# INDEXICALS, DEMONSTRATIVES AND THE MODALITY DYNAMICS

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The so-called 'new theory of reference' which emerged recently from the writings of S. Kripke and D. Kaplan has thrown a radically new light on various phenomena in the semantics of natural languages.

I think that it would not be an exaggeration to say, at least for Kaplan's part, that many of the general semantic insights of this approach were shaped when Kaplan attempted to construct a formal semantics for indexicals and demonstratives.

Now, it is interesting to note that the point where Kripke's work and Kaplan's logic of demonstratives converge is the relation between indexicals (and demonstratives) and modality. Indeed the development of a new theory of indexicals and new concepts of meaning by Kaplan is parallel to the analysis of various categories of necessary truth by Kripke, mainly the differentiation between the a-priori and the necessary. It is exactly at this cross-roads that the motivation for Kaplan's logic of demonstratives originated. As he testifies (Kaplan 1977, 1978a) it is the failure of previous indexical semantics to make sentences like 'I am here now' logically valid, that necessitated a new approach.

In the present paper I would like to question the adequacy of Kaplan's classification of this sentence and others into the category of a-priori though contingent truths.

I would like to argue that Kaplan's classification (and similar suggestions by Thomason and Bennett) overlooks many subtle issues. Once these issues are discussed, it is no more clear whether such sentences are a-priori truths or physical necessities and furthermore it becomes clear that it is less important to have a clear cut classification into a-priori vs. necessary truths than to understand the interaction between these categories in terms of the DYNAMICS which turn PHYSICAL NECESSITIES into CONCEPTUAL AND SEMANTIC NECESSITIES.

Consider the following sentences:

(1) I am here.
(2) I am alive.
(3) I have an electric activity in my Brain.
(4) Yesterday is past.
(5) Nothing is green and red all over.
(6) One Meter = The Bar in Paris.
(7) A mother is a woman.
(8) An Ophtalmologist is an Eye doctor.
(9) DTHAT $\alpha = \alpha$.

All these sentences dispaly a SORT OF necessity. At each context of use in which they are uttered, they are true at THAT context. Before the rising of Kripke-Kaplan approach to the question of necessity vs. the a-priori, no conceptual distinctions were available in order to distinguish EPISTEMOLOGICAL questions (whether the truth is a-priori or a-posteriori) from METAPHYSICAL questions (whether the truth is contingent or necessary). Now, ever since Kripke's analysis all four possibilities are legitimate combinations to most people: Truths may be necessary and a-posteriori, necessary and a-priori, contingent and a-posteriori and contingent and a-priori.

Kaplan (1977, 1978, 1978a) extended much of Kripke's insights into the realm of indexicals and demonstratives. Furthermore, Kripke was interested in cases of a contingent a-prioricity due to a special EPISTEMOLOGICAL (see his meter rod case) situation, while Kaplan discusses cases where there are SEMANTIC reasons that allow an a-priori contingency.

The study of indexicals motivated Kaplan to differentiate between two types of MEANING: CHARACTERS and CONTENTS.

The former are the rules of the languages which we associate with expressions. Thus the character of 'I' is 'The speaker of the context' (more generally, 'The agent of the context'), and the character of 'You' is 'The audience of the context'. Thus given a context, the character FIXES THE REFERENCE of the expression in question. What is content?

It is the classical Fregean *Sinn*, that function which given a possible world maps the expression into a referent. CHARACTERS are functions from CONTEXTS to CONTENTS. Kaplan's ideas are:

(A) CHARACTERS OF EXPRESSIONS FIX THEIR REFERENTS BUT ARE CONTINGENT.
(B) INDEXICALS HAVE UNSTABLE CHARACTERS.
(C) INDEXICALS AND PROPER NAMES HAVE A STABLE CONTENT.
(D) WE SHOULD DISTINGUISH THE *CONTEXT OF USE* FROM THE *CIRCUMSTANCE OF EVALUATION*. THE CONTEXT TELLS US WHAT IS SAID, AND ONLY THEN WE ATTACH A CIRCUMSTANCE TO GET A REFERENT, TO SEE HOW WHAT IS SAID, FITS THE FACTS.
(E) CHARACTERS, QUA RULES OF LANGUAGE, ARE THE BEARERS OF ANALYTICITY, WHILE CONTENTS ARE THE BEARERS OF NECESSITY.

This telegraphic review of Kaplan allows to consider the modal status of (1)-(9) in a logic of demonstratives. Kaplan's logic qualifies (1), (2), (3), (4), (6) and (9) as ANALYTIC. To that I think that one can safely add the rest, though Kaplan did not comment directly on them. (5) was always regarded as truth *ex vi terminorum.*

With regard to (7), Kaplan does not discuss common nouns, but I speculate that he would regard (7) as typifying a rule of language. Bennett (1979) whose system is very close to Kaplan's let meaning postulates make similar instances be truths in virtue of language.

As for (8) it is hardly controversial, it appears in Stalnaker (1978) which is very much in Kaplan's spirit and besides it is reminiscent of the famous 'A bachelor is an unmarried man'.

Kaplan argues that (1), for instance, is a sentence whose illtreatment in previous semantics of indexicals (The Montague-Scott approach) provoked him to advance his new logic of demonstratives ([1]). In Kaplan's logic (1) comes out valid. How is this arranged?

It is admitted that (1) expresses a CONTINGENT CONTENT (proposition). Yet, validity is defined as truth in every structure, and in every structure, in the set of all possible CONTEXTS. Now, a context is POSSIBLE (or PROPER) only if its utterer (agent) is at the place of the utterance at the time of the utterance. The familiar rule of necessitation is blocked: it is not the case that if $\alpha$ is valid $\Box\alpha$ is valid. For $\Box\alpha$ to be valid $\alpha$ should hold in all possible CIRCUMSTANCES

and there are possible circumstances which are not possible CONTEXTS. ([2])

What I would like to argue is that the class of sentences (1) - (9) is not a homogeneous class and that each sentence there invokes very subtle issues which go far deeper than what Kaplan's treatment assumes.

Let me start with (1). What makes (1) true in every context?

Consider the 'De-Dicto' proposition expressed by (1), i.e. that whoever is the speaker, wherever is the place of utterance and whenever is the moment of utterance, the speaker is at THAT place at THAT time. This is the character of (1). But is this character true in virtue of language?

It seems to me that it is PHYSICS which makes it true. Had the Physics of Sound propagation been different (say, sound would be travelling extremely slowly) or had Gravitation worked by the inverse to the fifth square of the distance, (1) could be false at a context. (An indication of this possibility is given by transatlantic calls. When I say in London 'I am here now', it is obvious that this is not true at the time of the hearer (say, at Los Angeles). This is due to the fact that Sound travels quite fast.)

It is strange that Kaplan did not notice this dependence on Physics because he says in his (1977, 1978a) that contexts in which the agent is not at the place of the context at the time of the context, are like impossible worlds. However, here clearly the impossibility is PHYSICAL and not LOGICAL (add to this the fact that at the end of his (1978a) Kaplan suggests a logic where individuals may lack positions in space or where individuals without temporal location (disembodied minds) are admitted. (1) fails to be valid in such a logic. But the point is that the IMPOSSIBILITY of disembodied minds or individuals outside space, is a PHYSICAL IMPOSSIBILITY).

Now, as for (2), it is again doubtful whether Language itself reflects its truth. It seems that the PHYSICS OF ORGANISMS is at work. The simplest thought experiment brings us circumstances in which dead men speak and so their utterances do not imply their existence. The 'De-Dicto' character 'Whoever is the speaker (he) is alive during the act of utterance' is a PHYSICAL necessity.

What about (3)? According to Kaplan it is a-priori but contingent. Again, I dont think this sentence owes its truth across contexts to Language. That my talking (or uttering a sentence like (3)) testifies that there is an electric activity in my Brain is a matter of Neurophysiological discovery. Indeed no speaker of English knew it in the $19^{th}$ century and I wonder how many know it nowdays. Thus the truth is due to a Physical (or Bio-Physical) necessity discovered in a scientific investigation and not through an a-priori reflection on language.

(4) is also dependent on Physics. Indeed the sentence expresses a true proposition in a context, if at THAT context a LINEAR structure of time is assumed. Had Time in our natural world been definitively CIRCULAR (as one of the solutions of General Relativity, due to Gödel, requires), (4) would not express in every context a proposition true at that context.

(5) is also dependent on Physics, at least on a Kripke-Putnam approach to this issue. Given that it is essential of the color Red that it has such and such a wavelength (and similarily for Green), it is a matter of Empirical investigation to discover that Red and Green have different Wavelenghts.

The additional premise, that a body cannot have two different colors all over is not obviously analytic as it was assumed in the exchange between Putnam (1956) and Pap (1957)). This is a property revealed by Optics, by empirical investigation into optical properties of bodies. The reader should resist the temptation to counter my argument by saying that WE cannot PERCEIVE a body which is Red and Green all over.

Indeed I assumed that we follow a Kripke-Putnam framework and so just as it is inessential to water that we drink it (or that it fills our lakes and rivers), it is inessential of the color Red that we perceive it in a certain way, though we may fix the reference of 'Red' using our perception powers, just as fix the reference of 'Water' using the fact that we drink it.

(6) is truly a-priori (though contingent). Kripke's insight is not that 'one meter' could denote a different length (just as 'Kripke' could denote Putnam) but rather that the special epistemological stand of the

one who dubbed the rod in Paris as 'One Meter' frees him from the need to make any empirical measurements to verify (6). Stalnaker has shown how in a two dimensional modal logic with the appropriate distinction between *context* and *circumstance*, (6) can be represented formally. Thus (6) is true in every context (at the world of THAT context) but not in all circumstances (see Stalnaker 1978). The main point is to note that a-prioricity is secured for (6) not because of SEMANTIC reasons, but due to a special EPISTEMOLOGICAL situation of a certain speaker.

(7) is more problematic. Disregarding non-human mothers, that is assuming that the contextual domain includes only humans, is the sentence analytic? I think it is not. 'Its not-analytic that one who gives birth is a woman' (disregarding delicate issues like adopted children or test tube babies). It seems that (7) comes down to the assertion that one who gives birth is a woman. This seems a purely BIOLOGICAL NECESSITY (as Thomason said once: 'Kim is pregnant therefore Kim is a woman' is not a LOGICAL inference). We can envisage physically possible worlds in which men are pregnant and give birth.

(8) of all, seems both a-priori and analytic. It duplicates Quine's favorite, 'A bachelor is an unmarried man'. Of course it could have been the case that 'Bachelor' (the word) does not mean what *we* mean by 'Unmarried man'. But then, it is of no surprise that words could have other meanings from the ones they in fact have. Secondly, it is very doubtful whether in such a case the language would still be English. The question: 'What are the essential properties of languages?' is extremely vague. If one thinks that a language in which 'bachelor' does not mean what 'Unmarried man' means is not English, then he secures the status of necessary truths for analytic sentences (analytic-in-English). If one accepts English even though it allowed 'bachelor' to change its meaning so radically, his analytic sentences may be contingent.

Finally let us consider (9). It seems to me to be Physics-dependent too (though Kaplan qualifies it as an analytic sentence).

Recall that 'Dthat $\alpha$' is a demonstrative which functions as follows: 'that' is a demonstrative which is completed by a singular term,

usually a definite description, as its DEMONSTRATION. The reader should recall that Kaplan suggests that with demonstratives the DEMONSTRATION FIXES THE REFERENCE (THE DEMONSTRATUM) OF THE DEMONSTRATIVE IN THE CONTEXT AND THE DEMONSTRATIVE, ACTING AS A RIGID DESIGNATOR, PICKS (OR STICKS TO) THIS DEMONSTRATUM IN ALL ALTERNATIVE CIRCUMSTANCES. Thus one should read 'Dthat $\alpha$' as 'the ACTUAL and PRESENT $\alpha$' when 'ACTUAL' and 'PRESENT' act as rigidifiers. Now let $\alpha$ = the first child born in the 21$^{th}$ century (the description is taken from Kaplan himself, (1973)). Now, Dthat $\alpha$ = $\alpha$, is not TRUE at the present context of utterance (and wont be until 1.1.2000) and so it fails to be a-priori. Why is it not true?

Well, at the 26.12.79 'the actual and present first child born in the 21$^{th}$ century' does not denote at all. Now, according to one's taste concerning possible objects 'the first child...' either denotes a possible object or does not denote at all. In any case the alleged identity between Dthat (the first child born in the 21$^{th}$ century) and the first child born in the 21$^{th}$ century is not true. This assertion holds as long as one does not make '$\alpha = \beta$' true when both '$\alpha$' and '$\beta$' are denotationless. This should not be taken as saying anything against letting '$\alpha = \alpha$' be true even when '$\alpha$' is denotationless (as D. Scott has suggested in his Free logic), because '$\alpha$ = Dthat $\alpha$' is not a SELF-identity.

So it seems that the best that one can say on (9) is that it is never false in a context and this is not the original Kaplanian intention in reading the a-priori as TRUE in all contexts.

However my main objection to the a-priority of 'Dthat $\alpha = \alpha$' is not based on this argument concerning denotationless terms. Let me pursue my main argument:

Let $\alpha$ = the third child of the tallest tribesman in a Tasmanian tribe stationed near Hobart.

Suppose I am in London and that I say to you (also in London) 'Dthat $\alpha = \alpha$'. (Further assume that we are NOT watching any TV program or movie on this tribe). Apparently there is no WAY in which I can DEMONSTRATE this DEMONSTRATUM in our Londonian speech context. DESCRIPTIONS are VERBAL and they process

PROPOSITIONAL INFORMATION. DEMONSTRATIONS are PHENOMENAL (usually visual) and they process PHENOMENAL (usually visual) INFORMATION.

Demonstrata of demonstrations should be located in a LOCAL context of the conversation (its neighborhood), within the visual field (and respectively for other senses) of the participants.

Thus while the description $\alpha$ easily picks THAT child of the tribesman, the demonstration cannot pick it, because no proper demonstration can take place (and it is the demonstration which fixes the demonstratum). Now to ignore the impossibility of demonstration in our case is to trivialize the DTHAT-functor. It is already suspectible right from the start of not being a true DEMONSTRATIVE because it incorporates a purely verbal, descriptive, non-PERSPECTIVAL component so that by processing it one arrives at the demonstratum (unlike other directly referential terms ('I', 'here'...) where there is no processing of verbal information).

Now to disregard the role of the demonstrations is to convert 'Dthat $\alpha$' into a usual description, i.e. to confirm the suspicions. So as long as 'Dthat $\alpha$' is a demonstrative, the act of demonstration is essential to the fixing of its demonstratum and if it cannot take place the Dthat-term is empty, and 'Dthat $\alpha = \alpha$' is not true.

But note that the reason for the impossibility of the demonstration is NOT linguistic. Had my visual power been extraordinary (I could see thousands of Miles and so would you, my audience) I could demonstrate that child while still being in the Londonian context.

(Actually this is the reason that I asked to eliminate situations where we are watching TV. Television (movie) is giving a kind of extraordinary visual power to its spectator. The same is true of very sensible recording mechanisms which allow us to hear very weak (for our ears) sounds.

The failure of 'Dthat $\alpha = \alpha$' is due to the physics of the sense-organs of human beings. If we would have stronger powers (the physics of our organs would be different) or if we are ready to regard objects different from us (in physical constitution) as users of demonstratives, we could avoid the failure of 'Dthat $\alpha = \alpha$'.

For the latter option think of the computer of the US strategic missiles HQ. Suppose it is connected to several monitoring stations

around the world. We could then have a program which uses a demonstrative 'This...' or 'That...' when the demonstratum is given by the computer's eyes which are thousands of miles away. Similarily, we can have ears of computers which process their findings. Such a computer could demonstrate sounds from the days of the Big-Bang!!!

I don't know whether these arguments concerning (1) – (9) are absolutely convincing. In any case they seem to me more attractive compared to Kaplan's ideas. Yet, the problem is that somehow we do feel that we know the truth-value of the sentences independently of any physical experience. I think that this apparent conflict between the arguments above and this strong intuition can be resolved in the following manner.

What seems to be the problem is that we find ourselves asking where is the border between LANGUAGE and PHYSICS. My main point is that the border does not seem static and invariant over time. Rather a certain DYNAMICS is involved here: Certain PHYSICAL Necessities, which are very basic and have an influence on our daily experience (unlike special relativistic effects in high velocities) BECAME fundamental to our conceptual structure and consequently were codified in language. This happened by making these physical properties parts of word meanings. Thus 'Yesterday is Past' could be shown to be a physical necessity dependent on the time structure assumed at the context. Yet the LINEAR structure of time is so basic to our conceptual system that it is part of the meaning of our TEMPORAL words that they involve this linear structure.

So where is the fuzzy border? Could it be the case that in two hundred years time where many generations are already educated in special relativistic terms, that certain truths of special relativity become analytic truths? This is hard to answer. I dont think that the cases which involve a dynamic transition from physical necessities into truths of language form a homogeneous class.

First, some physical theories are more basic to our conceptual structure than others. With these basic theories, the fact that we have discovered (in empirical research) that these theories fail to be true of the actual physical world, did not bring any change in the meaning of the related words that we use in natural language in the actual physical world. In technical discussions the change occurred quite immediately

but natural language and its conceptual structure resist many new empirical findings.

Thus 'Shortest path', 'straight line' are still associated uniquely with Euclidean geometry (we all know that sight is reliable only if light travels in straight lines). 'Velocity' is still understood in terms of classical mechanics.

(1) - (9) involve very basic physical necessities which ARE codified in language. The linear structure of time is very elementary in our temporal discourse. Similarily the physics of Sound and Gravitation are very reliable in daily experience and so entered the meaning of words involved in (1). Furthermore, our deep certainty in the inability of dead people to talk, guarantees the seeming analyticity of (2). Pregnancy and birth-giving are associated with women from the first day of humanity and consequently our conception of mother involves their being women.

Now, what Kaplan secures by invoking a non standard concept of validity (LD-validity (see his 1978a)) others secure by using MEANING-POSTULATES. I shall now argue that the remarks above apply equally well both to Carnapian postulates and to new meaning postulates used by current formal theories of the semantics of natural language.

Indeed since the explosion of Montague on the scene of grammar, MEANING POSTULATES (henceforth MP) are again respectable entities. Attempts to extend Montague's techniques to various constructions of English make a very frequent use of several MP (especially R. Thomason and M. Bennett's work).

In particular, in the accommodation of indexicals and demonstratives in Montague grammar, Bennett (1979) makes use of MP to qualify the following sentences as LOGICALLY TRUE:

(10) John is here iff John is at this place.

(11) If I go from here to New-York. New-York is not here.

(12) If I come from New-York (to) here, New York is not here.

In addition he makes (13) LOGICALLY FALSE:

(13) The man here is the man there.

To achieve this classification, Bennett uses the following MP: (numbers denote Bennett's numbering of MP).

(MP17) Every demonstrated place is a place.
(MP18) Every place is at itself and is not an entity other than it.
(MP21) The destination of 'GO' is not the here of the context. (Part of clause 7 of the natural logic interpretation rules) – The point of departure of 'COME' is not the here of the context.
(MP19) An object cannot be simultaneously here and there.

I think that all these five clauses are not analytic, or true in virtue of the language of which they are MP, English.

(MP17) owes its truth to space-time physics and to the physical constitution of our sense organs. We can only demonstrate things which, physically speaking, exist in space-time because in order to demonstrate something our sense organs must have an access to it and to objects out of space-time we do not have access (by means compatible with physical laws).
Accepting violations of physics, like telepathy or medium existence, we may demonstrate things out of space-time.

(MP18) owes its truth to the rigid attachement of a place to itself and to the non-merging of big places like cities or countries. Chicago cannot be at Boston (Bennett's example) because Physics forbids such a huge transfer of matter which ends in a perfect merging with another huge amount of matter. Moreover, elementary physics does not allow two places to exist at the same location in space. However another Physics, or even the situation at early times when the continents were forming (and everything was in Pandemonium), may have allowed places not to stick to their positions.

(MP21) reflects the classical conception of velocity, distance, time and motion. One does not have to assume a bizzare physics in order to show that (MP21) fails to be true in virtue of language.

Special relativity provides a case. The verb 'Go' is related to Time passage, such that if $x$ goes from $y$ to $z$ it TAKES TIME for $x$ to go from $y$ to $z$. Now, if $x$ could travel at light velocity, many of the

instances in which we use the verb 'Go' would no more satisfy this relation, because our use presupposes low velocities. A case in point is provided by the heroes of the TV science-fiction program 'Star-treck', who are able to convert their bodies into pure energy and then act as photons (the conversion is called 'Energization'). These people do not GO from many places to other places, their passage is instanteneous.

Else, we can consider the effect of bodies contraction in high velocities. If I am on a train which travels at light velocity I'll see the street we are passing in a contracted form. Thus while I travel on an ordinary Bus and I see Tom's house that is situated 10 meters from Bill's place, I'll say 'Tom GOES from his place to Bill place.' But when I am on that magic train the distance between these places conctracted completely (from my-frame-of-reference-point-of-view) so I shall not be using the verb 'Go'.

A third possibility is due to the time dilation effect. Given that even from a frame of reference moving quite slowly it seems that it takes a very short time to go from Tom's place to Bill's place, and given that when I am on this 'light-like' train the time in the street seems (to me) tu run very slowly, it would seem to me that there was no time at all for a going to take place.

UPSHOT: The verb of motion 'Go' depends on our classical physical conception of motion, time, distance and velocity. The same holds for the verb 'Come'. The requirement according to which, If I say that $x$ comes from $y$ (saying it at $z$) to $z$ then $y$ is not $z$ (the here of the context), is not analytic either. The same special relativistic considerations used for 'Go' can be duplicated to provide counterinstances to its truth.

Finally (MP19) guarantees that the man here is not the man there. More generally for any common noun F having to do with material objects, THE F here is not THE F there.

Here too the origin is physical. This MP is a special case of the physical necessity according to which no object can be (simultaneously) at two different places. Since Bennett guarantees in another meaning postulate that 'here' and 'there' denote places in space (MP

17 discussed above), it follows (as a special case) that no object can be here and there (in a context), but this is a PHYSICAL impossibility.

Thus it seems less important to have a clear cut classification of each of (1) - (13) into a category of necessity than to have an understanding of how the dynamics of transition, what we may call the MODALITY DYNAMICS, from PHYSICAL NECESSITIES TO CONCEPTUAL AND ANALYTIC NECESSITIES operates.

A final point concerning this modality dynamics is the following: its importance seems to reach far more than the domain discussed here. As a half-cryptic remark let me say that maybe this line of explanation may give some hints to the understanding of the Kantian stand in the issue on the true geometry of space. The possibility that physical experiences are converted into conceptual necessities and become part of our categorical schemes seems to throw some light on the Kantian view on the unique role played by Euclidean Geometry in our conceptual structure. ([3])

## NOTES

* Very special thanks are due to D. Scott and H. Kamp.

([1]) Actually, Kaplan's allegations are inexact. Montague was aware of the special status of sentences like 'I exist', and developed a notion of pragmatic validity to account for it. Scott too, does not seem to miss the different roles of WORLDS vs. elements of the CONTEXT. See his remarks on the principle of indexicality, Scott (1970).

([2]) The same move was made in an independent work by Thomason, though he uses a different terminology (Thomason 1976). The origins can be found in Kamp's discussion of the adverb 'Now' while commenting on the various normalcy conditions to be layed on the relations between the time of utterance and the time of reference.

([3]) I try to make more sense of these remarks in my (1980).

## ADDITION TO THE PAPER OF J. ALMOG

In this context it is very tempting to relate to a much wider class of sentences which seem to be a-priori but, on the other hand, seem to reflect a-posteriori information.

So far, I referred only to a-priori truths which correspond to Physical necessities. That is, truths which, given the laws of Physics, are true in every world in which these laws are respected.

But now, it seems to me that a recent approach to the theory of reference provides a case for sentences which are, on the one hand, true in virtue of language, but, on the other hand, seem to record a-posteriori contingent observations.

This seems to emerge from Putnam's approach to the theory of reference. I will not discuss here all the aspects of his approach. Rather I shall center on one relevant factor: That aspect of meaning, which Putnam regards as constituting what the ordinary competent speaker knows, when he knows the semantics of his language.

Putnam has argued at length why he regards stereotypes, standardized descriptions of paradigmatic cases (of a given kind), as providing the information which a competent speaker should master if he is to master the meanings of the words of his language.

I shall not criticize this suggestion, but rather, assume it for the sake of the discussion. My point will be the following: stereotypes, qua what the speaker knows as part of his linguistic competence, are providing for truths in virtue of language («Tigers have Stripes», «Elephants have trunks»). Yet the information they record is: (i) mostly a-posteriori, (ii) Contingent.

The point does not rest on (ii). Of course, some of the stereotypic information reflects necessary truths, at least according to the Kripke-Putnam approach: Tigers could not fail to be animals, Gold must be a metal, etc. But in most cases the features in question are contingent of the kind. This is hardly surprising if we note that stereotypes record surface-traits, accessible to our phenomenal powers, while, on the Kripke-Putnam approach, essences reflect micro-structure, which, in most cases, is hidden from the ordinary user of language and requires a non-trivial amount of scientific investigation.

Putnam present stereotypes in terms of linguistic obligation:

> «The theoretical account of what is to be a stereotype proceeds in terms of the notion of linguistic obligation; a notion we believe to be fundamental to linguistics and which we shall not attempt to explicate here. What it means to say that being striped is part of the (linguistic) stereotype of 'tiger' is that it is obligatory to acquire the information that stereotypical tigers are striped if one acquires 'tiger', in the same sense of 'obligatory' in which it is obligatory to indicate whether one is speaking of lions in the singular or lions in the plural when one speaks of lions in English»
> (Putnam 1975, 251)

Thus it would seem to follow that any competent English speaker should, on reflection, recognize the truth of «Tigers are striped», «Lemons are yellow», etc.

But this would mean that these sentences are, in some sense, true in virtue of language. As such they would be a-priori: One need not inspect tigers, consult his Encyclopedia, or read the relevant issue of the Annals of Zoology: one simply knows it, as part of his linguistic knowledge.

Before I go into the problems which seem to be generated here, let me separate myself from a possible stand which I definitely reject. Let us grant that «Tigers are striped» is a-priori. This, by no means, suggests that the proposition it expresses is necessary. In fact, it is contingent and the actual world may even falsify it.

All along the present discussion we should keep the dimension of metaphysical modality well apart. The Kripke-Putnam separation of this dimension from the epistemic dimension is fully endorsed here. The problem with our sentences arises at the epistemic level (As 'A-priori' and 'A-posteriori' are epistemic properties of sentences).

The speaker is assumed to know that tigers are striped and Lemons are yellow. Mind you, this is an ordinary linguistic competence, of the ordinary speaker, not the expert's knowledge (which centers on the study of essences and hence reflects facts from the metaphysical modality dimension).

But now, that Tigers are striped, Lemons are yellow, Water is transparent, etc. are all empirical discoveries. We have to «take a look» and record empirical information on tigers, lemons and water. So we record here A-posteriori information.

But a sentence can't be both a-priori and a-posteriori, this would be a double contradictio de adjecto. The question is: What has gone wrong here?

The diagnosis I wish to advance is this: The set of A-priori (A-posteriori) sentences has a time dependent extension.

Some members are constant members: 'A hunter is one who hunts' or (probably) 'Bachelors are unmarried' (Modulo, radical changes of the language).

Other sentences can turn to be (become) a-priori (a-posteriori).

One direction of change is to become a-posteriori after enjoying a-prioricity for some time. Kripke's meter case displays an instance. At a certain moment t, the reference fixer enjoyed a privileged epistemic status: In uttering «This bar=One meter» he could be said to know it a-priori. But at later times t', the sentence fails to enjoy this status. To predicate the bar with that property is to record an empirical observation.

'One meter' is a rigid designator whose reference can be traced from t' back, up to t, the context of dubbing. Then, at t, we uncover the spatial distance that 'One meter' now denotes rigidly.

In most of these cases, the earlier a-prioricity was due to some privileged epistemic position of some stipulator (see Kripke's case of «Vulcan»). Later the special epistemic situation is gone both for the dubbor and his community, and the sentence records an a-posteriori observation.

On the other hand, Putnam's sentences turned in the opposite direction. They turned from a-posteriori observations to a-priori truths.

Take «Tigers are striped». Metaphysically, it was certainly a feature which tigers had contingently and will continue to have contingently. Maybe the stripes were painted by some protesting artists, maybe they are due to atmospheric disturbances or maybe the tigers decided to cheat us and paint themselves that way. Even certain actuel tigers may fail to have stripes for some environmental or medical reason.

The necessity is epistemic, not metaphysical. If it is obligatory to know that they have stripes as part of one's linguistic competence, then, on reflection, a speaker assents to it without any observation or inspection of the world. He simply reflects on the word 'tiger'.

But the information is undoubtedly empirical. It is the output of a paradigmatic case of empirical observation: No theoretical terms, no bridge laws, just a simple look at the Zoo or in the Savana.

One can't simply give up the a-prioricity and fix on the a-posterioricity of the sentence. For all I know, it is part of our linguistic competence to assent to the sentence without any non-linguistic query, though this is not the case with «Tigers hunt for 6 hours at night, in the average», which is also an empirical observation (of a surface trait).

The difference between the two cases is roughly this: Both sentences *were* at earlier times records of a-posteriori observation. However due to the identification power, prominence, easy accessibility, etc, the first feature (striped fur) gained a special status: The information was built into our very concept of tiger. Of course, this does not make it less contingent a feature than it was before. It does not record essential properties. Rather it encodes something about the meaning (what is known by the speaker) of the word in English. Therefore if one learns English he should master this information. I, for instance, do not know when do tigers mate, hunt and how long do they live. Needless to say, I fail to know necessary features they have: What is their characteristic DNA or their skeleton structure. This is a case per se of *modality dynamics*: Certain bits of information *become* true in virtue of language, because of the conceptual role they are designed to play. Once this takes place, the competent speaker is able to assent to such sentences without the advice of his Zoological encyclopedia or his Zoologically learned friend.

The change is reflected in the formal apparatus of D. Kaplan I discussed above. Originally, at the context in which 'Tiger' was introduced to English, it could have been used to denote anything the reference fixer wished it to denote: A sample of (what we now call) Gold, Water or Lemons. But, given that it was fixed with tigers as reference and that a certain stereotype was associated with it, in later contexts, one can *re*dub it or point and say 'This is tiger' etc, only if the demonstratum satisfies the stereotype. This does not mean that the demonstrata, in later contexts, satisfy the same essence: For all we know, stereotypes may deceive us, and stereotype-sharing fails to guarantee essence-sharing. But one thing is clear: If, on a certain context, one were to say «Tigers are a shinny metal which is precious

and yellow», the speaker does not speak the same language. Thus, stereotypes *become* rules of the language and can be identified, in most cases, with characters: The rule which, given a context, fixes a content at that context of use. On Twinearth, we, or our twins, fix a reference which is an XYZ-substance. Yet, we use the same language, as long as we have used the same rule: «Water is that transparant liquid which we drink, which fills lakes and rains from the sky...».
This should not surprise us: Characters are, pace Kaplan, meanings of indexical words. Stereotypes are meanings of Kind words. Kind words are indexical (according Putnam). Hence characters *are* stereotypes, in their case.
Characters (stereotypes) guarantee a-priori truth. But this assertion should always be relativized to the stage of language-development in question. This is the decisive hidden variable which decides whether the information turned into truth (falsity) in virtue of language([4]).

## ADDITIONAL FOOTNOTE

([4]) One shadow jeopardizes the identification of characters and stereotypes. Putnam made the following point: Suppose that on twin-earth 'water' turned phonetically into 'Quaxel'. They would have the same stereotypic meaning, but different extensions ('they' means; (i) 'water', (ii) 'Quaxel'), an odd result. I take this serious objection in detail in my (1981).

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