that this regularity in behaviour is sustained by a social norm or convention, in other words, that it is maintained by the negative reinforcement provided by the non-occurrence of the aversive social consequences of failing to conform. Having formed this hypothesis, the next step is to test it, either by flouting the supposed convention oneself or, as Garfinkel did, by persuading his students to do so. If the effect of so doing is to evoke from other members of the group verbal aggressive behaviour of a kind designed to constitute an aversive consequence for the perpetrator of this misdemeanour, we have all the evidence we need to show that an important social convention has been transgressed.

Garfinkel describes his use of ethnomethodological experiment as follows:

students were asked to spend from fifteen minutes to an hour in their [own] homes imagining that they were boarders and acting out this assumption. They were instructed to conduct themselves in a circumspect and polite fashion. They were to avoid getting personal, to use formal address, to speak only when spoken to. (Garfinkel 1967, p. 47)

Typical reactions to this behaviour on the part of the student are described as follows:

family members were stupefied. They vigorously sought to make the strange actions intelligible and to restore the situation to normal appearances. Reports were filled with accounts of astonishment, bewilderment, shock, anxiety, embarrassment, and anger, and with charges by various family members that the student was mean, inconsiderate, selfish, nasty or impolite. (Garfinkel 1967:47)

Not surprisingly, Garfinkel's example in inducing his students to perform this kind of *in vivo* ethnomethodological experiment has not been widely followed by other sociologists. It survives, nevertheless, in the form of the *ethnomethodological thought experiment*. In an ethnomethodological thought experiment readers or listeners are invited to imagine what would happen if or has happened in their own experience when such a convention is flouted. Such thought experiments are extensively used by sociologists in the ethnomethodological tradition as a way of drawing the reader or listener's attention to the nature and existence of such conventions. This is well illustrated by the following quotation from a book by my sister, the Canadian feminist sociologist Dorothy Smith (1987). She writes:

> When I take my dog for a walk in the morning, I observe a number of what we might call 'conventions.' I myself walk on the sidewalk; I do not walk on the neighbor's lawns. My dog, however, freely runs over the lawns. *My dog also, if I am not careful, may shit on a neighbor's lawn, and there are certainly some neighbors who do not like this.*" (my italics) (Smith 1987, pp. 154-5)

It is in the form of this kind of thought experiment that we find the ethnomethodological experiment in the writings of conceptual analysts. Ryle (1949:105-6) for example writes:

> it would be absurd to speak of someone having a sensation, or a feeling, on purpose; or to ask someone what he had a twinge *for*.

Evidently what Ryle is doing here is inviting the reader to experience the consternation which is provoked in his or her own case by such deviant sentences, as a way of revealing the existence and nature of the linguistic conventions they flout.

Kripke's intuitions as ethnomethodological thought experiments[3]

Another example of an ethnomethodological thought experiment from a very different and more recent philosophical tradition is Kripke's (1972/1980) intuitions which show him that while there is a necessary connection between the predicates 'being H_2O' and 'being water', there is no such connection between the predicates 'being in pain' and 'having one's C-fibers firing'. As interpreted from within a conceptual analytic framework what these 'experiments' and their close relative, Putnam's (1975) Twin-Earth example, show is the way in which the conventions governing the discourse of scientifically sophisticated linguistic

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[3] This section was added in the light of the discussion of the role of intuition in linguistics in Dunja Jutronič's paper 'Is language an abstract object?' at the 1995 Bled 'Metaphysics' Conference.

communities, such as those to which most contemporary philosophers belong, become infected with the conventions governing the counterparts within established scientific theory of ordinary concepts such as 'water'.

The very different construction which Kripke and Putnam put on these intuitions has its source in Kripke's observation that interesting proofs in modal logic cannot be generated without the axiom

'The proposition "p is necessary" is itself necessary'

or formally

'$\Box p \rightarrow \Box \Box p$'

This axiom is inconsistent with the more traditional Leibnizian account of the necessity/contingency distinction which is assumed by conceptual analysis and which holds that a proposition is necessarily true if the linguistic conventions governing its constituent terms make its denial self-contradictory. On that view the proposition 'p is necessary' becomes a contingent metalinguistic proposition about the effect of the semantic and syntactic conventions governing sentences that express p.

Consequently, in order to preserve the axiom which makes 'p is necessary' itself necessary, Kripke has to give an alternative account of the necessity/contingency distinction in terms of what is and is not true in all possible worlds. Moreover, in order to justify the use that he makes of linguistic intuition in deciding what is and is not true of all possible worlds, Kripke introduces the notion that there are some general terms, natural kind terms, which "rigidly designate" those universals in the way that proper names allegedly "rigidly designate" the concrete individuals of which they are the names. Needless to say, the natural kinds which, on this view, are rigidly designated by natural kind terms have to be construed as abstract individuals of a kind whose existence, as we shall see, a conceptual analyst has reason to deny.

Not only is this theory profoundly at odds with a conceptual analytic conception of the way language and reality are connected, it leaves no room either for a coherent psychological account of how listeners come to understand the meaning of words and the sentences in which they occur[4] or for any rational justification of the appeal that is made to intuition in order to decide what words and expressions do and do

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[4] For an attempt to use the connectionist paradigm to make some kind of psychological sense of the so-called 'causal theory of reference', see my (Place 1989) paper in this journal.

not rigidly designate their objects, and hence, which sentences containing them are and are not going to be true in all possible worlds. The only justification of the appeal to intuition that the theory provides is that in a possible world in which words, or some of them, are connected to their meanings in the way the rigid designation theory implies, there is nothing to prevent us from supposing that in that world listeners have an intuitive ability to distinguish those cases where their words rigidly designate their *designata* from those cases where they do not. But that is just to say that in an imaginary world which is so far removed from the actual world, anything goes.

The Picture Theory of Meaning

As the Kripke-Putnam example illustrates, this kind of empirical investigation of the linguistic conventions governing the use of words in the construction of sentences in ordinary language is not, as one might suppose, a matter of interest only to students of language. It can also tell us something about the nature of the phenomena those sentences describe, particularly in those cases of which the language of folk psychology is a conspicuous example where the surface structure of the sentence can easily mislead us as to the nature of the phenomenon whose existence it asserts. In order to substantiate the claim that conceptual analysis can throw light, not just on features of our language, but on the features of the world we use it to talk about, we need to appeal to a version of Wittgenstein's (1921/1961) "picture theory" of the meaning of sentences. In a paper published in *Acta Analytica* (Place 1993) I described this theory as follows:

> Novel sentences acquire the property of orientating the behaviour of the listener towards an encounter with a novel situation by virtue of an isomorphism or correspondence between the syntactic structure and semantic content of the sentence on the one hand and the structure and content of what Barwise and Perry (1983) call 'a situation' which is thereby depicted on the other.
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> In order to give substance to this notion of an isomorphism between the structure and content of the sentence and the structure and content of the segment of extra-linguistic reality which it depicts we need two parallel taxonomies, one linguistic or syntactic, to be more precise, and the other ontological. The syntactic taxonomy which I favour derives from Frege's (1879/1960;1891/1960) function and argument analysis of the structure of sentences which he introduced in place of the classical subject-predicate analysis in order to accommodate relational or multi-place predicates. This analysis is shown in Figure 1.[5]
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> Corresponding to this syntactic taxonomy, I propose an ontology which derives partly from Aristotle's taxonomy of Categories and partly from the taxonomy proposed by Barwise and Perry in conjunction with their "Situation Semantics". According to this view, every thing in the universe belongs to one or other of three basic categories

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[5] For a more detailed working out of this syntactic analysis, see Place (1992a).
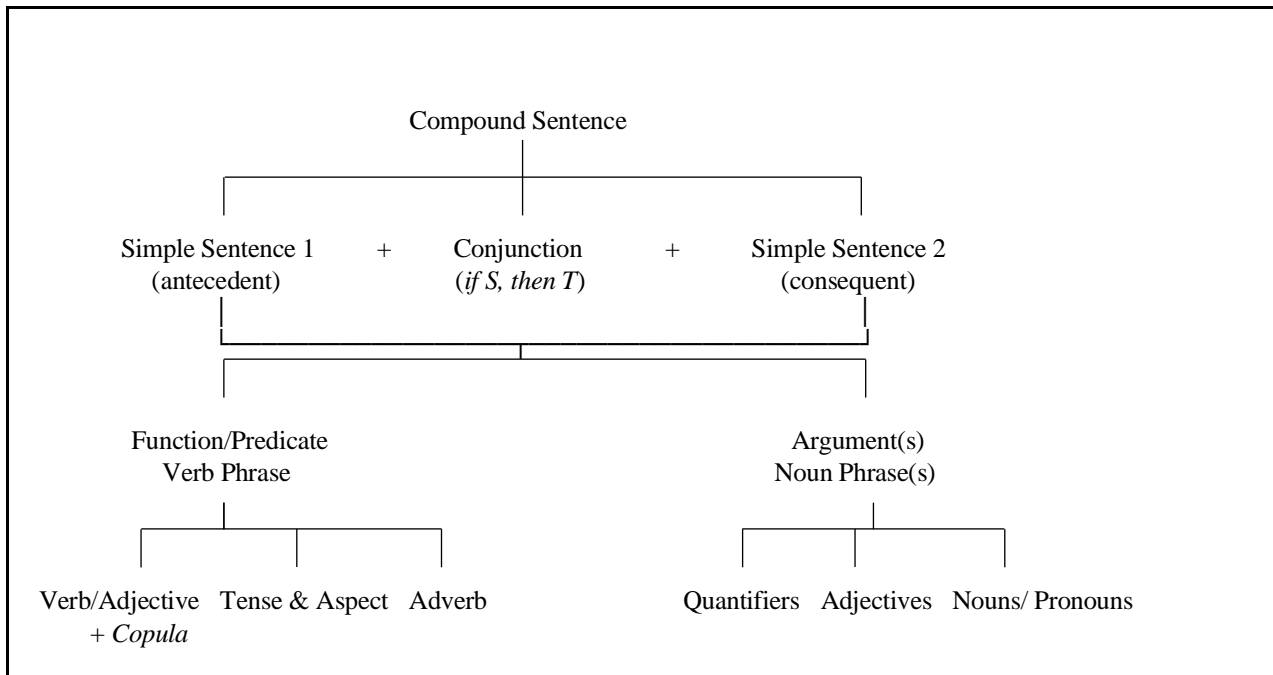
Figure 1. A Syntactic Analysis

(1)   *concrete particulars*, or physical 'substances' to use Aristotle's term, space-time worms which are extended and bounded in three dimensions of space and one of time,

(2)   *features* which are of two kinds,

  (a)   *properties* which are properties of some other thing, but only one such thing, and

  (b)   *relations* in which two or more other things stand to one another, and

(3)   *situations* which are also of two kinds

  (a)   *states of affairs* whereby a property of a thing or a relation between two or more things persists unchanged over a period of time and

  (b)   *events* whereby a property of a thing or a relation between two or more things changes either at a moment of time or over an extended period of time. . . . . This ontological analysis is shown in Figure 2.[6]

The way in which these two taxonomies map onto one another may be illustrated by means of the well known example of a simple relational sentence *The cat is on the mat*. Thus:

(a)   *concrete particulars* are represented by the noun phrases *the cat* and *the mat* occupying the argument places generated by the function (the verb phrase *is on*)

(b)   *features of concrete particulars* (in this case a relation between the two) are represented by a function or multi-place predicate expression (in this case the verb phrase *is on*)

(c)   *situations* are represented by the complete simple sentence (*The cat is on the mat*)

(d)   *features of features* are represented by adverbs and adverbial phrases (e.g. the adverbial phrase *without moving a muscle* in the sentence *The cat is sitting on the mat without moving a muscle*) while

(e)   *features of situations* are represented by compound sentences (e.g. *It is irritating to find the cat always on the mat, Dawn has broken and the cat is on the mat, If the cat is on the mat, it will be fed.*" (Place 1993, pp. 144-146)

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[6]   For a discussion of the place of B.F.Skinner's concept of the "three-term contingency" in this ontological analysis, see Place (1992a).
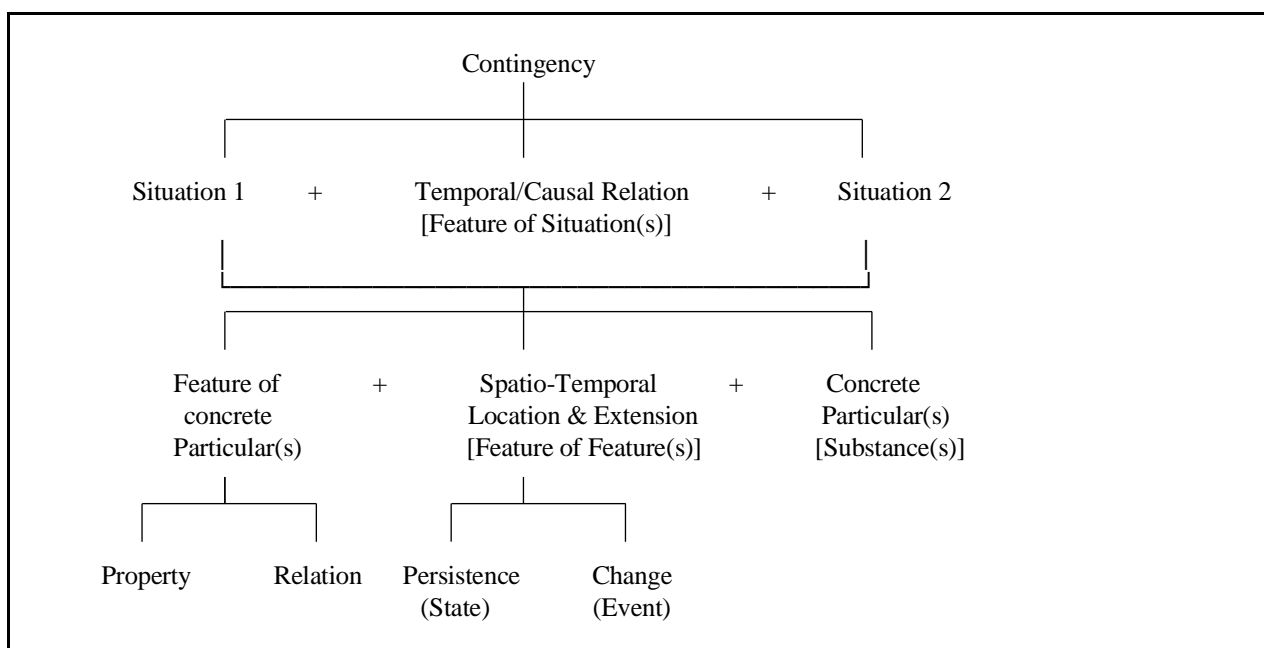
Figure 2. An Ontological Analysis

Evidence that reality has impressed itself on the grammatical constructions of ordinary language

We need the picture theory of meaning in order to make sense of the use that Ryle (1949) makes of the grammatical phenomenon known to linguists as the 'aspect' of a verb in order to draw the distinction between verbs "which signify dispositions" (Ryle *op. cit.* p. 116), "process verbs" (*op. cit.* p. 139) and "achievement words" (*op. cit.* p. 149), the latter perhaps better described as "instantaneous event" or "stop and start verbs." This threefold distinction, based on what Wittgenstein calls "the grammar" and Ryle calls the "logical behaviour" of the verbs in question, yields, once the corresponding situation types are put in the order (1) process, (2) instantaneous event, (3) disposition, a pattern which pervades all our mental life as it is presented to us in the language of folk psychology. This is the pattern whereby an instantaneous mental event, such as deciding what to do, stands at the interface between an antecedent mental process or mental activity, such as deliberating, and a subsequent and consequent mental disposition, such as intending to do something when the time is ripe. This recurring pattern which pervades the language of folk psychology is not just a peculiarity of our language. It reflects, I believe, an underlying pattern in the way the brain 'processes information' or 'transforms input into output' whichever metaphor you prefer. Its application at the level of the brain microstructure can be illustrated, if we think of the brain as a neural network which is,

after all, what it is, by the *process* whereby excitation passes through the network from input to output, the *instantaneous event* whereby excitation changes the weights of the individual synapses, and the permanent change in the *dispositional properties* of the network as whole that results from the changes in the synaptic weights.

I encountered another example, also from the psychological domain, at a one day conference on 'Attention and Consciousness' held in the Department of Philosophy, University College, London, on 26th May 1995. On that occasion the philosopher Paul Snowdon of Exeter College, Oxford, presented a conceptual analysis of the concept of attention in ordinary language in which he drew a distinction between what he calls "Attention$_n$"[7] represented by passive voice expressions such as *Her attention was caught by an unusual ____* and what he calls "Attention$_a$" represented by active voice expressions such as *She paid close attention to what she was doing.* What became apparent from other papers presented on the same occasion was that this distinction drawn on the basis of a grammatical feature of the verb phrases used to describe the phenomena corresponds to one amongst a number of distinctions which are beginning to emerge from empirical studies of the phenomena of selective attention in experimental neuropsychology, neurological studies of the effects of brain lesions and the various brain-imaging techniques that been developed in recent years. The distinction in question is that between on the one hand the involuntary subconsciously controlled attraction of the focus of attention to what I have called elsewhere (Place and Taylor, 1995) "problematic inputs" which seems to be mediated in the midbrain by the superior colliculus and pulvinar, and on the other the voluntary and conscious maintenance of concentration on such an input, once attention has been caught by it, until a satisfactory interpretation is achieved, a function which appears to be mediated by the superior parietal cortex.

A third example which also comes from the psychological domain is the light which is thrown on the distinction between the term 'reinforcement' as it occurs in the analysis of what is variously called 'classical', 'Pavlovian' or 'respondent' conditioning and the same term as used in the analysis of what is called 'instrumental' or 'operant' learning when the attempt is made to translate the term as it occurs in these two contexts into the language of folk psychology. As I have argued in a paper presented to the 1995 Annual

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[7] "n" here for 'noticing'.

Conference of the Experimental Analysis of Behaviour Group, it turns out that in classical/respondent conditioning 'a reinforcement' translates as 'an event which is as the individual expected' and which thus 'confirms that expectation'. In instrumental/operant learning, on the other hand, although it is also said to confirm the individual's expectations, the reinforcing event is given the additional property which classical/respondent reinforcement does not have of 'encouraging the individual to repeat the behaviour which produced it'.

In the light of these examples, we can justifiably claim that conceptual analysis reveals that, concealed behind much that is scientifically irrelevant or actively misleading, there are distinctions which correspond to features which have been shown to be significant by subsequent scientific research. What the examples do *not* show is that such features could have been identified by conceptual analysis in advance of the scientific analysis.[8]

On the other hand what can be justifiably claimed, in my view, is that conceptual analysis *can* alert us in advance to those would-be scientific concepts which derive from folk psychology or other aspects of ordinary language which are unlikely to survive in a fully developed scientific theory of the relevant field of scientific research. It can be predicted, for example, that since as I shall argue in a moment, abstract objects do not exist, the faculties of the mind, such as perception, memory and cognition which are a subset of such objects likewise do not exist and will have no place in a fully developed scientific psychology.

Abstract objects do not exist

Perhaps more far-reaching in its significance for metaphysics in general is an argument which can be derived from the principles of conceptual analysis, as I have expounded them, which supports the conclusion of nominalists and conceptualists over the centuries that abstract objects do not exist. The argument takes as its starting point Frege's "function and argument" analysis of the sentence to which reference has already been made in considering the example of the sentence *The cat is on the mat.* For our present purpose it will be helpful to consider a slightly more complicated atomic sentence, the sentence *John gave Mary the book.*

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[8] I am indebted for this point to Mark Kaplan who raised the issue in discussion of an earlier version of this paper when it was presented at the 1995 Bled Conference on 'Metaphysics'.

As analyzed by Frege, this sentence consists of a predicate in the form of the past tense of the verb *give* which generates three argument places, the giver, the receiver and the object given, all of which are occupied by noun phrases denoting what Aristotle calls "substances" in this case *John, Mary* and *the book*. From this analysis, it appears that there are two active-passive transformations of the sentence, namely:

(a)   *Mary was given the book by John*, and

(b)   *The book was given to Mary by John*

These transformations do not change the semantic content or the truth value of the sentence in any way. However, by putting each occupant of the three argument places in turn into the all important subject position, they have the effect of altering the point of view from which the event in question is viewed. Thus *John gave Mary the book* looks at the event as action on John's part and to that extent from his point of view. *Mary was given the book by John* looks at the event as something that happened to Mary and hence from her point of view, while *The book was given to Mary by John* looks at it as something that happened to the book and hence from the point of view of someone interested in its history.

But there is also another transformation in which it is the predicate that goes into the subject position, as in the phrase *John's gift of the book to Mary*. This differs from the other transformations in that it is a noun phrase rather than a complete sentence, one which not only focuses attention on the event rather than its participants, but has the function of permitting the construction of a sentence in which the event denoted by the predicate in the original sentence, occupies an argument place relative to a second order predicate, as in the sentence *John's gift of the book to Mary was extremely generous* or *John's gift of the book to Mary made Joe's gift of a pencil look mean.*

In order to achieve this transformation, the original predicate, the verb *gave*, has to be *nominalized*, that is to say converted into a noun, in this case the noun *gift*, and it is these nominalizations of predicates and other non-substance denoting parts of speech which, according to me, are the source of fictitious abstract objects. In the case of the noun *gift* the temptation to suppose that this denotes an abstract object over and above those concrete objects, the giver, the receiver and object given, is minimal. This is partly because what is referred to is a particular event rather than a type of event, and partly because the specification of the concrete objects occupying the original argument place makes its derivation from the original sentence very

clear. But when we begin to talk in generalities about such things as memory, perception or language, we lose the connection with sentences about people remembering or recognizing things, seeing, hearing, smelling, tasting and feeling things, saying something, speaking, talking, writing, listening, understanding and reading what is said or written.

As even Plato, the archetypical advocate of the belief in abstract objects, concedes, things whose existence we establish by observation are invariably particular. Either they are concrete particulars, such as individual living organisms or individual inanimate material objects or they are properties of or relations between such particulars. Of abstract objects we find no trace outside the constructions of human language. It follows that once conceptual analysis puts us in a position to rumble the grammatical device which, if we don't take care, can easily persuade us to believe in such things, the conclusion has to be that there aren't any.

Reducing the abstract to the concrete

As was argued by George Pappas in a discussion of an earlier version of this paper at the Bled conference, the view that only sentences with concrete particulars in their argument places are atomic[9] implies that any sentence whose surface structure contains an apparent reference to one or more abstract objects must be reducible in principle to one or more sentences whose arguments refer only to concrete particulars. Pappas claimed that the history of similar programmes of reduction, such as the phenomenalist programme for reducing sentences with concrete particulars in their argument places to sentences whose arguments refer only to sensibilia or the like, shows that they have little hope of succeeding. While it is true that anyone who denies the existence of abstract objects is committed to such a programme of reduction in the case of sentences apparently containing a reference to such objects, and owes an illustration of how such a reduction would proceed in a sample of the more obviously difficult cases, the comparison with the failure of the

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[9] There is an exception to this rule in the case of the direct object argument place in sentences built around certain transitive verbs (verbs of utterance and most psychological verbs) and its counterpart in the various sense-preserving transformations of the sentence. These are the cases in which the argument place is occupied by a description or embedded sentence whose function is sometimes to quote what the individual referred to by the noun phrase in the subject position has said or would be inclined to say or else to indicate a range of possible situations which, if actualised, would constitute a manifestation of the disposition specified by the verb around which the sentence is constructed. Sentences containing such arguments are accepted as atomic on the present view provided all the remaining arguments refer to concrete particulars.

phenomenalist reduction of what on this view are atomic sentences to sentences referring to sensibilia does not justify Pappas' pessimism with respect to the outcome of such a programme. For the two cases are very different. In the first place, the phenomenalist programme requires that *all* sentences, both all those whose arguments unquestionably refer to concrete particulars *and* those that appear to refer to abstract objects, be reducible to sentences whose arguments refer to sensibilia, whereas the present view requires reduction only in the latter case. Secondly, the sentences that are taken to be atomic on the present view are sentences which naturally occur in ordinary language as spoken by the unsophisticated, whereas those which require reduction are to be found, by and large, only in the language of sophisticates. By contrast the sentences to which the phenomenalist aims to reduce his sentences cannot be formulated in ordinary language without referring to the very concrete particulars to which the programme aims to avoid referring, and, if Wittgenstein (1953) is right, cannot be formulated in any language which is intelligible to anyone other than the speaker.

In order to demonstrate that the programme for reducing all sentences whose arguments appear to refer to abstract objects to sentences whose arguments quite explicitly refer only to concrete particulars is both feasible and natural in the sense that the resulting sentences are of a kind which are regularly found in ordinary language, we may illustrate the process by means of the following examples which are based on the two cited by Jay Rosenberg during the discussion in the earlier version of this paper at the Bled conference.

The first is the familiar case of an arithmetical proposition such as 2+2=4 where there is a temptation to say that the three arguments 2, 2 and 4 refer to the abstract object, the number 2 (twice) and another abstract object, the number 4. In such a case, the reduction to a statement about concrete particulars takes the form:

> If at any time two concrete particulars or collectivities composed of concrete particulars which are of the same kind are considered as grouped together with two other concrete particulars or collectivities of such concrete particulars of the same kind, the resulting group will, by virtue of the conventions governing our counting system, consist of four members.

The second example is the case of the eye of red that is in violet or, to put another way, the claim that 'violet stands midway between red and blue, just as green stands midway between blue and yellow and orange between yellow and red' where the arguments 'red', 'violet', 'blue', 'green', 'yellow' and 'orange' are taken

to refer to the respective abstract objects. This proposition would be reduced to a statement with concrete particulars as the referents of its arguments somewhat as follows:

> If a beam of white light passes through a prism, the beam that emerges appears to an observer with normal vision to consist of a range of different hues with violet at one end merging into green merging into yellow merging into red at the other end. But while there is no merging of the red hue into the violet, since they always appear at opposite ends of the spectrum, all normal observers agree that they can readily imagine a similar merging of violet into red and *vice versa* in just the same way that the other hues merge into one another as the observer's eye moves from one end of the spectrum to the other. Moreover, just such a smooth transition of the two hues into one another can be easily replicated as far as the observer is concerned by mixing different proportions of blue and red pigments, a mixture that yields a violet hue when the red and blue are approximately equal, just as a mixture of blue and yellow pigments in roughly equal proportions yields a green hue, though the effects of mixing light of those hues is quite different.

It will be noted that these 'reductions' are informal often multi-sentential elaborations of the original sentence, rather than sentences which could readily be substituted for the original. This is not so much a weakness of the reductive programme. Rather it demonstrates how convenient is the shorthand which is provided by the practice of nominalizing predicates and other parts of speech which do not otherwise occupy the argument places of genuine atomic sentences.

Conceptualism and its problems

An inevitable consequence of denying the existence of abstract objects and asserting that only particulars exist is that you are driven to adopt a view of universals which construes them as the products of the classificatory behaviour of living organisms. As Quine (1953/1980) puts it:

> *Conceptualism* holds that there are universals but they are mind-made (Quine *op. cit.*, p. 14).

It brings two problems with it.

1. The first is the problem of how to rebut an argument which has been around since it was deployed by Plato in the *Parmenides* (Plato, 1961, pp. 8-9). It begins with the observation that we can only learn to lump things together as instances of a kind by
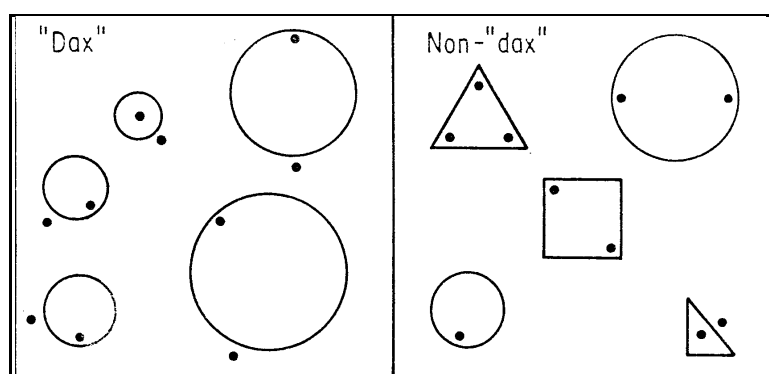

Figure 3. Samples of "dax" S^D's and "dax" S^A's
(*From Kimble and Garmezy, 1963, after Smoke, 1932*).

noticing the respect or respects in which they resemble one another. But then, it asks, how do we notice the respect or respects in which the instances resemble one another and differentiate them from things of other kinds unless we already have a concept of those features which the instances have in common and which other things lack? It seems that all we can do is to form new concepts by combining ones we already possess, as in the case of the "Dax"s on Figure 3 which are readily identified as consisting of a circle with one dot inside the circle and another adjacent but outside. But where did we get the concepts of `circle', `dot', `inside' and `outside' which we deploy when we identify "Dax"s by their defining characteristics? Not surely by recognising *their* defining characteristics. And if not, what alternative is there to the view that we recognise circles, dots and things being inside and outside by virtue of some kind of innate knowledge of the abstract objects to which those terms are taken by the platonist to refer?

2. The second problem for the conceptualist is how to rebut Kant's (1781/1787/1929) argument that if we can only make sense of our experience by imposing our own conceptual scheme upon it, i.e., by classifying things in the way we do, we can never be sure that it represents things to us "as they are in themselves", even if, as Kant himself maintains, we have no alternative but to construe things that way.

The Solution

It is my belief that a solution is available for these problems and that the same solution resolves both. It is not to be found in conceptual analysis, although some useful groundwork is waiting to be done on the grammar of phrases such as 'having a concept of an *x*' or 'recognising *x* as a thing of kind *y*.' But neither is it to be found by a process of *a priori* argumentation. It is to be found in the process of *operant discrimination learning* described by B. F. Skinner (1938) in *The Behavior of Organisms*. This is the process whereby a living organism forms what he calls "stimulus classes", "response classes" and connections between them which in his words

> tak[e] account of the natural lines of fracture along which behavior and environment actually break.
> (Skinner 1938 p. 33).

This is achieved by means of a learning process which in his later work Skinner calls "contingency-shaping" (Skinner 1969) and "selection by consequences" (Skinner 1981). This in essence is the same process as that

which we observe in a connectionist network which is learning to discriminate a complex pattern in a variety of different contexts using

the error-correcting or 'delta' learning rule (McClelland and Rumelhart, 1988, p. 83)

Though it seems unlikely that the process of back-propagation by which the delta rule is implemented in a connectionist network corresponds to anything that takes place in the brain, the parallel between the parameters of the discrimination learning process as observed in the rat or pigeon in the Skinner box and in the connectionist network is exact. The only difference is that whereas in the network it is the human trainer who decides which outputs will receive an error-message and which a correct-message, in the living organism it is the motivational attitude of the organism to the immediate consequences of its behaviour which determines whether those consequences register as a reinforcer (correct-message) or as a punisher (error-message).

This kind of discrimination learning answers the first of the two problems confronting the conceptualist in that the organism or network learns to discriminate between two classes of object without separately discriminating the features of the objects it is responding to in making the discrimination. This is well illustrated both in Paul Churchland's (1988) example of the Gorman and Sejnowski network which learns to discriminate mines from rocks on the seabed by the distinctive pattern of sonar echoes received from the two classes of object, and by the oft quoted example of Canfield's (1941) chicken sexer who learns to discriminate the sex of a day-old chick from a brief glance at its external genitalia (Figure 4) without ever being able to say what features of them he or she is responding to.

It answers the second (Kantian) problem because the effect of the selection of behaviour by its consequences in the case of a living organism is to ensure that the stimuli that are considered as grouped together are those that correspond to the pattern of causal relations on which the success of any behavioural enterprise and hence the ability of the individual to survive and reproduce itself ultimately depends.

The appeal to Darwin's (1859) principle of variation and natural selection, albeit as applied to the process of ontogenetic rather than phylogenetic development, explains why the theory of universals to which I am appealing to fill the gap left by the rejection of abstract objects is conceptualism rather than nominalism. For, although it is with concepts in their linguistic manifestations that conceptual analysis is concerned, it is
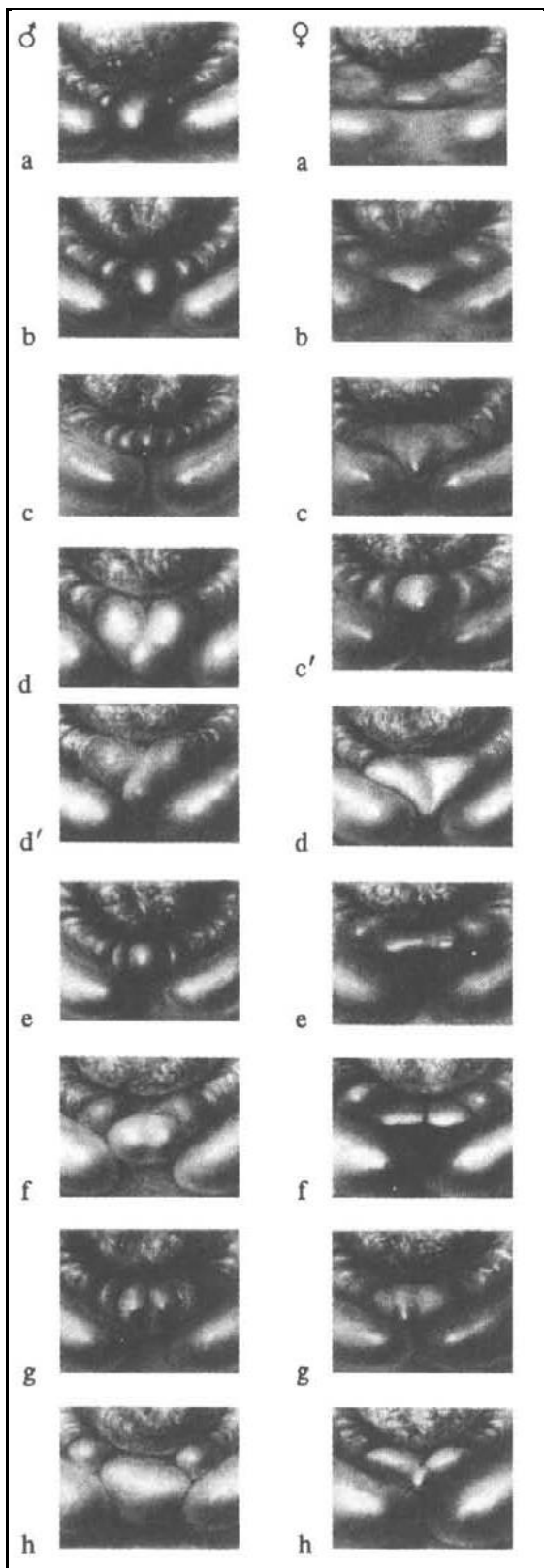
Figure 4. External genitalia of male (left) and female (right) day-old chicks *(Canfield, 1941).*

only in so far as linguistic concepts have a foundation in a biologically determined conceptual scheme, that we can invoke the principle of operant discrimination learning, *alias* learning by trial and error-correction, both to counter Plato's resemblance argument and Kant's scepticism with respect to the claim that our conceptual scheme carves up reality along Skinner's "natural lines of fracture."

Thus, although conceptual analysis takes us only part of the way towards an understanding of the interface between language and reality, what is needed to supplement it and thus provide us with a complete metaphysics is still firmly grounded in empirical observation, the experimental study of operant discrimination learning in organisms such as the rat and the pigeon and pattern discrimination learning by trial and error-correction as observed in artificially constructed neural networks. There is still a gap in the account as I have presented it here between pre-linguistic concept-formation in neural networks and living organisms and the picture theory of the meaning of sentences in natural language which, I have suggested, provides conceptual analysis with its theoretical underpinning. I have attempted to bridge that gap elsewhere (Place 1992a), but there for the time being we must leave it.

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