This chapter devotes itself to the first phase of Putnam's writings. The objective here is twofold. Firstly, it gives a detailed discussion of Putnam's theory of reference. Secondly, it tries to formulate, in explicit terms, the underlying realist intuitions of this theory of reference. This is to demonstrate the intimate interplay between reference and realism that exists in Putnam's work at this early stage. This chapter is thus divided into two sections. The first section deals with the question of centrality in a semantic framework. We can trace two kinds of centrality in a semantic discussion, viz., one that assigns centrality to meaning (sense) and the other that assigns centrality to reference. Centrality is explained here in terms of 'invariance' that explains the concept of applicability in a semantic scheme. This section begins with a critique of the view that assigns centrality to meaning which is followed by an attempt to formulate reference as central to a semantic framework in the manner of Hilary Putnam. The second section tries to explicate all the underlying realist principles of this theory of reference.
1.1 Centrality in Semantics — Sense or Reference?

1.1.1 Introduction

Semantics is broadly defined as the study of meaning. But there are very few notions in philosophy as obscure and hard as meaning. Traditionally the word ‘meaning’ has been used to mean either of two things, viz., intension and extension. Intension stands for the concept, or idea attached to a word and extension stands for the object or class of objects to which the word is applicable. These two notions are taken as constitutive of any semantic framework devised to provide an understanding of the relation between language and reality. In an attempt to explicate the relation between language and reality, a semantic framework tries to explain in clear terms the criteria or conditions of applicability of a name/term to an object or a class of objects. This applicability is worked out with the help of the concepts of intension and extension. But it is done differently by the different theories of semantic framework. Until recently meaning was almost unanimously identified with intension. This consensus of traditional theory was first subjected to severe criticism by the proponents of the direct reference theory who instead placed importance on the extension or reference component of a semantic framework. In both the

For obvious reasons, while discussing the direct reference theory I will mainly concentrate on Putnam's version of it. The other prominent proponents of this theory are Kripke, Donnellan and Kalpan.
frameworks a tendency to underplay one component by making it subservient or dependent on the other can be found. In the framework of traditional theory, reference is made subservient to sense as sense is taken as the sole supplier of the criterion of identity and applicability. On the other hand, the direct reference theory, as the name suggests, considers reference to be central as it is reference which ultimately decides the applicability of a name/term to an object or class of objects. Intension, in this framework, is made subordinate to reference. Thus, sense in the traditional theory and reference in the direct reference theory are given special status. This special status is due to the fact that they provide stability to their respective frameworks by being the ultimate arbiters in the case of applicability. Applicability of a term is therefore solely dependent on the invariance of sense in the traditional theory and on the invariance of reference in the direct reference theory; The idea of invariance as attached to sense and reference respectively cannot be thought of in any other terms or order. Since invariance of the reverse order, i.e., to take reference as central in the framework of traditional theory and sense as central in the direct reference theory does not guarantee applicability. Centrality is thus defined here in

This possibility will be brought out in two different ways. In the case of traditional theory it will be shown that sameness of senses ensures sameness of the associated referents whereas sameness of referents does not ensure sameness of the associated senses. For the direct reference theory, on the other hand, it will be argued that the sameness of senses does not ensure the sameness of referents and is rather dependent on the latter.
terms of the invariance that ensures stability, and thereby invariance of the entire framework.

1.1.2 The Centrality of Meaning: An Exposition of Traditional Theory

Semantics or the study of meaning was traditionally conceived as providing a solution to the problems of synonymity and that of analyticity. The native speakers of a language use certain expressions as expressing the same thing. This fact is explained through the concept of meaning by maintaining that two expressions express the same thing, i.e., they are synonymous if they have the same meaning. The concept of meaning is also taken to explain the concept of analyticity. A statement is called analytic if it is true by virtue of its meaning.

The notion of sense or intension gets centrality as it is conceived to answer both these questions — regarding analyticity and synonymity. Traditional philosophers thus have equated meaning with intension. Two terms are said to be synonymous, if the ideas/concepts/intensions attached to them are the same. This trend can be traced back to Aristotle's *De Interpretatione*. Aristotle maintains that the mind forms 'mental likenesses' (Blackburn, 1984, 41) when confronted with external things. And words of our language cannot refer to external objects by themselves but only by associated ideas or 'mental likenesses' in the mind. That is to say, the associated idea
provides the meaning. As Locke (1947) says, "... words in their primary or immediate signification, stands for nothing but the ideas in the mind of him that uses them ....". For the traditional philosophers intension or concept captures the notion of meaning in its entirety, i.e., without any residue. Intension, for them, exhausts the whole meaning of the term. For this reason extra-linguistic matters are not given any importance in their discussion of meaning. This results in their making reference subservient to intension. Meaning (taken in the sense of intension) is thus considered as central in this semantic framework.

Though different forms of this traditional theory can be identified in the writing of different philosophers, Frege was the first philosopher to formulate it systematically. In "On Sense and Reference" (ed. P. Geach and M. Black, 1970) Frege formulates his theory of meaning about proper names (singular terms) and declarative sentences. Frege does not explicitly deal with the meaning of general terms. However, we can extend his treatment of meaning to these terms.

Keeping in line with the traditionalist's intension-extension distinction, Frege also distinguishes between the sense and reference of a name/term. It is the distinction between the mode of presentation of an object and the object presented; the latter being the referent of an expression, the
A possible question which might arise in this respect is regarding Frege's introduction of the notion of sense in addition to the notion of reference. The reason for introducing this notion of sense makes sense central to Frege's framework. Frege introduces the notion of sense while considering identity statements involving pairs of descriptive expressions which uniquely specify the same object. This point can be explained by considering two kinds of true identity statements where the identity sign is flanked by proper names. To cite Frege's classic example, '(a) The morning star is the evening star'; and '(b) The morning star is the morning star'. What makes (a) true is the fact that the proper names concerned have the same bearer. Here, we should mention one fundamental assumption of Frege's theory which is that the meaning of a sentence is a function of the meanings of its constituent expressions. So the meaning of a sentence remains unchanged, if we substitute an expression occurring in that sentence with another expression with the same meaning. But now by this Fregean assumption (a) must have the same meaning as (b) which results from (a) by the substitution of a coreferential expression. But (a) and (b) cannot have the same meaning, for they differ in crucial respects: (i) (a) is a contingent truth, as it could have been otherwise, whereas (b) is a necessary truth; (ii) (a) is an a posteriori truth, as its truth can only be known by empirical investigation, whereas (b)
Theory of Reference

is an a priori truth; and (iii) (a) is an informative truth while (b) is uninformative.

The question is how could two sentences have the same meaning while differing in various respects? Frege's answer is that it is the difference in sense between 'the morning star' and 'the evening star', which accounts for (a)'s being contingent, a posteriori and informative while (b) is necessary, a priori and uninformative. Thus he primarily introduces the notion of sense for explaining the difference between two sorts of true identity statements.

Frege holds that expressions of natural language express senses, and through these senses only they refer to or stand for their respective referents. That is to say, in Frege's opinion the sense of an expression provides us with the route to the object, which the expression stands for. The route to the reference, according to Frege, is contained in some descriptive specification of the object. An object satisfying that description will be the object named. This description of the sense of a name is a part of its meaning, and is known or unknown by any speaker with mastery of the name concerned. Reference, thus," does not form a part of meaning. Reference, so conceived, may be considered a consequence of meaning.

For Frege, the mere knowledge of the referent of a name
is not enough to know the meaning of that name. As Dummett puts it, "merely to know that a name has as its referent an object with which we are confronted, or which is presented to us in some way, at a particular time is not yet to know what object the name stands for" (Dummett, 1973, 545). We do not know this as we do not know "how to recognize the object as the same again", i.e., the associated criterion of identity. Sense supplies us with the criterion of identity and also with the criterion of application. Sense provides, as it has already been mentioned, some identifying description of the referent. Frege's semantic theory is based on two relations, one of the meaning sort and the other of the referring sort. However, the relation of the meaning sort assumes primacy since the relation of the referring sort is ultimately dependent on the criterion of identity which is provided by the relation of the meaning sort. Thus this central tenet of Frege's scheme can be condensed to his characteristic slogan 'sense determines reference'.

The centrality of sense in this framework, thus, is derivable from the fact that it is taken to supply the criterion of identity and that of applicability. In order to grasp the meaning of a name it is necessary to know the associated criteria of, identity and applicability. Frege's treatment of proper names explicitly exemplifies this. For example, we may take the term 'Aristotle' which, according to Frege, is logically equivalent to the descriptions like 'pupil of Plato', 'theteacher of Alexander
the Great', 'the philosopher who was born in Stagira', etc. And these descriptions will give us the 'criteria of identity' in the sense that the object which falls under these sets of description will be called by the term 'Aristotle'. In that way the sense of a name specifies a set of necessary and sufficient conditions to fall under its expression.

Following this discussion, we can formulate Frege's treatment of the meanings of natural kind terms. Natural kind terms are general terms. In Frege's framework we can trace two slightly different concepts of sense that a general term can get attached to. As Dummett (1973, 548-50) observes, there can be countable general terms whose sense will involve criteria of application as well as criteria of identity. On the other hand, there can be uncountable general terms whose senses get exhausted in the attached criteria of applicability only. Geach in his Reference and Generality, has accused Frege of not having made this distinction explicitly. But since it lies beyond the scope of this thesis I would take it that for Frege all general terms have univocal sense. However, it really does not make much difference for my conclusion here. In this view, the meaning of a natural kind term say, 'lemon' is given by specifying a set (conjunction) of properties which will give us the necessary and

3 Frege's treatment of proper names is subject to alternative interpretations. Notable in this respect are the writings of Searle, Kripke, Wittgenstein etc. Depending on their varying interpretations of the criteria of identity and application, they propose disjunctive or conjunctive theories of names.
sufficient conditions for membership in that class (i.e., the class of objects called 'lemon').

Keeping the centrality that is assigned to meaning in mind, we should now give a detailed exposition of the Fregean notion of sense (Sinn) which is nothing but meaning. This analysis assumes importance in the light of Putnam's criticism of Frege's theory. This notion of sense and its relation to reference have played a central role in the contemporary arena of philosophy of language. So, this notion is of immense importance as far as philosophy of language is concerned. We have already seen that according to Frege the sense of a proper name cannot be consisted in its having the reference that it has and that he argues for the existence of sense in terms of the notion of 'cognitive value' which constitutes its 'informative content'. The sense of a proper name or any referential expression is something that forms a part in any belief whose expression involves that term or expression. The sense of a term supplies a concept and the denotation or referent of that term is identified as something that uniquely satisfies that concept. Tyler Burge (1979) has talked about three different functions that Frege's notion of sense is asked to carry out. Following Nathan U.

In analytic philosophy the semantic aspect of sense is taken into consideration. But for our purpose here we can take the other two functions of sense also into account. The failure to see the inherent psychologism in Fregean philosophy can be ascribed to the analytic philosophers' failure to focus on the other two functions of 'sense' in addition to treating it as a semantic notion.
Salmon (1982) we can outline these three distinct functions or properties of sense as Sense., Sense., and Sense.; Sense is taken here as a psychological or conceptual notion. This is a purely qualitative property, i.e., the conceptual representation of an object which any competent speaker of a language associates in a particular way with his or her use of the term. This notion of sense is something which a subject "grasps" or "apprehends" and in this way it has only conceptual ingredients.

 Sense,: This is a semantic notion. We have already noticed that Frege’s semantic theory is based on two sorts of relations and one of them is of the referring sort. That is to say, sense provides us with a mechanism by which the reference of the term is secured. Sense gives us the route to the reference.

When sense is identified as ‘psychological’ under Sense,, it, by no way, means that Sense. of a term is like a private subjective expression (e.g. images), accessible to the mind of only one subject. This is because Frege makes a distinction between his concept of sense and the concept of mental images. Sense., in any form, is supposed to be something which is ‘objective’, i.e., intersubjective in the sense that it is graspingly different subjects and by the same subject at different times. Similarity for Frege, senses are immutable (Dummett, 1973). For him, the sense of a term can never be altered though two different senses can be attached to a term. Again, senses are timeless entities that neither come into nor pass out of existence. The reason which has been given by Frege is that otherwise we would be unable to maintain that anything was true at a time when there was no one to think about it. Because what we count as true or false is a thought, and if the existence of a thought depends upon its being grasped there would be nothing true at a time when there was no one who grasped it. So the thoughts, i.e., senses are to be regarded as eternal entities. Thus in being objective, immutable and eternal, Frege’s notion of senses is comparable with Plato's Ideas.
**Theory of Reference**

**Sense**: This is a cognitive or epistemic notion. This property of the sense of a term sense contributes to the informative content of sentences containing that term. This sense of a term forms a part of any belief expressed by means of the term, and is relevant to the epistemological status (a priori, a posteriori, trivial, informative) of sentences containing the term.

At an initial glance, it might seem that for any meaningful singular term, the Sense of the term is the Sense of the term is the Sense of the term. In Salmon's opinion, this three-way identification, which makes a rigid theoretical claim, is only possible in the cases of definite description in attributive use. It is true that we cannot say with certainty whether Frege would accept this three-way identification in the case of all proper names. But it should be accepted that the Fregean notion of sense, which is introduced as the mode of representation of the referent, soon becomes complicated by the diverse roles it is called upon to play. Sense is regarded as the route to reference, as the grounding for a competent speaker's understanding, as the informative content and more generally as the criterion of the same saying. All these diverse motivations speak for the central role that sense plays in Frege's framework.

The centrality of sense can also be made evident from the conception of language understanding which Frege's theory
holds. Frege maintains that the understanding which a speaker of a language has of a word in that language can never depend merely on his associating a certain thing with it as its referent. In addition to that there must be some means by which the association is worked out and the knowledge of which precisely constitutes the speaker's grasp of its sense. Understanding here consists of mere knowledge of sense or intension. Thus understanding of reference becomes only a consequence of the understanding of meaning. The evidence of the centrality attached to the concept of sense in this Fregean framework is Frege's denial of the fact that two terms can have the same senses but different referents. For Frege, as we have pointed out before, two terms can have same referents but different sense depending on our ways of conceiving the referent. For example, 'Morning Star' and 'Evening Star' have the same referent (Venus) while differing in meaning. But the Fregean scheme blocks the possibility of the reverse order, i.e., the possibility of two terms having the same sense but different referents. This possibility becomes counter intuitive in this scheme as sense only provides us with the route to reference,

1.1.3 Putnam's Reformulation of Traditional Theory

Before going into the reformulation which is provided in the light of Putnam, one point should be clarified. Here the principal aim is to examine the viability of traditional theory.
But a reformulation of this theory will give us better understanding into Putnam's criticism of it. So, we begin with the reformulation. In order to do that we subsume the whole of Frege's theory under two features, viz., mentalism and individualism. We will try to show Putnam's criticism against traditional theory as advanced against them. Thus this reformulation has a methodological rather than a substantive importance.

The centrality attached to the concept of meaning (sense) in the Fregean (traditional) semantic framework also results from its internalistic (mentalistic) account of semantic understanding and cognition. We have already noted that the theory of understanding here consists of mere knowledge of intension. We may now ask, how is any speaker going to learn the meaning of a term? It is possible by 'grasping' the intension. This grasping is to be ultimately involved in a psychological state. Frege himself insists that one gains access to the sense of an expression only by a special mental apprehension. For him 'grasping' or 'apprehending' a sense is a mental process and this is in some ways analogous to visual perception. Frege writes, "[A]lthough the thought does not belong to the contents of the thinker's [private] consciousness yet something in his consciousness must be aimed at the thought" (ed. Strawson, 1967, 35). This evidently suggests that the grasping of a sense always essentially involves a directed mental/psychological experience.
But since understanding for them consists solely in grasping the intension and grasping is purely a mental act, understanding presupposes the existence of nobody other than the person grasping it. This points our attention to the 'methodological solipsism' presupposed by traditional theory. 'Methodological solipsism' can be taken as an outcome of the centrality that is attached to meaning (sense) in this framework. 'Methodological solipsism' of traditional theory is evident from the fact that in this theory understanding of an expression is regarded wholly internal, involving nothing in addition to the speaker but what is directly accessible to his or her mind. Similarly Salmon has pointed out,

A person's being in (such) a psychological state entails the existence of the person and perhaps of some things that are conceptual in nature, but nothing essentially or fundamentally external to the subject is involved. On the orthodox Fregean theory, the objects of thought consist solely of general properties that do not involve direct reference, and hence do not include non-intensional entities as constituents" (Salmon, 1982, 58).

Thus we can reformulate two basic assumptions of the traditional theory of meaning in the following manner: (i) to know the meaning of a term is to be in a psychological state and (ii) meaning of a term determines its extension or reference. We can attach to these premises the principle of 'methodological solipsism'. Keeping all these presuppositions in mind the traditional theory can be shown as consisting of the following two features:
1.1.3.1 Mentalism: This feature can be regarded as a direct outcome of traditional theory's ascription of centrality to meaning (sense). Traditional theory can be considered as mentalistic since this theory implies that whatever goes on inside a speaker's mind while grasping a term, is enough to determine the meaning (and in turn reference) of that term. Traditional theory of meaning considers the state of knowing the meaning of a term (say A) as exactly the same as the state of having a mental concept (i.e., to be in a 'psychological state, say S'). To be in a psychological state S is to know that it is the intension of A. This means that the psychological state S determines the intension of A. This intension (or the 'psychological state') in turn determines the extension (or the set of objects referred to) of the term as meaning determines reference. Thus the psychological state involved in grasping specifies a set of necessary and sufficient conditions to be fulfilled by an object to fall within the 'extension' of that term. Thus one may determine the properties (the necessary and sufficient conditions) which are included in a given sense by investigating the properties that are included in the psychological state of a subject in grasping the sense. The set of properties included in a sense in turn must uniquely determine the extension with respect to any possible world and time. Thus, according to this traditional view, the psychological state of a subject in grasping the sense of a term A must uniquely determine
the semantical intension as well as the extension of the term A. This can easily be seen as an expression of mental ism or psychologism as the psychological states are taken here to be the determining factors. We have already noted in the footnote 5 that Frege argues against the psychological interpretation of his theory on the ground that senses are objective entities, and, therefore, they are not subjective psychological states. But Putnam shows that the very act of grasping these so-called objective senses involves psychologism. The reason is that grasping is solely a mental act. This makes Putnam conclude that, "Frege's argument against psychologism is only an argument against identifying concepts with mental particulars, not with mental entities in general" (Putnam, 1975, 222). Thus, according to Putnam, the psychologism/Platonism controversy introduced by Frege is "somewhat like a tempest in a teapot",

1.1.3.2 Individualism: This aspect can be seen as a corollary of the internalist account of language understanding and is made explicit by Putnam's concept of 'methodological solipsism'. According to traditional theory, to know the meaning of a term is to 'grasp' its intension. But as has already been mentioned, since 'grasping' is solely a mental act, it presupposes the existence of nobody other than the person grasping it. Thus, meaning can be acquired fully in the privacy of one's own mental states.
1.1.4 Putnam's Critique

Against this centrality ascribed to meaning (sense) in the Fregean framework, Putnam proclaims that 'meanings are not in the head'. In the framework of Putnam, the centrality is ascribed to reference and to extra-linguistic fact. We will start with the problems arising from the mentalistic and individualistic scheme of Frege's semantic theory. In his criticism Putnam confines his discussion of traditional theory to providing a satisfactory analysis of the meaning of natural kind terms. For the sake of brevity we will confine our discussion mainly to natural kind terms, although with the help of Kripke's theory, this discussion can easily be extended to the treatments of proper names and other terms.

The consequence that follows from the above reformulation of traditional theory is that a psychological state of a speaker in grasping a word determines the intension and this intension further determines the extension of that term.

Against the mentalism of traditional theory Putnam offers his Twin Earth argument to point out that extension can never be determined by psychological states. Because "it is possible for two speakers to be in exactly the same psychological state ..., even though the extension of the term A in the idiolect of the one is different from the extension of the term A
in the idiolect of the other" (Putnam, 1975, 222).

Thus, to show that 'meanings are not in the head', Putnam has given the highly imaginative Twin Earth argument with the help of a little science fiction. We may imagine that there is a distant planet exactly like Earth in every respect except in some minor points. Following Putnam we may call this imaginary planet 'Twin Earth'. This 'Twin Earth' differs from Earth in some respects due to some peculiarities of 'Twin Earth'. We now imagine that on Twin Earth in place of water there is a different liquid which is superficially indistinguishable from water on Earth. This liquid has a long and complicated chemical formula and for the present concern it is abbreviated as XYZ. We also imagine that for every speaker on Earth (e.g., S,) there is an exact counterpart or Doppelganger (S,) on Twin Earth whose mental biography is qualitatively the same as that of the given Earth speaker (S,). Specifically, we can even imagine that "the same course of non-relational mental associations, events and images run through the minds of any given Earth subject and his or her alien counterpart" (Salmon, 1982, 67).

Now, if a spaceship of Earthians goes to Twin Earth, they will, at first instance, think that 'water' has the same meaning on Earth as well as on Twin Earth. But after discovering the difference between water (Earth water, H2O) and water (Twin Earth water, XYZ) in terms of their chemical composition, the
Theory of Reference

Earthian will say: "on Twin Earth the word 'water' means XYZ".

On the other hand, if a spaceship from "Twin Earth" visits Earth, they will come up with the observation that, "on Earth the word 'water' means H\textsubscript{2}O".

In 1994 with the help of advanced chemical theories, it is possible to say that "on Earth 'water' means H\textsubscript{2}O" and "on Twin Earth 'water' means XYZ". But we can very well think of 1790 when these chemical compositions of both the water of Earth and Twin Earth were unknown to us. But even then by 'water' on Earth we meant H\textsubscript{2}O and on Twin Earth we meant XYZ. As has been mentioned earlier, these two planets are identical in almost all respects and an Earthian can find his counterpart on Twin Earth. It has also been imagined that when an Earthian S and Twin Earthian S\textsubscript{2} use the word 'water' they are in the same psychological state because they understand them on the basis of their indistinguishable phenomenal features in the absence of the developed chemical theory. But in fact S\textsubscript{2} understands H\textsubscript{2}O when he says 'water' and S\textsubscript{1} understood XYZ when he says 'water'. Thus the extensions of these two 'waters' of Earth and Twin Earth are different even though the speakers' (S\textsubscript{1} and S\textsubscript{2}) psychological states in grasping these waters are the same. It follows, then, that extension of the term 'water' is not a function of the psychological state of the speaker by itself. Meanings, if understood properly, as Putnam observes, are not just in the
head. Hence, meaning does not determine extension. "Even given the meaning, whether something is a lemon or not, is, . . . ., a matter of what is the best conceptual scheme, the best theory, the best scheme of 'natural kinds'" (Putnam, 1975b, 142).

This Twin Earth argument also shows that the conception of the invariant sense of traditional theory falls short of a viable semantic component. It is a general requirement of a semantic framework that it identifies an unique referent for a term/name. In the framework of traditional theory the component of sense, due to its centrality, is supposed to provide this uniqueness. But this sense invariance fails to capture the 'uniqueness' of the reference identification as with the help of the Twin Earth argument we can show that there is nothing in the sense theory which can block the term 'water' s getting attached to both H$_2$O and XYZ$^6$.

Again, the primacy that is attached to the criterion of identity as specified by sense in this sense theory renders any statement of meaning analytic. The reason is, this framework equates meaning with sense and then reduces sense to a set of exhaustive (necessary and sufficient) conditions. So the

Putnam's original argument maintains that 'water' gets attached to H$_2$O and XYZ in two different Earths. But with the help of an example provided by S. Boer (ed. B. K Matilal and J. L. Shah, 1985, 103-150) we can show that even in the same Earth 'water' might get attached to H$_2$O and XYZ if we accept the sense invariance provided by traditional theory.
In the traditional view, the meaning of, say 'lemon', is given by specifying a conjunction of properties. For each of these properties, the statement 'lemons have the property $P$' is an analytic truth; and if $P$, $P$, ..., $P$ are all the properties in the conjunction, then 'anything with all of the properties $P$, ..., $P$ is a lemon' is likewise an analytic truth (Putnam, 1975b, 140).

If meaning can be given in terms of analytic definition, then these statements of meaning should express a truth that is both necessary and knowable a priori. And to say that a statement is necessarily true is to say that in discourse about counterfactual situations the term 'lemon' must apply to just those things, whatever they may be, that have all the features mentioned in the meaning statement. There can be no possible worlds, in which lemons, properly so-called, lack these features and in any possible world anything that has all these features is by definition a lemon.

But we can very well think of a few abnormal members of a class which are produced due to some change in conditions or in some other parts. The problem with traditional theorists is that

This point is also reiterated in Putnam's later writings (e.g., "Why is a Philosopher?" (Putnam, 1990a) where he has attributed the problems of traditional conceptualism to its aprioristic nature.
they cannot accommodate the existence of abnormal members of a
natural kind within the range of its theory. Putnam gives
examples of these cases and argues: 'A three-legged tiger is
Still a tiger', 'A green-colored lemon is still a lemon'.

One of the implications of the traditional theory is
that the preservation of the distinction between the disagreement
about the meaning of words and the disagreement about the facts
is a prerequisite of the sense invariance of this semantic
framework. One of the major defects coming out of this
distinction is that it rules out the possibility of accommodating
scientific change within this framework. But we can imagine
that, owing to some scientific discovery, the things we have been
calling cats turn out to be robots controlled from Mars. The
robot cats obviously do not have any of the normal properties of
an animal cat. Thus it is conceivable, without involving
ourselves in contradictions, that cats may lack the properties
mentioned by the traditional theorists, as being analytically
tied to the term 'cat'. But if these sentences expressed
analytic truth, to conceive cats as robots would involve
contradictions. The unavailability of an explanation of
scientific change is also derivable from another consequence of
the centrality of sense. We have already pointed out that the
sense of a proper name or any referential expression forms a part

8 This, like the Twin Earth argument, is a widely used argument
of Putnam.
in any belief whose expression involves that term or expression. This indicates that the sense of a term should remain invariant under normal process (both scientific and nonscientific) of belief fixation. This aspect of sense invariance thus rules out the possibility of accommodating the results of scientific change. The traditional theory, due to its sense invariance thesis, is forced to maintain that as a result of these discoveries cats cease to exist. But from the point of view of our everyday linguistic practice as well as our scientific practice this conclusion sounds counter intuitive. These considerations indicate that the sentences expressing meaning can never be analytic. They express propositions that are neither necessary truths nor truths knowable a priori.

This same distinction between disagreement about meaning and disagreement about facts also blocks the way of meaning holism within the scope of the framework of traditional theory. The very nature of meaning through sense requires that each sentence be given independent truth-value. Because the meaning of a declarative sentence is taken to be the associated thought and this thought is taken to be providing the route to the truth-condition which is the referent. So, there is no problem whatsoever in this scheme to relate a sentence independently to the range of experience that confirms it. So

*J. Katz has explicitly stated this.*
there is no need and also scope of holism in this framework. The highly questionable distinction between analytic and synthetic truth can also be shown as an outcome of this meaning invariance thesis of sense theory. Moreover, after the publication of Quine's 'Two Dogmas of Empiricism', the holistic nature of knowledge (scientific and linguistic) has been widely accepted. So if we take holism as a fact of our language use, then the major lacuna of the sense invariance of traditional theory can be identified as its failure to accommodate holism. This is due to its analytic meaning statement which results in the absolute nature of semantic invariance.

Against the 'individualist hypothesis' of traditional theory, Putnam proposes his notion of 'division of linguistic labor'. By this notion he establishes the fact that reference and meaning are social or 'collective' phenomena. So any semantic scheme, which fails to take note of this fact cannot be considered as a correct model of semantics. We can explain this concept of 'division of linguistic labor' with the help of the example of gold. In our community gold is important for many reasons. It is a precious and monetary metal, it is a metal which many people like to wear. In our community some people wear gold, some people sell gold, some people are engaged in the job of telling whether or not something is really gold. To say this is not to say that these categories are strictly exclusive in the sense that the person who wears gold cannot sell gold. We
are considering it as if it is the 'job' of some people in a community to wear gold and that of some to sell gold and so on. But it is a fact about our society that whoever buys or wears gold or discusses 'gold standard' cannot tell whether something is really gold or not.

Putnam explains this fact by introducing a distinction between acquiring the use of the term 'gold' and acquiring the method of recognizing whether something is gold or not. In order to communicate in a society one has to acquire the use of a term. A speaker can do so by acquiring the basic normal characteristics (i.e., the stereotype) of the kind that the term represents. But this does not mean that every speaker has to acquire the methods of recognizing whether something belongs to that kind or not. Methods of recognition are a matter of empirical scientific investigation and a few speakers of a linguistic community (the scientific experts in that field) are able to acquire those methods. In case of doubt about the true extension of a term, a normal speaker can depend on the experts in that field who have acquired the methods of recognizing whether or not a thing belongs to a class. The experts, in turn, determine the extension by conducting different tests. By using those tests they will tell whether a thing belongs to a kind or not. But these tests do not form a part of meaning. Different experts might use different tests. The difference in tests does not matter so long as they pick up the same set of objects as the
extension of a term. An expert can select a particular test depending on his convenience, the advancement of scientific findings, etc. As Putnam concludes, "[T]he test isn't part of the meaning; but that there be some test or other (or something, e.g. a sample, from which one might be derived), is necessary to preservation of 'the normal usage'" (Putnam, 1975b, 151).

All these aspects are there in a language which is considered as a collective body. But in Putnam's opinion, language or linguistic community divides the 'labor' of acquiring and knowing the use and the extension into two parts. The way of recognizing the extension possessed by the expert is very much a part of the knowledge possessed by the collective linguistic body, even though it is not possessed by each individual of that community. Thus, for example, advanced scientific theory about a term may fall under the social meaning of that term without being known to all speakers who acquire the term. Putnam observes:

Every linguistic community exemplifies the [] division of linguistic labor...: that is, possesses at least some terms whose associated 'criteria' are known only to a subset of the speakers who acquire the terms, and whose use by the other speakers depends upon a structured cooperation between them and the speakers in the relevant subsets (Putnam, 1975, 228).

Frege's individualistic framework, in missing this 'cooperative' aspect of our language use flounders as a satisfactory explanation.
1.1.4 Neo-Classical Theory: An Attempt to Restore Meaning Centrality

Recently in the tradition of transformational generative grammar, an attempt has been made to restore the centrality of meaning by showing the limitations of the criticisms advanced by new theorists against traditional formulation of meaning centrality. The attempt made by J. Katz in his formulation of neo-classical theory of reference may be particularly mentioned. However, note that this attempts can never be taken as independent from the traditional approach to meaning. It is a mere variant of the traditional theory. Thus my attempt will be to show that the criticisms which hold against traditional theory are equally applicable to the theory of Katz.

Katz accepts the lacuna of traditional theory in specifying a priori the criterion of identity for the application of a term. This lacuna is ascribed to traditional theory's failure to differentiate between the empiricist approach to language and a rationalist approach to meaning. Language is taken as a historical entity in the traditional theory. Katz, on the other hand, offers a rationalist approach to language and as a part of it he introduces the linguistic distinction between type and token. The level of type is confined to the level of grammar and at this level semantic competence is purely determined by the speaker's knowledge of syntactic and
Theory of Reference

phonological features of the language. Thus meaning, at the level of type, does not 'appeal to extensional notions like applicability or truth' (ed. French et al, 1979, 107).

With the help of this above mentioned improvement on traditional theory Katz tries to show that the counter examples given by Putnam apply only to the level of token of meaning and reference. The reason is that, these examples depend on the presupposition of language as historical. But at the level of type we can still maintain without contradiction that meaning determines reference. Against this attempt of Katz we can propose the following criticisms:

(1) The mentalism and individualism of traditional theory can be traced even at the level of type, since this level keeps the mentalistic premise, i.e., of meaning determines reference intact. We can follow Putnam in maintaining that Katz has merely presented the traditional theory in an ornate garb.

(2) Katz accepts 'division of linguistic labor' as a fact of language use. But any model which ascribes centrality to meaning is individualistic in nature. Because, if understanding consists of only knowledge and that knowledge is encapsulated in meaning, then any person can acquire that knowledge in the privacy of his mental states. So individualism results as a direct outcome of this model. Thus Katz's semantic framework fails to account for a fact which Katz himself accepts as a feature of our language.

(3) The differential device of type-token renders the class
(extension) of type reference, at least in the case of natural kind terms, empty. With the help of the Twin Earth argument we can argue that the meaning attached to each natural kind is empty. This follows from Katz's conclusion that if cats turn out to be robots controlled from Mars then there is no cat. Similar thought experiments can be extended to all natural kind terms with the consequence that all of them become empty. This concept of empty reference does not serve any philosophic purpose.

(4) Katz accepts Mill's distinction between the meaning of proper names and general terms. For him proper names are like indexicals and therefore devoid of any meaning content. He accepts a system of direct reference for them. But as natural kind terms (and also artifacts) are shown to be indexicals by Putnam, we can treat them as proper names even in the framework of Katz. So the attempt of neo-classical theorists fails to restore centrality of meaning. Thus Katz's attempt, as mentioned earlier, is not a new departure from traditional or Fregean approach to meaning. The reason is that it retains the basic shortcomings of the Fregean model.

1.1.5 Reference as Central

Putnam's critique of the traditional theory shows that the psychological states of grasping the meaning of a term do not determine its reference. But the question arises of how reference is determined, if not by the associated sense.
Putnam's reply to this question is contained in the constructive side of his semantic theory. On the constructive side of Putnam's theory of meaning, we get his anti-mentalistic 'causal theory of reference' and his anti-individualistic notion of 'division of linguistic labor' and his unique conception of language understanding and semantic competence. These are aspects of his semantic framework which ascribe centrality to reference. The criterion of identity and applicability are supplied here by his notion of invariant referent. The criterion of identity is encapsulated in the sameness of its reference. Likewise the criterion of identity and applicability of a term is also provided by the sameness of its reference. To present Putnam's causal theory of reference in a nutshell: reference of a term is fixed by an initial 'introductory event' where the term is 'dubbed' onto the object for the first time. This reference is then carried on through a 'causal chain', to use Putnam's phrase, which links every future use of a term to its initial 'dubbing ceremony'. Later generations share this reference by being causally connected with this initial 'dubbing ceremony'. The concept of causal chain, thus, plays a very important role in Putnam's scheme.

The position will be even clearer if we approach it from the point of view of what constitutes linguistic

Donnellan's discussion on descriptive expressions with referential use makes this point explicit.
understanding in this framework. In the case of the traditional theory, as a result of its sense invariance, understanding is explained solely in terms of knowledge, viz., knowledge of intension. But, for Putnam, the concept of linguistic competence is not a mentalistic notion. Linguistic understanding or competence is not a matter of unalloyed knowledge. In this respect he differs from traditionalists and linguists like Chomsky. Linguistic competence consists, as Putnam observes, in the ability to strike the right sort of relationship to certain situations. The right use of a term has to be related to a situation in which the referent of the term is present, i.e., the initial 'dubbing ceremony'. The associated conceptual content of a term/name does not play any role in this initial 'dubbing ceremony' of term introduction. Even if we accept that the associated conceptual content sometimes helps us in picking up the reference, it never provides the ultimate identifying description. Knowledge of the meaning of the term therefore does not necessarily include any conceptual content. To understand the meaning of a term is to be a part of the causal chain, which is after all a social chain, associated with the use of it. This point has twofold implications – firstly, it implies that this framework ascribes centrality to the referent (object or class of objects) involved in the initial dubbing ceremony; secondly, it implies that language understanding has a social or collective nature. Putnam's famous concept of 'linguistic division of labor' is an expression of the social aspect of his direct theory
of reference. In our section on Putnam's Critique, we have discussed the notion of 'linguistic division of labor' at length. It is to a critical discussion of causal theory of reference that we now turn our attention.

According to Putnam, as we have already seen, the referent of a term provides invariance to the semantic framework related to it. The question before us is how this reference makes available the criteria of applicability and identity. Such criteria are explicated in terms of two factors: one is the object or a sample of object involved in the initial dubbing ceremony and the other is the contribution of final sciences. The initial 'dubbing ceremony' serves as the paradigm for future use. This factor of paradigm also includes the aspect of locality by maintaining that the paradigm should be from our environment, something which our forefathers confronted while introducing the term. Final sciences make this contribution by determining the nature of the referent of a term. Thereby they determine the nature of the sameness relation that holds between a present use and an initial or other use. These two factors point to the two components of causal theory of reference. The first component that refers to the initial 'dubbing ceremony' and the causal chain that connects a present use of a term to the initial use of it is discussed in the subsection, 'Indexicality and Paradigm'. The second component, viz., the contribution of final science is dealt with in the subsection 'The Contribution
1.1.5.1 Indexicality and Paradigm

Putnam equates natural kind terms with indexicals. By indexicals, we commonly refer to the words that change their extensions from context to context. 'Here', 'Now', etc. are examples of such indexical terms. However, as Putnam notices, nobody has ever tried to apply the view of traditional theory that 'intension determines extension' to these indexical terms. This is for the obvious reason that no such attempt is possible. We can make this impossibility explicit with the help of the Twin Earth example. In that example, we have assumed that each one of us on Earth has a counterpart (doppelganger) on Twin Earth. And that each Earthian has exactly the same mental make-up as his counterpart on Twin Earth. So, when I think on Earth, that 'I have a headache', my counterpart on Twin Earth also thinks 'I have a headache'. But the extension of the particular token of 'I' is different in both these Earths. In my verbalized thought the extension of 'I' is myself, whereas the extension of the same token of 'I' in my doppelgänger's verbalized thought is himself. Thus the same word 'I' has two different extensions in two different idiolects and since we (myself and my doppelganger) are in the same mental state in having the headache, we cannot say that the concepts or meanings associated with that word are different. Putnam, through this
example, succeeds in showing that the two assumptions of the traditional theory of meaning—viz., (a) words have intensions and (b) intension determines extension—fail to be true in the case of indexical terms.

Putnam summarizes his semantic theory about natural kind terms by maintaining that they (natural kind terms) "have an unnoticed indexical component". The indexicality of Putnam's theory can be derived from two aspects of his scheme. Firstly, the reference here is determined by tracing a causal chain back to the initial dubbing ceremony that serves as the paradigm. Secondly, it is maintained that the paradigm has to be local. This is the implication of the contribution of the environment. By environment here, Putnam also refers to the nature of the things (i.e., kinds) themselves. In the example of 'water,' the nature of water (H₂O) fixes the reference of 'water'. This indexicality is further clarified by the fact that "... the entire society" as "embedded in its environment" (Putnam, 1990a, 110) fixes the reference. Thus, for any sample x, we say that x is water only if x bears the relation of sameness to the water around here. Putnam's view that natural kind terms are indexical and Kripke's view that they are rigid designators can be regarded as two sides of the same coin.

It should be remarked here that Kripke’s talk of rigid designator is essentially related to his notion of possible world. A kind of necessity thus follows from the possibility of identifying same referent (rigid designator) across different possible worlds. Putnam, in his "The Meaning of ‘Meaning’",

54
But critics like Zemach (1976) have pointed out that the phrase ‘around here’ fails to take care of a few serious difficulties in new theory. To name a few:

1) We do not and cannot know the correct reference of any substance term as we are not in a position to determine which particular case served as the paradigm in the initial instantiation.

2) Given a defective historical paradigm, we would be forced to deny some conceptually necessary proposition like "our prime example of 'water' is water".

About the second criticism, following Boer, we can say that it is based on too strict a reading of the new theory. This criticism seems to presuppose that a "single historical episode of ostensive dubbing infallibly fixes the extension ..." (Boer, 1985, 108). But there is no such infallibility involved here.

While explicating this point, Boer calls our attention distinguishes between metaphysical necessity and epistemological necessity and maintains that natural kind terms have metaphysical necessity, whose negation is rationally conceivable. But Putnam clarifies his position further in his recent publication, "Is Water Necessarily H₂O?" (1990). He identifies metaphysical necessity with 'physical necessity' (1990, 56-7) which has no element of inconceivability. He also distances himself from Kripke especially by giving up all talk about the possible world (Putnam, 1990, 69). Talk of the possible world is not a prerequisite for Putnam's semantic scheme due to its empirical nature. As Putnam writes in "Why is a philosopher?" (1990a), 'no metaphysical glue' fixes the reference.
to a very illuminating point involved in all the initial naming ceremonies. He says that our initial user (i.e., dubber) does not work in a vacuum. But his use of a term in the initial naming ceremony is assisted by his experiences with the particular object concerned on different occasions and a battery of referential intensions. Before introducing the term, he has a clear picture of the different features/properties of the object which he wants to bring under one name by the introduction of the term. Thus, "the demonstrated sample is just a heuristic device to focus his own and the audience's attention . . . . The paradigm sample thus plays a purely derivative role" (Boer, 1985, 109). Thus, even if the paradigm sample is XYZ, since the liquid, the acquaintance of which on different occasions leads the initial user to such a naming ceremony, is H₂O, we will conclude that all other subsequent uses of 'water' refer to H₂O and not to XYZ.

Still it may be imagined that the initial dubber lived in a place filled with XYZ instead of H₂O which resulted in his being acquainted with only XYZ. Does this mean his use and all subsequent uses of 'water' refer to XYZ? This criticism can be countered by maintaining that the new theory does not make any claim that a single historical event serves for the introduction of the term. As Kripke observes, there may be different independent dubbing ceremonies in the case of natural kind terms. It can be interpreted as making a 'weaker claim' that there are a number of historical introductions of a term such that every
subsequent use of that term "has its extension fixed by some such introductory event or other" (Boer, 1985, 109).

In fact, the objection raised by Zemach is against the very possibility of our current uses of a term as stemming from a defective initial dubbing. Such a possibility can never be ruled out theoretically. But practically we tend to readjust\textsuperscript{12} our uses of a term within our speech community. New theory does not prevent us from any such ‘readjustment’ as the meaning statement here is not analytically associated with the term. The contingent and empirical nature of Putnam’s conception of language and meaning uniquely makes room for such readjustments. Such a readjustment takes place where (i) the associated stereotype is fairly detailed, (ii) the object plays an important role in the speech community and moreover, where the speech community uses the same word to refer to different objects at different times. For example, ‘water’ is initially associated with XYZ and then its referent is shifted to \text{H}_2\text{O}. On the other hand, where the stereotype is vague, and is associated with a socially unimportant substance, there are more chances of retaining the historical usage and accepting a change in the present use of the term.

In order to answer the first criticism, we all have to

\textsuperscript{12} Such readjustments are implied and also governed by the principle of benefit of doubt, which Putnam takes as regulative of any viable philosophy of language.
be clear about what we mean by 'knowing the correct reference'. If we mean knowing the totality of stuff which bears the sameness relation to the stuff which is initially dubbed by the term, then we can fairly maintain that we do know the reference. Zemach's problem comes as for him knowing reference equals to knowing 'decision procedure'. Knowing the reference amounts to the decision as to the proper application of the term, provided by the associated 'intensions'. As new theory fails to do it, so the critics maintain, it should be rejected.

But in the case of the terms with strong stereotype, we tend to reintroduce them (if necessary) depending on the local samples. So there remains a good chance of our knowing the reference of such terms as we fix their reference by continually reintroducing the term by means of local paradigm. In the case of terms (e.g., 'elm') with less strong stereotype and of lesser social interest, we tend to follow the initial single historical dubbing. But due to their unimportance in speech community, we are not willing to assert that they must apply to such and such local things. It may be objected that this sort of redubbing or readjusting undermines the unity and continuity of reference, theoretically, as we do not depend on a single initial naming ceremony. But practically we can make room for unity and continuity within a given speech community over a long period of

Such reintroductions are obviously versions of the readjustments that a speech community makes in its use of a term.
time, as

bounded at the one end by an initial introduction of a term
and at the other by a de facto redubbing under the collective
pressure of autonomous referential intensions regarding local
stereotypical stuff or things (Böer, 1985, 112).

But our usual formulation of new theory has to be
emended as *prima facie*, it seems to exclude all the *theoretical*
terms as it relies on the *observability* of the object in the
initial naming ceremony. The emendation can be made by showing
that the function of ostensive paradigm is only a *derivative* one.
What the user has in mind (battery of referential intensions)
under some description or other plays an important role. Such
description might have an indexical component in order to provide
the spatio-temporal framework within which the descriptive
elements single out the intended subject. But we should make it
clear that the descriptions are in no way synonymous with the
terms used. *Reference fixation* is different from *synonymity*
creation.

1.1.5.2 The Contribution of the Final Sciences

This aspect of the new theory comes to the forefront
when we try to determine the nature of the sameness relation
mentioned in the ostensive definition of a term. It is said in
the definition of ‘water’ that whatever bears a sameness relation
to this liquid, while pointing to a glass of water, will be
water. The question arises: what sort of sameness, that is, sameness of appearance or of deep structure is being referred to here?

A possible reply might be that it is sameness of appearance that counts. It might be maintained that if one's psychological concept of 'water' is so loose as to include not only liquid samples of H\textsubscript{2}O but also liquid samples of chemical compounds distinct but superficially indistinguishable from H\textsubscript{2}O — i.e., imaginary compound XYZ — then the term 'water', at least for the speaker, does not designate H\textsubscript{2}O, but some general category of liquid with the features colourless, odourless, thirst-quenching etc., which would include samples of both H\textsubscript{2}O and XYZ. A challenger of the new theory might ask, why should we suppose otherwise? Of course, in 1994 almost everybody knows that a liquid sample is a sample of water if and only if it is basically composed of H\textsubscript{2}O. But in 1790, in the absence of any such advanced chemical theory, why should we suppose that the term water would properly apply only to samples of H\textsubscript{2}O and not of XYZ?

This sort of doubt cannot be answered simply by

In his early phase, Putnam takes micro structure of the paradigm of a kind to determine its nature. But in his later phase he prefers concepts of obeying the same set of laws, 'lawful behavior' (Putnam, 1990, 70) etc., to micro structure. As such niceties do not make any difference to the purview of this thesis, a detailed explication of them is not attempted here.
reproducing the initial argument for the theory of direct reference. The traditional theory bases itself on a conditional statement that if the term 'water' is descriptional in terms of the properties of being colourless, odourless, thirst-quenching etc., then the term 'water' must refer to any substance that" happens to have all these properties. The direct reference theorist's denial of the consequence of this conditional consists in drawing a modus tollens inference. But the present doubt is over the question as to why we should not be performing modus ponens instead of modus tollens (Salmon, 1982).

Putnam attempts to get himself out of this doubt by presenting an alternative picture. We may imagine a person pointing to a glass of water and saying "this liquid is called 'water'". In this case his "ostensive definition" of 'water' is based on an empirical presupposition. This empirical presupposition is that the body of liquid he is pointing to bears a certain sameness relation to most of the stuff that he and other speakers of his linguistic community have called 'water' on different occasions.* This presupposition becomes false if unknowingly instead of pointing to a glass of water he points to a glass of hydrochloric acid. In such cases he does not intend his ostensive definition to be accepted. Thus, we might say that ostensive definitions give us a defeasible necessary and

This point is reiterated in "Is Water Necessarily H₂O?", where Putnam takes paradigm as defeasible (1990, 60).
sufficient condition for a membership in a class. In the case of ‘water’, this necessary and sufficient condition is that the liquid has to bear the relation Same, to the stuff in the glass to which the speaker is pointing and saying "this liquid is called ‘water’". But this condition is based on the above mentioned empirical presupposition. Only given that the empirical presupposition is satisfied, we can say that the ostensive definition provides a defeasible, necessary and sufficient condition.

To ascertain the nature of reference invariance of this semantic framework, we should look into this sameness relation. What sort of sameness is it? How hard is it? Putnam holds that the sameness relation is a theoretical relation which is determined by scientific findings. But deciding sameness with the help of scientific discoveries naturally points to a precondition, viz., the sameness of appearance, which serves at the initial level of naming should coincide with the scientific sameness. But as the critics point out, in many respects, this is not the case. Consider, for example, the case of ‘jade’ as it is found to be associated with two different chemical compounds, viz., jadeite and nephrite. Under such findings, what should be the extension of ‘jade’? Or should we maintain the counter intuitive conclusion that the extension of ‘jade’ is empty like that of ‘unicorn’?
Again, how strict and uniform should this sameness be? We may take Putnam’s example of iron. Putnam says:

Consider an ordinary sample of iron. By the standards of high school chemistry/ it is ‘chemically pure’. But it consists of different isotopes. Any naturally occurring sample of iron ... will exhibit the same lawful behavior as any other ... . But if we use a cyclotron or some other fancy gadget from atomic physics to prepare a sample of iron which is mono-isotopic, that sample will — ... — behave slightly differently from a ‘natural’ sample. Should we then say that a hunk of iron consisting of a single isotope and a hunk of natural iron ... are two different substances or one? (Putnam, 1990, 68).

All these examples direct our attention to the interest-relativity aspect of the criterion of applicability provided by this reference invariance. Interest-relativity can be traced in both term-introduction and term-identification. We have already seen that every semantic framework presupposes that uniqueness in term-introduction be retained. We do presuppose while using a term that it will pick up a unique referent. But, as Boer (1985, 115) points out, this presupposition is not an ‘indefeasible semantic presupposition’. We always readjust our usage following the scientific findings. This readjustment is largely interest-relative. In the case of ‘jade’ the different underlying traits of its referents are accommodated within the linguistic community with the help of qualification. What regulates the application of the qualification is our interest, that is, the purposes that are served by the use of the term. Depending on our social interest, i.e., taking the interest of jewellers into account, we use adjectivally qualified ‘true jade’
for jadeite as opposed to nephrite jade. Acceptance of this interest-relativity, however, does not "amount to the admission that the original term failed to get any grip on reality". This tolerance is not unlimited. The 'openness' which is allowed to a term largely depends on the various purposes for which a natural kind term is introduced.

We can trace 'interest-relativity even in term-introduction. We can differentiate between two kinds of 'desires' for introducing a term. One is the non-scientific desire of common people to talk about a number of things showing resemblances by using one single word. The other is the scientific desire that introduction of these terms should ultimately prove useful in formulating significant inductive generalizations, that is to say, it should perform explanatory functions.

In some cases, classification or grouping of things depending on these two desires coincide. But in some cases it does not. In the cases where final sciences provide determinate number of kinds of things or stuff that are exemplified in the paradigm class, we can still use the term with some added adjectival qualification. But what will be the case with terms referring to biological species for which even scientists can offer different kinds of classifications or grouping? In the case of biological kind, viz., 'beetle' the extension of the terra
Theory of Reference

will depend on ‘the determinate principle for sorting the paradigm-class’. By ‘beetle’ we usually mean several different kinds of insects. So the extension of ‘beetle’ will depend on whether we want to refer only to the kind to which our present sample belongs (resulting thereby in a very narrow extension of ‘beetle’) or "the ‘lowest’ taxon embracing all the individuals in the sample" (resulting thereby in an absolutely broad extension, as Dupre says "counting onions as lilies"). The decision depends on the interest of the decider.

What makes room for interest-relativity in the framework of direct reference theory is the collective nature of the conception of language understanding of this framework. This collective nature is partly regulated by the ‘principle of benefit of doubt’. This principle says that we should grant the introducers or scientists who determine the nature of the referent of a term the possibility of "reasonable modification of [his] description" (Putnam, 1975a, 275). But the users of a term can also be granted this benefit of doubt from the point of view of ‘significant’ use of the term. ‘Linguistic division of labor’ maintains that in case of doubt an ordinary speaker can get his doubt clarified by an expert. But this, by no means, claims that the whole of common speaker's language is laden with doubts. Moreover, it points to the existence of scientific and

Putnam explicitly endorses all these modifications in his "Is Water Necessarily H_2O?" (1990, 68-9).
non-scientific uses of our language and their interdependence. In most of the cases both these methods pick up the same referents. But interest-relativity takes care of the few instances where there is apparently slight difference between the common man's use and the expert's use.

We might now turn to Putnam's overall conception of meaning. He does not want to define 'meaning' by showing it as synonymous with the traditional notion of 'sense' or 'concept' or any other notion. He, instead, provides a description of meaning or to use his expression 'normal form for the description of meaning'. His proposal is that the normal form for the description of the meaning of a word can be given in the form of a finite sequence or 'vectors'. This description should include as its components the following aspects; (1) the syntactic markers that apply to the words, e.g., 'adjectives'; (2) the semantic markers that apply to the word, e.g., 'natural kind'; (3) a description of the additional features of the stereotype, if all of them are not contained in (2); (4) a description of the extension. This last component is, in a way, different from the other three components. The first three represent a hypothesis about the individual speaker's competence. But extension is a matter of scientific discovery. "It means that (we say) the extension of the term 'water' as they (the speakers in question) use it is in fact H_2O" (Putnam, 1975, 269). In order to give a description of extension as a component of meaning description,
we present the extension (the set) not the description of extension. It is different in another very important way: we have already seen that it is reference which provides invariance here to the semantic scheme.

1.2 Underlying Realist Intuitions

This section tries to formulate in explicit terms the realist intuitions that underlie Putnam's theory of meaning of natural kind terms. Before going into the details, it is important to make clear the nature of realism that Putnam was interested in. Realism has never been a purely metaphysical doctrine for Putnam. Instead, realism is empirical here. Realism is conceived as presenting an empirical hypothesis (though not in the strict scientific sense of hypothesis) to explain the phenomena we observe (Putnam, 1975c, 21). Philosophy of language here takes the phenomena we observe as fact, and tries to explain such fact. Realism is called upon to furnish such explanation. Putnam in his "Why Is a Philosopher?", observes that his realism is different from the traditional realism which was held by the traditional theory of meaning. As he says, "[T]his (his new or direct theory of reference) kind of 'realism' goes with a more fallibilistic spirit in philosophy" (Putnam, 1990a, 110). Putnam thus proposes an 'explanatory inductivist' argument, which, in his later writings, is termed as an abductive argument. Keeping this empirical (explanatory)
nature of Putnam's realism into mind we can now proceed to formulate a few realist intuitions underlying Putnam's semantics of natural kind terms.

In "Language and Reality" (1975a), Putnam enumerates two principles, viz., the principle of benefit of doubt and the principle of reasonable ignorance as two methodological principles of any viable philosophy of language. These two principles govern Putnam's entire theory of meaning. These two are realistic in nature. A brief exposition of them will help us in deriving the realist model underlying the semantics of natural kind terms.

The first principle, the principle of benefit of doubt (hereafter PBD) points to two aspects of Putnam's theory of meaning, viz., 'causal theory of reference' and the 'linguistic division of labor'. These two concepts, as we have seen, together point to the fact that our use of language depends on a mutual social cooperation. But the most significant point here is that 'causal theory of reference' uses descriptions contingently, i.e., only to pick up the referent of a term and does not, therefore, consider it (description) as synonymous with the term. This phenomenon, thus, keeps it open for a name to be attached to a wrong description. An initial dubber might want to talk or refer to a certain object. But due to 'ignorance or inadvertence' the description which he uses might not hold true
of that referred object. This is mostly the case with scientific terms. With our advancement in scientific findings we might come to realize that the existing description attached to a term does not hold for that object in to to. The PBD says that in such cases we should grant the dubber the possibility of 'reasonable modification of his description'. That is to say, we should give him the benefit of doubt that he wanted to talk about the same object as we do, but due to limited nature of scientific knowledge available, used a partially wrong description. For example, according to PBD we should assign the same reference to the term 'electron' which occurs in Bohr's 1900 and 1934 theories inspite of the slight change in the informative status of these two theories. Putnam maintains that this principle should be observed as it makes 'stable reference to theoretical entities' possible. The application of PBD is however not unreasonable. It is applicable to 'electron' but not to 'phlogiston'. The reason is, in the case of 'phlogiston' no 'reasonable reformulation' of its original description is available that can turn into a characterization of a kind of entity that we recognize.

The second principle, the principle of reasonable ignorance (hereafter PRI) takes into account two aspects of Putnam's theory of meaning, viz., 'division of linguistic labor' and the 'indexicality' or 'the contribution of environment'. 'Division of linguistic labor', contrary to common philosophical
assumption, shows that the knowledge of the meaning of a term need not amount to knowledge of its total meaning. Contribution of the environment says that 'paradigm' of a kind should be paradigm 'for us' that is, from 'our' environment. The 'actual nature of the paradigm' which is found in our environment has to be taken into consideration.

PBD and PRI, thus, have the feature of 'linguistic division of labor' in common which posits that meaning is not in the head. But the difference between them is evident from the fact that while PBD asserts that meaning is not in the common speaker's head, PRI asserts that it is not in the head of the experts. They thus serve as two pillars of Putnam's social and natural theory of meaning.

The two principles mentioned above, which are

17 In a recent paper, James Beattie (1993) accuses Putnam of being inconsistent and parochial in his semantic theory. His charge of inconsistency assumes relevance here. He charges that causal theory of reference cannot consistently accommodate 'division of linguistic labor'. He attributes this inconsistency to the alleged tension between the nonhuman environment taken as the arbiter in the causal theory of reference and the human (expert) decision making taken as the arbiter in the 'division of linguistic labor'. But this charge depends on a misconception about Putnam's entire scheme. Philosophy has never been an impersonal, alienated affair for Putnam. This presupposition of Putnam, which remains latent in his early phase, is made explicit in his later writings. Our speech community as embedded in its environment is taken to fix the reference of a term. So there is no room for any tension of the Beattie kind. For this same reason, Putnam also does not need to take help of the suggestion of Devitt and Sterelny (1987) that 'division of linguistic labor' should be drawn in a physicalistic term and not in human terms.
themselves realistic in nature, cover the whole of Putnam's theory of meaning and point to a few realist intuitions. These can be enumerated in the following terms:

(1) The very use of PBD is to make 'stable reference' possible. In this manner it makes room for trans-theoretic terms, that is for 'terms that have same reference in different theories'. Acceptance of trans-theoretic terms is undoubtedly a realist intuition as opposed to the anti-realist conception of theory-dependence of scientific terms.

(2) PBD along with the acceptance of trans-theoretic terms point to another aspect of Putnam's theory, viz., 'convergence' of scientific terms and consequently, of scientific knowledge. This aspect points to the 'cumulative' or convergent nature of scientific knowledge, which forms a part of the explanatory realist model.

(3) Both (1) and (2) along with PRI point to a deeper aspect of Putnam's theory. This aspect consists of his acceptance of theory-independent entities or reality of which our theories give alternative descriptions. This is due to the acceptance of 'the contribution of environment' which says that the 'actual nature of these entities' (paradigm) shape our final meaning of the terms referring to them. This is undoubtedly a strong realist intuition. It would not be irrelevant here to mention that Putnam in his later stage of internal realism gives up this faith in theory-independent entities. In fact, this rejection is responsible for the charge of shifting stances against later
Putnam. Later, in this thesis, an attempt is made to argue that the aspect of 'the contribution of environment' (and with it the explanatory realist model) can be retained, notwithstanding the rejection of mind-independent entities.

(4) From (3) and PRI it may follow that realism underlying natural kind terms accepts an extra-theoretic (non-epistemic) concept of truth which consists of the correspondence to the mind-independent reality. This aspect, again, has been given up in the internal realist model.

(5) Apart from these two methodological principles, Putnam's theory of language understanding also implies a realist intuition. Understanding of language here, as has been mentioned earlier, expands beyond knowledge, namely to the state of being causally connected to an external situation, and thus points to a realist undertone.

The semantic centrality that is ascribed to reference in this early phase of Putnam is thus intimately related to a strong realism. It, in fact, derives much of its force from the realist principles of PBD and PRI. PBD, which Putnam takes as a regulative principle has a very wide implication in Putnam's entire writing as consisting of three phases. In the first phase PBD functions within a semantic framework. We have already noticed in our discussion that the reference here supplies the criterion of applicability. It thus assumes centrality. This centrality is further qualified as interest-relative in nature.
This interest-relative nature is made possible by the PBD. In the second phase, on the other hand, this PBD is applied to a wider scheme, viz., to the causal-explanatory hypothesis of realism. The interest-relativity that is inherent in this causal-explanatory hypothesis is also made available by PBD. A detailed discussion of this phase is offered in the next chapter.