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INTENSIONALISM, CONNECTIONISM AND THE PICTURE THEORY OF MEANING ⁱ

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Abstract

The connectionist model of the brain as a parallel distributed processor (PDP) is invoked in support of the view that the sense of singular terms and the intension of general terms and of more complex linguistic expressions determine

- (1) the reference of singular terms,
- (2) the extension of general terms,
- (3) the truth of propositions,
- (4) the validity of arguments,
- (5) the meaning of sentences.

Intensionalism and Conceptualism

I shall use the term "intensionalism" in this paper to refer to a theory of meaning which takes as its starting point the theory of universals generally known as "conceptualism." Although it was a familiar position to the philosophers of the Middle Ages, conceptualism is particularly associated with the philosophy of Immanuel Kant. This is the doctrine which holds that universals do not exist either, as Plato thought, in a realm of their own beyond space and time nor, as some medieval interpreters of Aristotle have it, in rebus, in the particulars which are subsumed under them, but are the products of the mind. However, the intensionalist version of conceptualism which is expounded here seeks to avoid the scepticism, subjectivism and relativism which has characterised that doctrine, since it became contaminated by Cartesian scepticism and the idealism of Berkeley and Kant, by insisting

- (1) that particulars exist at particular times and places, independently of the universals of which they become the instances once those universals are formed by a mind,
- (2) that particulars resemble and differ from one another in ways which, given the need to survive in a hostile environment, constrain the minds both of linguistically incompetent animals and of linguistically competent humans to construct their universals in the way they doⁱⁱ.
- (3) that the human and animal brain functions as a parallel distributed processor (PDP)
- (4) that a parallel distributed processor (PDP) is a device - I would be prepared to say "a mind" - which, given reliable feed-back as to when its judgements are correct and incorrect, generates universals from the resemblances and differences between the particulars encountered by its sensorium.

What I am suggesting is that the PDP or "connectionist" model of brain functioning allows us to restore to the philosophical agenda the traditional conceptualist thesis that only particulars exist and that universals exist only as concepts which are abstracted by minds from resemblances between particulars. However, my purpose in this paper is

not so much to defend that thesis as to examine its implications for the philosophy of language and through the philosophy of language for epistemology and the philosophy of mind

Intensionalism and the philosophy of language

Conceptualism considered as a theory of universals is an ontological thesis, an answer to questions about what there is and what there isn't. I propose to use the term "intensionalism" spelt with an `s' rather than with a `t' to identify the position in the philosophy of language which corresponds to conceptualism in the field of ontology. Intensionalism, so conceived, holds

- (1) that the extension of a general term and the reference (Frege's 1892/1952 Bedeutung) of a singular term is determined by its intension or sense (Frege's Sinn), in so far as there exists some object, feature or situation or class of objects, features or situations picked out by that intension or sense,
- (2) that the intension or sense of a linguistic expression allows it to specify and characterise what is possible as well as what actually exists, without thereby implying the existence of such things as possible worlds or Meinongian intentional objects,
- (3) that the truth of a statement is determined either in part (in the case of a synthetic proposition) or wholly (in the case of an analytic proposition) by a combination of its syntax and the intensions or senses of its constituent terms and
- (4) that there are valid deductive inferences whose validity depends either on quantification which ranges over the possible as well as the actual or on the intensions or senses of the terms contained in the premises.
- (5) that the meaning of an atomic sentence (one which cannot be analysed as a conjunction, disjunction or implication relation between two or more such sentences) is the situation (event or state of affairs) which it depicts.

Extensionalism

Intensionalism contrasts with the opposite position in the philosophy of language which we may call "extensionalism". Extensionalism, so conceived, holds

- (1) with Kripke (1972;1980), that some, if not all, general and singular terms "rigidly designate" their extensions or references without any mediating intension or sense
- (2) with the advocates of possible world semantics, that the only way to specify and characterise what is possible, but not actual, is through extensional quantification over possible worlds,
- (3) with Quine (1953/1980) that the truth of any statement is determined solely by a combination of its syntax and the relations of co-extension, class inclusion and class membership between the extension or reference of its terms,
- (4) that the validity of all inferences can be formalised in terms of an extensional logic in which the validity of the inference depends either on the logical connectives linking atomic propositions (as in the propositional calculus) or on extensional quantification theory (as in the predicate calculus).
- (5) that the meaning of an atomic sentence is the set of conditions which, if they existed would make the sentence true, and which if they did not exist would make it false.

Extensionalism and logicism

Just as intensionalism involves conceptualism, so extensionalism is usually taken to imply what Quine (1953/1980) has called "logicism". Logicism in Quine's sense resembles platonism in holding that universals and classes exist as abstract objects independently of human conception. However, it differs from classical platonism in restricting the abstract objects which it recognises to those which satisfy the principle that to exist is to be the value of a variable. In other words, only those abstract objects are recognised over which it makes sense to construct sentences involving the extensional singular (or existential) quantifier, ($\exists x$ in the Russellian notation).

Arguments for and against the extensionalist and intensionalist theories of reference

The arguments favouring the extensionalist over the intensionalist standpoint and vice versa differ according to which of the five parameters mentioned above is being considered, the five parameters being:

- (1) reference,
- (2) modality,
- (3) truth,
- (4) validity,
- (5) semantics.

The argument which favours an extensionalist or rigid designation theory of reference in the case of proper names is that two people can correctly apply a proper name to its bearer using entirely different and non-overlapping criteria, as in Frege's (1918/1956) example of Dr Gustav Lauben who is known to Herbert Garner, but to no one else, as the man who "was born on 13th September, 1875 in N.N.", but who "does not know where Dr.Lauben now lives nor indeed anything about him"; whereas Leo Peter who knows Dr.Lauben both personally and as "the doctor who lives as the only doctor in a [certain] house does not know that Dr.Lauben was born on 13th September, 1875 in N.N."

In the case of natural kind terms, the argument for the extensionalist view is that language users are reliably able to apply terms like water, long before the real essence of the natural kind in question (H_2O in the case of water) is discovered by empirical scientific research, and without being able to specify in words any precise set of criteria for distinguishing cases to which the natural kind term in question applies from those to which it does not apply.

The case for the contrary intensionalist position rests on the argument that the extensionalist theory of reference makes the process whereby the individual acquires the ability to apply such terms correctly wholly mysterious. It can be explained neither by any process of learning nor by any plausible history of the hypothetical process whereby an innate ability to distinguish members and non-members of the extensions of certain natural terms might be supposed to have evolved. The intensionalist position, by contrast, takes as its starting point the principle that there are no extensions, no classes, until some principle of classification, some intension or sense, has been adopted by an individual or a social group. Only as a consequence of the application of such a principle of classification are particulars assigned to a class or identified as the unique referent of some name or description. This view, as I have argued both here and more extensively in a recent paper in this journal (Place 1989) entitled 'Towards a connectionist version of the causal theory of reference', has recently, received substantial reinforcement from the advent of the connectionist or neural network model in artificial intelligence. For here we have a mechanism whereby classifications of just this kind can be learned by a system organised in the way that we know that the human and animal brain is in fact organised. They can be learned, moreover, in the way that human beings and animals learn to make them, without needing to formulate the criteria employed in assigning

particulars to the extension of a class or in identifying them as the referents of a name or description in words or symbols of any kind.

Arguments for and against the extensionalist and intensionalist theories of modality

The principal argument in favour of the extensionalist account of modality in terms of extensional quantification over possible worlds comes from formal modal logic. In order to generate logically interesting proofs, it has been necessary to adopt as an axiom of formal modal logic the principle whereby

If a proposition 'p' is necessarily true, the proposition 'p is necessary' is also necessarily true.

This principle is in conflict with an intensional interpretation of modality in which a logically possible or contingent statement is one whose negation is not made self-contradictory by the intensions of its terms, while a necessarily true proposition is one whose negation is self-contradictory by virtue of the intensions of its terms. For on such a view it is a matter of contingent fact about language and not a necessary truth that the intensions of the terms bachelor and unmarried man are such as to make it self-contradictory to assert that there is an unmarried man who is not a bachelor and vice versa, that there is a bachelor who is not an unmarried man, and, hence, necessarily true that all unmarried men are bachelors, and all bachelors are unmarried men. For it is evidently not self-contradictory to suppose that the semantic conventions which determine the respective intensions of these terms might be other than they are. This is true even in the case of terms like number, even and prime which make it self-contradictory to deny and, hence, necessarily true that

Two is the only even prime number.

The response of the extensionalist to this dilemma is to abandon the traditional definition of the necessary/contingent distinction in terms of what it is and is not self-contradictory to deny and substitute a definition according to which a statement is necessarily true, if it is true in all possible worlds, and contingently true, if there is at least one possible world in which it is false.

For the extensionalist, modal sentences have to conform to the demands of formal logic, both to those of formal modal logic and to the existential commitment of the singular quantifier in extensional quantification theory. If that entails adding possible worlds to our ontology, so be it. From the intensionalist perspective, the problems which the extensionalist encounters in trying to accommodate the modal features of language within an extensional formal logic are simply the result of an obstinate refusal to recognise that language has other semantic functions beside that of establishing reference to objects that exist.

Arguments for and against the extensionalist and intensionalist theories of truth

The best known set of arguments against the intensionalist theory of the truth of propositions and in support of the extensionalist alternative is Quine's critique of the analytic/synthetic distinction in his 'Two dogmas of empiricism' paper which appeared as a chapter in his From a Logical Point of View (Quine 1953/1980).

Although he begins his discussion of the analytic/synthetic distinction by criticising Kant's original definition of analyticity for being restricted to propositions of the subject and predicate form, Quine's own discussion focuses entirely on propositions of this type in which the truth value of the proposition, when viewed from the extensionalist perspective, depends on the relations of co-extension, class inclusion and class membership.

I have discussed Quine's position on this issue in a forthcoming paper (Place forthcoming - a) as follows:

According to Quine, and in this respect I cannot imagine that anyone would disagree with him, there is an intimate connection between the analyticity of a proposition and the intensions of its terms. He illustrates this connection by contrasting two universal statements:

- (1) All creatures with hearts have kidneys;
- (2) All bachelors are unmarried men.

In both these examples the truth of the statement is bound up with the fact that the extensions of the pair of terms involved in the sentence coincide. Every creature with a heart is a creature with kidneys and *vice versa*. Every bachelor is an unmarried man and *vice versa*. But in (1) the two general terms creature with a heart and creature with kidneys differ in meaning or 'intension'. It is a simple matter of fact, established by observation, that the two predicates have the same extension, that every known species of organism that possesses a heart, also possesses kidneys. This, therefore, is an example of a synthetic truth. (2), on the other hand, is analytic. In this case the coincidence of the extensions of the predicates bachelor and unmarried man is determined without need of observation on the strength of a synonymy or equivalence of meaning or intension between the two predicates involved.

"Quine's contention with respect to these examples is that whereas the notion of two expressions having the same or overlapping extensions is clear and precise, the notion that, in cases like that of bachelor and unmarried man, this is due to coincidence or overlap between the intensions of the two expressions is totally obscure. In support of this conclusion he cites four different criteria that have been proposed for deciding whether co-extension and class-inclusion arise analytically and necessarily or synthetically and contingently and concludes that none of them satisfy the requirement of helping us to decide a doubtful case, such as whether or not the statement Whatever is green is extended is analytic or synthetic. There is no need, I think, to discuss these criteria in detail here; since I would not want to dispute Quine's judgement that they all rely on an unanalysed notion of the synonymy of two linguistic expressions, a notion which is inseparable from the concept of 'analyticity' which the criteria are intended to elucidate. From this he concludes that 'for all its *a priori* reasonableness, a boundary between analytic and synthetic statements simply has not been drawn. That there is such a distinction to be drawn at all is an unempirical dogma of empiricists, a metaphysical article of faith.' (Quine 1953/1980: 37)

As set out in Place (forthcoming - a), the reply to Quine's critique of analyticity from the intensionalist perspective is that, in considering the various proposed criteria for distinguishing between cases where co-extension, class inclusion, etc. comes about as a consequence of the equivalence of two intensions or the inclusion of one intension within another, Quine totally ignores

the intensionalist/conceptualist claim that the very existence of the classes which constitute the extension of a general term and the very possibility of making an identifying reference to the object picked out by a singular term depend on the intension of the general term and the sense of the singular term. We know, of course, from what Quine says elsewhere in his writings (e.g., 1953/1980: 14) that he is not favourably disposed towards this intensionalist/conceptualist position. But where he explicitly discusses that view, he doesn't dismiss it as incoherent, as he seems to be doing in 'Two dogmas'.

Of course to claim, as the conceptualist does, that there can be no extension without intension, no reference (Bedeutung) without sense (Sinn) is not by itself sufficient to explain how extension and reference are supposed to be generated by intension or sense. It may well be, therefore, that what Quine is claiming with respect to the intensionalist/conceptualist position, though he does not say so, is that no clear account has been given of how this result is supposed to be achieved. But if that is what he is claiming, it is surely mistaken. For suppose, as is natural to do from this perspective, that we take the intension of a general term to consist in the criteria employed by a competent user of the term in deciding whether or not a given instance does or does not belong to its extension; and suppose also that the sense of a singular term consists in the criteria employed by a competent user of the term in identifying its reference; it is abundantly clear that in the case of the examples Quine discusses, the criteria by which we decide whether or not a creature has a heart are quite different from the criteria by which we decide whether or not it has kidneys; whereas it is equally clear that the criteria for deciding whether or not someone is a bachelor are indistinguishable from those we use in deciding whether or not someone is a man who has not been married beforeⁱⁱⁱ. "We are now in a position to test the principle that a statement is analytic if the criteria for assigning an object to the extension of one predicate include or coincide with those for assigning an object to the extension of the other to the sentence Whatever is green is extended where, according to Quine, it is not clear whether the statement is true analytically or synthetically. If we do this, it at once becomes apparent why this is a difficult and puzzling case. For, although it seems somehow self-contradictory to postulate an unextended green object, it doesn't seem right to say that whether or not an object is extended is among the criteria we use in deciding whether or not it is green in the way that whether or not a liquid satisfies the formula H_2O is, for the chemist at least, not just one of the criteria, but the sole criterion for deciding whether or not it is water. Nevertheless, it seems right to say that there is a linguistic convention whereby the predicate green, when used as a colour word, is restricted in its application to extended

substances and their surfaces; and, if we apply the principle that a statement which is true solely by virtue of linguistic convention is analytic, that makes the statement Whatever is green is extended an analytic proposition. Quine, of course, would retort that the notion of a linguistic convention is just as obscure as the notion of analyticity which it is supposed to illuminate. But if, as seems reasonable, it is accepted that conforming to a social norm or convention is a matter of avoiding behaviour which the social group (the linguistic community in this case) rejects as unacceptably deviant, we can perhaps use, as positive evidence of the existence of such a norm or convention, the results of what I have called, in an unpublished paper (Place forthcoming -b), an ‘ethnomethodological thought experiment’ in which the reader or listener is invited to imagine the consternation that would be provoked within the linguistic community by the suggestion

- (a) that a certain mathematical point is green, or
- (b) that a straight line, in the sense of the shortest distance between two such points on a plane, could likewise be green^{iv}.

However, to claim that there is evidence for the existence of a linguistic convention which forbids the ascription of colour predicates to non-extended objects is not to deny that underlying that linguistic convention there is a contingent fact about the physics of light, namely, that, in general, photons can only reach the eye of an observer, if they are emitted from and/or reflected by some kind of extended object, and that, consequently, it is only such objects that can be distinguished by their colour.

Arguments for and against extensionalist and intensionalist theories of validity

According to the extensionalist there are no valid arguments whose validity cannot be represented in terms of a formal extensional logic. Formal extensional logics are of two kinds:

- (1) extensional propositional logic (the propositional calculus) and
- (2) extensional predicate logic (the predicate calculus).

In an extensional propositional logic the validity of an inference depends on logical connectives like conjunction, disjunction and material implication (If **p** is true, then **q** is true) whereby the truth of one proposition is linked to the truth or falsity of another proposition, regardless of the content or intension of the propositions in question. In an extensional predicate logic we, as it were, go inside the proposition where the propositional calculus stays outside; but the validity of an inference in the predicate calculus depends entirely on the relation between the extensions of the various predicates involved, on whether one is included in the other, or they coincide, overlap, or are mutually exclusive.

The intensionalist is not, of course, denying the validity of arguments which conform to the formal patterns of these extensional logics. All that he is denying is that all valid arguments conform to one or other of these patterns. According to the intensionalist there are two types of valid argument which escape the extensionalist net:

- (1) arguments involving quantification over modal (possible rather than actual) situations (events or states of affairs)
- (2) arguments whose validity depends on the intension of the predicate expression.

The prime example of a valid argument involving quantification over possible situations is the case where a causal counterfactual of the form

If situation **C** had not existed at time **t**, **E** would not have existed at **t**

is deduced from a causal law of the form

Over the period of time which includes **t**, given that all other relevant causal conditions are in place, whenever a situation of the **C** type exists, a situation of the **E** type will exist.

The extensionalist does not, of course, deny the validity of arguments of this type, but can only avoid doing so at the expense of adding to his or her ontology a possible world in which the counterfactual is actualised. The intensionalist has no need to multiply entities beyond necessity in this way.

The prime example of arguments whose validity depends on the intensions of the predicate expressions contained in the premises comes from the domain of relational logic. It is true that relational inferences depend partly on syntactic features of the sentences which form the premises of the argument, for example the use of prepositions such as of, by, to, from, etc. It is also possible to formulate relational arguments symbolically, for example the expression aRb is used to describe a situation in which one object a stands in a two place or dyadic relation R to another object b . But we do not know what inferences can and cannot be drawn from premises of this form without knowing the nature of the relation involved. Thus, in the case of a comparative relation such as larger than, if we know that A is larger than B and that B is larger than C , we can validly infer that A is larger than C . On the other hand, if A is larger than B , we cannot infer, indeed we know it is false that B is larger than A . Here we find the opposite situation. If A is different from B and B is different from C , we cannot infer that A is different from C , since those assumptions are perfectly consistent with the case in which A is the same as C . Whereas if A is different from B we can infer that B is different from A . In other words the symbol R in the formula aRb is not a variable for which we can substitute any relation in the way that p and q are variables for which we can substitute any two distinct propositions in the propositional calculus or in the way that F and G are variables for which we can substitute any two distinct monadic predicates in the predicate calculus. This of course is not to deny that there are theorems in relational logic which are true of any relation, and where the symbol R does, indeed, stand for any relation.

The truth conditional theory of sentential semantics

The theory of the meaning of sentences which is advocated by extensionalists, particularly by Davidson (1967/1986), depends on the application to sentences in natural language of a theory of the semantics of formalised languages proposed by Tarski (1930-1/1936/1956).

As applied to the meaning of sentences in natural language, truth conditional semantics rests on three principles:

- (1) the meaning of a sentence in any language whether formal or natural consists in its truth conditions, the conditions such that the sentence is true, if and only if those conditions obtain,
- (2) one way to characterise the truth conditions of a sentence in a given target language is to characterise those conditions using a meta-language, i.e., a language whose sentences have sentences in the target language in their argument places, and have functions or predicates which express in the meta-language what the corresponding sentence in the target language expresses.
- (3) the truth conditions of sentences in natural language can be set out by constructing sentences in which quotation marks are used to mark off quotations of the sentence whose truth conditions are to be given from a (meta-linguistic) use of the same sentence to state the conditions under which the sentence is true.

Although, as we have seen, Tarski's theory was intended as a way of giving meaning to a formalised language, the idea of using the same theory as a way of specifying the truth conditions - and hence meaning - of sentences in natural language was suggested by his use of the natural language sentence 'It is snowing' as an example of the kind of meta-linguistic translation he has in mind. Thus:

'It is snowing' is a true sentence if and only if it is snowing.

Though this is the example Tarski himself uses, subsequent commentators, particularly those who have taken this formula as a way of giving the meaning of sentences in natural language, have preferred to substitute the non-indexical sentence

'Snow is white' for the indexical 'It is snowing'. This substitution is justified on the grounds that Tarski's theory aims to specify the truth conditions of the target sentence in so far as these can be formulated in the meta-language. Using an indexical sentence such as 'It is snowing' makes it embarrassingly obvious that, in such cases at least, the sentence depends for its truth on the occurrence of an extra-linguistic event in the speaker's current environment.

It will be evident from this that an account of the meaning of sentences in natural language based on this formula of Tarski's differs from the other aspects of the extensionalist position we have been considering in that there is no insistence that the meaning and truth of sentences depends on the sentence or its constituent parts having some actually existing entity or class of such entities as their reference or extension. For we can use Tarski's formula to characterise the truth conditions of the sentence

'All bachelors are unmarried men' is a true sentence if and only if all bachelors are unmarried men.

Yet, according to the intensionalist at least, the truth of this sentence depends solely on the linguistic conventions governing that combination of words, and does not require any kind of empirical check on the marital status of particular bachelors. Tarski's formula is evidently wholly neutral with respect to the debate over the viability of the analytic/synthetic distinction.

It would seem that there are two reasons why, despite this lack of congruence with other aspects of their position, extensionalists are attracted to the truth conditional account of sentential semantics:

- (1) Since they are inclined to believe that any assimilation of natural language to formal logic is a virtue, they are impressed by the fact that Tarski's method is one of the most elegant and, certainly the best known method of giving meaning to a formalised language, and conclude that what is sauce for the formalised language goose will be sauce for the natural language gander.
- (2) On the analogy of the extensionalist accounts of reference and truth considered above, one might expect the extensionalist to hold that sentences have meaning only in so far as they refer to an actually existing situation or class of situations. But this would have the embarrassing consequence that a sentence like

The cat is on the mat

is meaningless, not just in a case like the present where the context of utterance does not determine reference to a particular cat and a particular mat, but equally in a case where it is quite clear which cat and which mat are being referred to, but where it is simply not the case that the cat in question is on top of the mat in question. Adopting the truth conditional account of the sentential semantics allows the extensionalist to avoid this reductio ad absurdum of his position.

Arguments for and against the truth conditional theory of sentential semantics.

There are two objections that can be raised to the truth conditional theory of sentential semantics from the intensionalist standpoint. The first of these objections proceeds from the fact that, as we ordinarily understand the matter, only indicative or declarative sentences have a truth value. It follows that any theory in which the meaning of a sentence is defined in terms of the conditions under which it is or would be true is restricted in its application to sentences of this kind. This objection can, however, be readily deflected by invoking Frege's (1918/1956) concept of the thought which can occur in three different forms depending on whether the sentence has declarative, imperative or interrogative force. Take for example the thought The door shut. This can occur with declarative force as The door is shut, with imperative

force as Shut the door, and with interrogative force as Is the door shut?, What is shut? or What is the state of the door? ^v When it occurs with imperative force we can say that the thought is made true when the imperative is complied with. When it occurs with interrogative force, the question is answered correctly in so far as it elicits the relevant true proposition (in our case the proposition The door is shut) as an answer.

The second objection to the truth conditional theory of sentential semantics is less easily deflected. The claim is that truth conditional semantics, when presented as an account of the meaning of sentences in natural language, is based on a misconception of what Tarski was doing in the paper (Tarski 1930-1/1936/1956) from which the theory derives. As the title of the paper ("The concept of truth in formalized languages") makes clear, Tarski's objective and achievement was to devise a formal procedure for giving objective meaning to the otherwise empty formulae of a logical calculus. This is achieved by mapping the individual formulae of the calculus onto the corresponding sentences in a meta-language with whose meaning, it is assumed, the reader will already be familiar. In practice, this means that the meta-language sentences are sentences in whatever natural language the writer is currently using. I take it that Tarski's extension of this procedure to sentences in natural language, using the device of quotation marks to distinguish the case where the sentence is mentioned from the case where it is used, was intended only as illustration of the principle. He can hardly have failed to realise that no one who did not already understand the sentence

it is snowing

could possibly understand the Tarski sentence

The sentence 'it is snowing' is true if and only if it is snowing,

and that for someone who does already understand the sentence

it is snowing

the Tarski sentence adds nothing that he or she does not already know. Not only does it tell us nothing that we do not already know about the particular sentence in question. It tells us nothing about what it is for sentences in general to have a meaning, and nothing about how sentences in natural language acquire their meaning in the first place.^{vi}

The picture theory of the meaning of simple sentences

The intensionalist alternative to truth conditional semantics which I favour is an application to the sentences of natural language of the so-called "picture theory" developed by Wittgenstein (1921/1971) in the Tractatus Logico-Philosophicus. On this theory, a simple sentence like Shut the door or The door is shut functions for the listener, in the case of an imperative or interrogative sentence, as a plan or blueprint for an action or utterance that is required by the speaker from the listener, and, in the case of an indicative sentence, as a map or diagram of some past, present or future feature of the extra-linguistic environment. It does so by virtue of an isomorphism or one-to-one correspondence between the syntactic structure of the sentence and the senses or intensions of its terms (constituent noun phrases and verb phrases) on the one hand and the structure and content of the segment of extra-linguistic reality which is thereby depicted on the other.

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. Compound sentences are analysed into simple sentences. Simple sentences are analysed into function, predicate or verb phrase on the one hand and one or more arguments or noun phrases occupying the argument places determined by the function/predicate/verb phrase on the other. Verb phrases are analysed into verb with or without adverbial qualification, or adjective plus copula in both cases with indicators of tense and aspect. Finally noun phrases are analysed into nouns, pronouns, quantifiers and qualifying adjectives. Corresponding to this syntactic taxonomy, I propose an ontology which derives partly from Aristotle's taxonomy of Categories and partly from the taxonomy recently proposed by Barwise and Perry (1983) in conjunction with their "Situation Semantics". According to this view, every thing in the universe belongs to one or other of three basic categories:

- (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.

It should be noted that in this taxonomy the things that properties are properties of and that relations hold between may be either concrete particulars, features (properties of relations or relations between properties) or situations. Relations, however, can only hold between things of the same category, between concrete particulars, between properties or between situations. Moreover, there are no situations which do not involve the persistence of or changes in the features of one or more concrete particulars. As Aristotle puts it, substances are the ultimate subjects of all predication, the ultimate bearers of all properties, the entities between which all relations ultimately hold.

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) e.g. The cat is sitting on the mat without moving a muscle
- (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).

It is a consequence of this version of the picture theory of the meaning of sentences that

- (a) an imperative is complied with in so far as the listener creates a situation which conforms to that specified by the sentence,
- (b) an indicative or declarative is contingently true in so far as there exists a situation which corresponds to that specified by the sentence (the correspondence theory of truth).

Another implication of this view is that Frege's (1892/1960) distinction between the sense (Sinn) and reference (Bedeutung) of a singular term applies pari passu to all linguistic expressions from phrases to complete sentences. The sense of an expression, on this view, is the kind of concrete particular, feature or situation which, if it existed, would constitute the referent of the expression in question. Equally, the referent of an expression is that actually existing concrete particular, feature or situation, or class of such actually existing concrete particulars, features or situations to which a speaker who uses the expression in question is able to draw the attention of any competent listener who has the background knowledge required to identify the referents of any constituent indexicals or proper names. But since the function of an imperative sentence is to specify a situation which will not exist unless or until it is brought into existence by the listener, it is only in the case of a true indicative/declarative sentence in the past or present tense that the feature represented by the predicate and the situation represented by the sentence as a whole actually exist. It is only in these cases that predicates and sentences can be said to have referents.

Arguments for and against the picture theory of the meaning of sentences

The picture theory of the meaning of sentences has a number of advantages as compared with truth conditional semantics, its principle rival:

- (1) since it does not rely on the concepts of truth and falsity, the picture theory of the meaning of simple sentences is not restricted in its application to declarative sentences and can explain the meaning of imperatives and interrogatives without having to assimilate them to declaratives;
- (2) although it does not characterise the meaning of particular sentences in a way which would make their meaning clear to someone who did not already understand it (only a paraphrase will do that), it does provide an account of how sentences which the listener has never encountered before are able to orientate the behaviour of the listener towards an encounter with a situation the like of which he or she has never encountered before;
- (3) it provides an account of how sentences get their meaning which explains the sense in which it is true that nothing determinate has been said until the sentence is complete;
- (4) it gives an account of the truth and falsity of synthetic propositions in terms of a correspondence between the situation depicted by the sentence (its sense) and an actually existing situation (its reference) which does equal justice to the conformity of what is said both to linguistic convention and to the state of the extra-linguistic universe.

On the other hand, the picture theory of the meaning of sentences is widely supposed to encounter an insuperable difficulty in explaining the truth of negations and counterfactuals. For if, as the picture/correspondence theory requires, a true contingent proposition needs the existence of a corresponding situation to make it true, a true negation needs the existence of a negative situation as its truthmaker and a true counterfactual needs the existence of [a] counterfactual situation to make it true. But, so it is argued, the notions of negative and counterfactual situations are self-contradictory. For to say that something is not the case is to say that that situation does not exist. But, according to the theory, if

something is not the case, there must exist a situation which makes that negation sentence true. Thus, in order to account for the truth of a negation, we seem compelled to postulate the existence of a non-existent situation which is self-contradictory. Likewise in order to account for the truth of a counterfactual conditional of the form

If situation C had not existed, situation E would not have existed

we seem compelled to postulate the existence of two non-existent situations, one described in the antecedent, the other in the consequent.

This objection is damaging only if we assume that the situation whose existence constitutes the truthmaker and referent of a true negation or counterfactual conditional is the same situation or pair of situations whose existence is negated in the negation or implicitly denied in the antecedent and consequent respectively of the counterfactual conditional. But why should we make that assumption? Why can't we say that the situation whose existence makes the negation or the counterfactual conditional true is a different situation from the situation or situations whose existence is denied within those sentences? Can't we say that the situation whose existence makes a negation true is the situation whereby so-and-so is not the case, and that the situation which makes a counterfactual conditional true is the situation whereby if the situation specified in the antecedent of the conditional had existed, the situation specified by the consequent would have existed? I can't see why not.

NOTES

- i. A revised version of a paper presented to a course on 'Naturalized Epistemology and the Philosophy of Mind' at the Inter-University Graduate Centre, Dubrovnik, September 1989.
- ii. The earliest recorded exposition of conceptualism is in Plato's Parmenides, 132, where the attempt is made to refute it. It was endorsed by Aristotle, according to the best contemporary scholarship (Lloyd 1981; Frede and Patzig 1988 - I am indebted to Dr. Peter Simons of the University of Salzburg for these references), and, following Aristotle, by a long line of medieval philosophers from Boethius in the 6th century to William of Ockham in the 14th.
- iii. It should be emphasised that speaking of "criteria" in this connection must not be taken to imply that such criteria are always or even commonly specifiable in some kind of verbal formula or definition. On that point Quine is entirely right. But the notion that we can and frequently do use criteria we cannot specify in words is not an incoherent notion. It is precisely the kind of thing which, as we have seen, a parallel distributed processor (PDP) learns to do. [Note reproduced with minor modifications from Place (forthcoming - a)]
- iv. Professor J.J.C.Smart (personal communication) objects that consternation by itself is not enough to show that a linguistic convention has been broken. He points out that an empirically improbable claim, such as the claim to have observed a five legged dog will provoke consternation. This, I would claim, shows a limitation of the ethnomethodological experiment when conducted as a thought experiment. When conducted in vivo, I suggest, clear differences would emerge in the listener's response between the expression of disbelief provoked by the claim to have seen a five-legged dog and the expression of incomprehension provoked by the syntactically or semantically deviant utterance. [This note which is taken from the text of Place (forthcoming - b) is not included in Place (forthcoming - a)]
- v. Needless to say, What is shut? and What is the state of the door? do not express the thought The

door shut unless and until the answers The door and Shut respectively are supplied by the listener.

vi. Dr. Peter Simons (personal communication) gives another and perhaps more cogent argument for this conclusion. He points out that since, as is well known, every true proposition materially implies every other true proposition, Tarski's formula is satisfied by any pair of true propositions. Thus, to use his example,

'Trawa jest zielona' is true if and only if snow is white,

where 'Trawa jest zielona' is the Polish for 'Grass is green', not 'Snow is white'.

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