REFERENCE
AND
MODALITY

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INTRODUCTION

THE founders of modern logic dealt with the topics of these essays. Gottlob Frege wrote about them in 1892 in 'On Sense and Reference',[1] and in other works about the same time. Bertrand Russell first dealt with the problems in 1905 in 'On Denoting'.[2] But Frege's work was largely unstudied until nearly the middle of this century, and although Russell's Theory of Descriptions was anything but ignored, its applications to the problems of this volume were not given special attention until 1948 when Arthur Smullyan wrote the essay here reprinted.

The problems which concerned Frege and Russell were revived and placed in new perspectives by Willard Van Orman Quine beginning nearly thirty years ago. In the early 1940s Quine launched an attack on the concept of logical necessity and related notions which he has sustained and deepened up to the present day. The papers in this volume, except perhaps Saul Kripke's, are all direct responses to Quine's work and the bibliography lists but a part of a further extensive literature, the fallout of his writings.

In the introduction I shall say something about these views of Quine's and those of his critics and defenders. My aim is to acquaint the reader with the main issues of the collection and to indicate some respects in which these essays are related among themselves. Only some of the issues of these papers are touched upon and sometimes an author's conclusions are given without his supporting arguments. An introduction cannot be a substitute for the book. My goal is only to provide orientation.

I

A fundamental principle governing identity, says Quine in the first of his papers reprinted here, is that of *substitutivity*. *The terms of a true statement of identity are everywhere intersubstitutive, salva veritate.* Hardly is the principle stated than one finds cases contrary to it. The true identity 'Cicero = Tully' will not support the substitution of 'Cicero' for 'Tully' in ' "Tully" consists of five letters'. This is not a genuine paradox, for *substitutivity* is wrongly applied to terms in contexts in which they do not refer 'simply' to their objects. ' "Tully" consists of five letters' is not

[1] Translated in *Translations from the Philosophical Writings of Gottlob Frege*, edited by P. Geach and M. Black (Oxford: Basil Blackwell, 1952).
[2] *Mind*, 1905. Reprinted in *Logic and Knowledge*, edited by R. C. Marsh, London: Allen and Unwin, 1956).

about Cicero (= Tully) but about one of his names. Lapse of substitutivity merely reveals that the occurrence of the name supplanted is not 'purely referential' because 'the statement depends not only on the object, but on the form of the name'.[3] Quotation is only the most blatant of contexts in which terms can fail of purely referential occurrence. Consider, 'Philip believes that Tegucigalpa is in Nicaragua.' Misuse of *substitutivity* will take us from this and 'Tegucigalpa = the capital of Honduras' to the falsehood, 'Philip believes that the capital of Honduras is in Nicaragua.' Here again, for Quine, failure of substitutivity is only symptomatic of 'Tegucigalpa's' failure of purely referential occurrence at the place of substitution. '. . . the contexts "is unaware that. . ." and "believes that. . ." *resemble* the context of single quotes in this respect: a name may occur referentially in a statement S and not occur referentially in a longer statement which is formed by embedding S in the context "is unaware that. . ." or "believes that. . .".' Quine calls these contexts 'referentially opaque'. Logical modality provides another example.

(1) 9 is necessarily greater than 7,

and

(2) The number of planets = 9,

are true, but *substitutivity* would be misapplied to them to arrive at the falsehood

(3) The number of planets is necessarily greater than 7.

Affliction of modal contexts by referential opacity renders quantified modal logic a very obscure business, for we cannot *quantify into* referentially opaque contexts. We cannot go by existential generalization from (1) to

(4) $(\exists x)(x$ is necessarily greater than 7).

(4) lacks clear sense. 'What is this number which according to (4) is necessarily greater than 7. According to (1) from which (4) was inferred, it was 9, that is, the number of planets; but to suppose this would conflict with the fact that (3) is false.' The difficulty arises because necessary or contingent traits of objects are taken to belong to them not absolutely but according as one way of specifying them is used rather than another. Nine is taken to have necessary greaterness than seven according as it is specified in (1) but not as in (3). Hence the difference in truth value between

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[3] All quotations in the introduction are from the author's contribution to this volume unless specifically indicated to the contrary.

(1) and (3) and the obscurity of (4). The modal logician, saddled as he is with (4), is thus committed to a metaphysical view, 'Aristotelian essentialism' to give it a name, according to which necessary and contingent properties *do* belong to objects irrespective of their modes of specification, if specified at all. 'Evidently', says Quine, 'this reversion to Aristotelian essentialism is required if quantification into modal contexts is to be insisted on'. He concludes, 'so much the worse for quantified modal logic'.

Arthur Smullyan responded to these arguments of Quine's by contending that they were fallacies turning on scope ambiguities of definite descriptions in modalized statements. Proper deployment of Russell's Theory of Descriptions reveals (3) to have two nonequivalent interpretations according as the scope of its contained definite description is taken as large or small. With the scope large (3) follows from (1) and (2) but that is all right, for so understood, says Smullyan, it is true. (3), with small scope accorded its contained description, is indeed false but no consequence of (1) and (2), so again, no paradox.

Ruth Barcan Marcus is one of the pioneering founders of quantified modal logic and she defends her work against Quine's attack. She does this from the vantage point of a general view about extensionality. For her, it comes in degrees. 'I will call a principle extensional if it either (a) directly or indirectly imposes restrictions on the possible values of the functional variables such that some intensional functions are prohibited or (b) it has the consequence of equating identity with a weaker form of equivalence.' If we identify equality with indiscernibility, it does come in degrees. 9 and the number of planets are indiscernible with respect to the stock of predicates available in classical predicate logic but they become discernible with the admission of modal predicates. Hence, for Mrs. Marcus, it is a fallacy to suppose that (2) supports substitution of '9' for 'the number of planets' in modal contexts such as (1). The identity sign of (2), she thinks, does not stand for 'true identity' but a weaker equivalence relation. If its singular terms were taken, however improbably, as genuine proper names, then (2) would indeed be, for her, a true identity; but then these terms would be everywhere intersubstitutive, so (3) would both be true and follow from its premises. 'The paradox', she says, 'evaporates.' Mrs. Marcus, like Smullyan, is invoking Russell's Theory of Descriptions, but another part of the theory. For Russell too (2) is not a true identity since it contains a definite description. In her appeal to genuine proper names, Mrs. Marcus again harks back to Russell. Like Smullyan she does not confront the issue of essentialism in her paper.

Quine has replied to these objections as follows: 'Notice to begin with that if we are to bring out Russell's distinction of scopes we must make

two contrasting applications of Russell's contextual definition of description. But when the description is in a non-substitutive position, one of the two contrasting applications of the contextual definition is going to require quantifying into a non-substitutive position. So the appeal to scopes of descriptions does not justify such quantification, it just begs the question.'[4] Quine's second reason for rejecting the recourse to the Theory of Descriptions in defence of modality rests with his theory of the 'primacy of predicates'. According to Quine, all constant singular terms are eliminable in favour of general terms and bound variables. So if referential opacity is worth worrying about it must show its symptoms when the constant singular terms are gone. The argument against quantifying into opaque contexts can then still be made. Take the sentence

(5) $(\exists x)$ (necessarily x is odd).

'. . . let us ban singular terms other than variables. We can still specify things; instead of specifying them by designation we specify them by conditions that uniquely determine them. On this approach we can still challenge the coherence of (5), by asking that such an object x be specified. One answer is that

(6) $(\exists y)\ (y \neq x = yy = y + y + y)$.

But that same number x is uniquely determined also by this different condition: there are x planets. Yet (6) entails "x is odd" and thus evidently sustains "necessarily x is odd", while "there are x planets" does not.'[5] (6) and 'there are x planets' uniquely specify the same object. Does that object verify (5)? We might answer 'yes' if we start from (6) since it entails 'x is odd'. But if we start from 'there are x planets' we will answer 'no', since this latter specification does not entail 'x is odd'. Thus we are unable to specify an object which verifies (5). The idea of there being an object which is necessarily odd is incoherent. The only recourse for the modal logician is to essentialism according to which (6) is germane to (5) since it specifies its object essentially while 'there are x planets' specifies that same object accidentally and thus is irrelevant to (5).

Of the authors appearing here, Dagfinn Føllesdal is nearest to complete agreement with Quine. His paper deals with causal rather than logical modality, but is concerned only with features which the two modalities share. 'To make the parallelism between these arguments and those of Quine apparent', he says, 'Quine's wording will be used wherever possible.'

The difficulties with causal necessity have their root in referential opacity. Suppose there is a well such that all who drink from it are poisoned. Let us suppose further that just one man has drunk from that well, a man born in place p at time t. Then presumably, it is true that,

(7) It is causally necessary that the man who drank from that well got poisoned.

It is also true that,

(8) The man who drank from that well = the man who was born in p at t.

But in spite of (7) and (8), it is false that,

(9) It is causally necessary that the man who was born in p at t got poisoned.

Attempted quantification into (7) yields

(10) $(\exists x)$ (it is causally necessary that x got poisoned).

'However, what is this object that got poisoned? The man who drank from the well, that is, the man who was born in p at t? But to suppose this would conflict with the fact that (9) is false.'

Føllesdal explores various ways of making an honest proposition of (10), thus legitimizing the quantified logic of causal necessity. One such way is suggested by Frege. When Frege came to deal with opaque contexts (he called them 'oblique'), he decided that names in them referred to their ordinary senses and not their ordinary references. Suppose that identity statements which are not merely true but necessarily true must contain terms whose ordinary senses are the same. (Frege, in fact, did not specify an identity condition for senses.) Then given Frege's principle identifying oblique reference with ordinary sense, necessary identity statements would sustain substitution in necessity contexts. If we now further suppose that all true identity statements are necessarily true, all our purported examples of the referential opacity of necessity will be swept aside and safely accounted fallacies.

At one time Quine thought that by intensionalizing the values of our variables we would render all true identities necessarily true and so clear the way to quantified modal logic. In a statement addressed to Rudolf Carnap and published in *Meaning and Necessity*, Quine says, 'I agree that such adherence to an intensional ontology, with extrusion of extensional entities altogether from the range of values of the variables, is indeed an effective way of reconciling quantification and modality. The

cases of conflict between quantification and modality depend on extensions as values of variables. In your object language we may unhesitatingly quantify modalities because extensions have been dropped from among the values of the variables; even the individuals of the concrete world have disappeared, leaving only their concepts behind them.'[6] The purging of concrete individuals from the universe of discourse, Quine thought, would leave us with intensional objects no one of which could be uniquely specified by alternative conditions that fail of logical equivalence.

I am unable to construct a plausible argument that the purification suggested by Quine would have such beneficial consequences. At any rate, he was wrong about this and he says so. 'As a matter of fact, the worrisome charge that quantified modal logic can tolerate only intensions and not classes or individuals was a mistake to begin with. . . . I have been slow to see it, but the proof is simple.'[7] Suppose the condition 'φx' uniquely to determine the object x. Then, where 'p' is any truth not implied by 'φx', '$p . \varphi x$' also uniquely determines x. But the two conditions 'φx' and '$p . \varphi x$' are contingently and not logically coincident. This argument does not depend upon the extensionality of x, so intensionalizing the values of the variables will not evade it.

Suppose that we go at it the other way around and simply exclude those objects from our domain of discourse which admit of unique specifications by conditions which fail of necessary equivalence. 'There ceases to be any . . . objection to quantifying into modal position. Thus we can legitimize quantification into modal position by postulating that whenever each of two open sentences uniquely determines one and the same object x, the sentences are equivalent by necessity.'[8] We can put this opacity-annihilating postulate thus, where 'Fx' and 'Gx' are arbitrary open sentences and 'Fx and x only' is short for '(w) (Fw if and only if $w = x$)':

(11) If Fx and x only and Gx and x only then (necessarily (w) (Fw if and only if Gw)).

But this postulate annihilates modal distinctions along with the referential opacity of necessity. Let 'p' stand for any true sentence, it can be shown that 'Necessarily p'. Let y be any object and let $x = y$. Then

(12) (p and $x = y$) and x only

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[6] *Meaning and Necessity* by Rudolf Carnap, 2nd edn. (Chicago, Illinois: The University of Chicago Press, 1956), p. 197.

[7] *Ways of Paradox* by W. Quine (New York: Random House, 1966), p. 182.

[8] *Word and Object* by W. Quine (Cambridge, Mass.: M.I.T. Press; New York and London: Wiley and Sons, 1960), p. 197.

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and

(13) $x = y$ and x only.

Next, in our postulates take 'Fx' as '$p . x = y$' and 'Gx' as '$x = y$', and it follows from (12) and (13) that,

(14) Necessarily (w) ((p and $w = y$) if and only if $w = y$).

(14) implies '(p and $y = y$) if and only if $y = y$' which implies 'p'. Hence, since what is implied by a necessary truth is a necessary truth, (14) implies that necessarily p. Q.E.D. Modal distinctions collapse.[9] Føllesdal tells the story in his paper, translating it to apply to causal rather than logical necessity.

Some, like Jaakko Hintikka,[10] have proposed abandoning substitutivity, in order to gain quantified modal logic. But Føllesdal argues that to restrict substitutivity in modal contexts is to abandon quantification as well. 'Quantification and substitutivity of identity go hand in hand.' The argument is as follows. Suppose we restrict substitutivity, denying it as a valid mode of inference in modal contexts. The justification for this is that an identity '$x = y$' may be true in this world and not true in some logically possible alternative to this world. (If '$x = y$' is also true in every logically possible alternative to this world, then its terms will also be unrestrictedly intersubstitutive in modal contexts.) This means that what corresponds to x, i.e. y, in this world are several objects (or none) in some logically possible alternative to this world. Now what will it mean under these conditions to say, e.g., '$(x)NFx$'. It means that everything is such that *it* has F in all possible worlds. Does x have F in all possible worlds? This question has no clear sense since 'it' has lost its unique reference in the possible world where '$x = y$' is false. Thus in order to make sense of quantification in modal contexts we must require that all true identity statements be necessarily true and this amounts to the requirement that identity be universally substitutive.

Restricting substitutivity in modal contexts or intensionalizing the values of the variables of modal logic are seen not to have the desired effects. Føllesdal proposes a third alternative, restrictions on the constant singular terms, or their complete elimination. He remarks, paradoxically, 'By insisting on the "primacy of predicates" and the eliminability of *all* singular terms in favour of general terms and variables, Quine . . . can be said to have levelled the road for modal logic.' Getting back to constant

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[9] Ibid., p. 198.

[10] 'Quantifiers in Deontic Logic', by Jaakko Hintikka, *Societas Scientiarum Fennica, Commentationes Humanarum Litterarum* 23 (1957), No. 4.

singular terms, it is clear that they cause us difficulty only when they change their reference from possible world to possible world. Thus 'the number of planets' is nine in this world but not in other possible alternatives to it. And generally this will be true of definite descriptions. In order to avoid failures of substitutivity we are only required to exclude such terms and to require that all referring expressions have constant reference in all possible worlds. 'In order to avoid trouble, we should admit into our stock of singular terms only those descriptions which keep the same description in all . . . possible worlds.' The same restriction applies to all singular terms, constant and variable. None of this, of course, avoids essentialism. Rather, it implements it. Allowable names touch the essence of things and others do not. So Quine says, 'This plan of Føllesdal's is the formal implementation of the essentialism which, I have held, is the price of quantifying into opaque constructions.'[11] Føllesdal agrees.

II

Developments in modal logic took a new direction in the middle 1950s. Modal logic was provided with its semantics (model theory). In terms of this semantics various problems such as that of completeness could be formulated and solved. Saul Kripke's paper presents semantics for quantified modal logic and Jaakko Hintikka sketches the job for the propositional attitudes. I will not present the formal details since both papers are expository and the reader can find a compact presentation of Kripke's models in the first appendix of Terence Parsons' paper. Still, an informal heuristic account may be of help.

We begin with the idea of a *model structure* which is an ordered triple $\langle G, K, R \rangle$. K is a nonempty set of which G is an element and R is a reflexive relation defined on K: Intuitively K is the set of all possible worlds, G is the actual world and R is the relation of relative possibility. To say that one world is possible relative to another is to say that whatever is true in the former is possible in the latter. Thus intuitively R is required to be reflexive since what is true in a possible world H is possible in H. A *quantificational model structure* is a model structure together with a function ψ which assigns to each H ε K a set $\psi(H)$. Intuitively, $\psi(H)$ is the set of individuals existing in H (this may vary from possible world to possible world). For the semantics of quantified modal logic the relevant features about each possible world are (i) which things exist in that world and (ii) which things fall within the extensions of the predicates in that world. With regard to (ii), things are allowed to fall within the extension of a predicate in a possible world which do not according to (i) exist in that

[11] *Words and Objections*, p. 341.

world but do exist in another world possible relatively to it. A model (on a model structure) first fixes (ii) and then defines inductively a truth value for each formula A in each world H relatively to an assignment of objects (which need not exist in H) to the free variables of A. The quantifiers of A range only over objects existing in H. For a modalized closed sentence A the definition is,

NA is true in the world H if and only if A is true in every world H' which is a possible world relatively to H.

A closed sentence is a valid sentence just in case it is true in G in every model on every model structure.

One might suppose that if quantified modal logic has its semantics in terms of which completeness can be proven, then surely there cannot be serious further questions of interpretation remaining, so that at last Quine's qualms can be set aside. But the creation of the new semantics has not terminated the philosophical controversy, though the issues have undergone reformulation. The question now arises as to the intelligibility of the semantics. There is no question, of course, as to the soundness of the mathematical results, or as to the semantics considered as a mathematical structure. There is no lack of clarity about the triple $\langle G, K, R \rangle$ consisting of a nonempty set K, a distinguished element of that set G, and a reflexive relation R defined on K. But this structure provides an account of *modality* only if K is regarded as the set of possible worlds and R as relative possibility and G as the actual world. So the structure must have an intuitive sense relating to *necessity*, and the philosophical controversy concerns the clarity of the relevant intuitions.

Terence Parsons bases his search for the essentialist commitments of modal logic on Kripke's semantics, and he comes up (happily) empty-handed. Parsons distinguishes several varieties of essentialism and several senses in which modal logic might be committed to it. He finds modal logic uncontaminated. 'I also argue', he says, 'that work in quantified modal logic need not even presuppose the *meaningfulness* of essentialist claims *in any objectionable sense*.' Parsons distinguishes individual essences which belong so intimately to their objects that not more than one thing *could* have them, and general essences which distinct individuals are not prohibited from sharing. His discussion is concerned solely with general essences. Parsons recognizes that it is individual essences which concern us in the problem of identifying individuals across possible worlds. 'Roughly, an object in one world is identified with an object in another world just in case they have the same individual essence.'

Parsons' investigation concerns a brand of essentialism about general essences. The doctrine holds (roughly) that there are general essences which some things have and which other things lack. A system of quantified modal logic (specifically, one of the systems of the class discussed by Kripke) is, according to Parsons, capable of commitment to essentialism in one or more of three senses. Let an *essential* sentence be one (roughly) which is general and which ascribes a necessary property to some things which it asserts that other things lack. Then a system of quantified modal logic is committed to essentialism in the first sense if '(i) It has some essential sentence as a theorem.' In this sense, Parsons proves that his systems fail of essentialist commitment. They fail of commitment to essentialism in the second sense as well. According to this, a system of quantified modal logic is committed to essentialism if '(ii) It has no essential sentence as a theorem, but nevertheless requires that some essential sentence be true—in the sense that the system, together with some obvious and uncontroversial non-modal facts, entails that some such sentence be true.' According to the third sense, a system is committed to essentialism if '(iii) The system allows the formulation (and thus presupposes the *meaningfulness* of) some essential sentence.'

The importance of this last sense of 'commitment' is this. Although modal logic has been shown not to be committed to the *truth* of essentialism, it must be committed to the *meaningfulness* of essentialism, 'for quantified modal logic simply *is* that symbolism within which essential sentences are formulable'. Thus quantified modal logic is committed to essentialism in sense (iii). But Parsons holds that there *need* be nothing objectionable in this. It is thought to be objectionable because it is thought that truth-conditions for essential sentences cannot be given in a determinate and clear way. But that is not true. The antiessentialist modal logician 'has a simple method of assigning determinate (and natural) truth-conditions to all essential sentences. That is to make them all false in all possible worlds'. Freedom of commitment in senses (i) and (ii) allows 'a freedom of any objectionable commitment in the third sense'.

My own essay takes up the doctrine of individual essences which Parsons put aside. Two individuals are the same across possible worlds if and only if they have the same individual essence. Consider the manner in which a model assigns a truth value to the sentence '$(\exists x)NFx$' in a world H. '$(\exists x)NFx$' is true in H if and only if there is some thing which exists in H such that *it* has F in all worlds possible relative to H. What does it mean to say of an object that it is identical with an object in another possible world? What is the criterion of identity across possible worlds? These questions are requests for explication of the doctrine of individual

essence. So one can grant all that Parsons shows and still object to modal logic as involving us in an unintelligible metaphysics. And Quine agrees that here is where the essentialism involved in such systems as Kripke's surfaces. He says, in his response to the essay of David Kaplan in this volume, 'In any event Kaplan and I see eye to eye, negatively, on essentialism as applied to particulars. The result is that we can make little sense of identification of particulars across possible worlds. And the result of that is that we can make little sense of quantifying into necessity contexts when the values of the variables are particulars.'[12] So I see vindication for Quine in the semantics for modal logic, only I do not conclude 'so much the worse for modal logic' for I think I can see sense in essentialism. Whenever we talk about what might have happened to a thing but did not, we invoke the idea of that thing (the *same* thing) in another possible world in which what *might* have happened to it but did not (in the actual world) *did* happen. If we can understand this language about what might have been, we can identify individuals across possible worlds. And surely we do understand such talk, at least so I argue in my paper.

III

The essays discussed so far take necessity as centre of interest, but there are very close similarities between necessity and what Russell called 'propositional attitudes'. Propositional attitudes are for example, believing, supposing, denying; activities which, for Russell, take propositions as their objects. Belief may be taken as typical of the lot. Quine's second essay, and those following it in this book, deal with various aspects of the propositional attitudes. The most prominent feature which logical necessity shares with belief is referential opacity. This is shown in the example about Philip and Tegucigalpa cited above. There is an important asymmetry in Quine's attitude to these two classes of opaque contexts. He dismisses quantified modal logic as committed to an unacceptable metaphysics, and he can do this with a clear conscience because he believes that science and mathematics have no use for necessity. The concept of belief cannot thus be dismissed as unintelligible. He says, 'What makes me take the propositional attitudes more seriously than logical modality is a different reason: not that they are clearer, but that they are less clearly dispensable. We cannot easily forswear daily reference to belief, pending some substitute idiom as yet unforeseen. We can much more easily do without reference to necessity.'[13]

The principal considerations of Quine's second paper turn on an ambiguity in belief statements. Consider 'Ralph believes that someone is a

[12] Ibid., p. 343.   [13] Ibid., p. 344.

spy.' This may be paraphrased as 'There is someone whom Ralph believes to be a spy', and represented thus,

(15) $(\exists x)$ (Ralph believes that x is a spy).

Here 'belief' is said to have its 'relational' sense. Or 'belief' may have its likelier 'notional' sense, in which case our original statement may be paraphrased as, 'Ralph believes there are spies' and represented thus,

(16) Ralph believes that $(\exists x)$ (x is a spy).

'The difference', says Quine, 'is vast; indeed if Ralph is like most of us (16) is true and (15) is false'; (15) presages an arrest. In later work, Quine distinguishes two senses of belief, 'transparent' (as in (15)) and 'opaque' (which is here called 'notional'). He says, 'In my treatment of belief I distinguished an opaque and a transparent version, but in modal logic I got no further than the opaque.'[14] (15) does not involve quantification into an opaque context for here 'belief' has its transparent sense.

Yet, for Quine, that sense is odd, as is brought out by the following story.[15] Tom insists 'Tully did not denounce Catiline. Cicero did.' In the transparent sense, Tom believes that Cicero, i.e. Tully, denounced Catiline, and in that same sense he believes that Tully did not denounce Catiline. So in the transparent sense, Tom believes both that Tully did, and that Tully did not, denounce Catiline. Quine says, 'This is not yet a self-contradiction on our part or even on Tom's for a distinction can be reserved between (a) Tom's believing that Tully did and that Tully did not denounce Catiline, and (b) Tom's believing that Tully did and did not denounce Catiline.'[16] This oddity is the price we pay for

(17) $(\exists x)$ (Tom believes that x denounced Catiline).

(17) demands the transparent sense of belief. Quine prefers to avoid quantification into belief, even transparent belief. 'Thus in declaring belief invariably transparent for the sake of "Someone is such that Tom believes that he denounced Catiline" . . . we would let in too much. It can sometimes best suit us to affirm "Tom believes that Cicero denounced Catiline" and still deny "Tom believes that Tully denounced Catiline", at the cost—on *that* occasion—of "Someone is such that Tom believes that he denounced Catiline". In general what is wanted is not a doctrine of transparency or opacity of belief, but a way of indicating, selectively and

[14] Ibid., p. 343–44.
[15] *Word and Object*, p. 148.
[16] Ibid., p. 148.

changeably, just what positions in the contained sentence are to shine through as referential on any particular occasion.'[17]

In the second part of his paper, Quine suggests, provisionally, the following way of doing this. We settle on a single sense of belief, the opaque sense, and think of this as a relation between a believer and an *intension* named by a 'that'-clause. Intensions named by such clauses without free variables—intensions of degree 0—are propositions. There are also intensions of degree 1, or attributes named by prefixing a variable to a sentence in which it has a free occurrence; so $z(z$ is a spy) is the attribute spyhood. We name higher degree intensions by prefixing multiple variables in the same fashion. Now we can recognize a dyadic sense of belief between a believer and a proposition,

(18) Tom believes that Cicero denounced Catiline.

And we can also recognize a triadic sense of belief holding between a believer, an attribute, and an object,

(19) Tom believes $y(y$ denounced Catiline) of Cicero.

And tetradic belief,

(20) Tom believes $yz(y$ denounced $z)$ of Cicero and Catiline.

With this apparatus, we can steadfastly maintain a policy of not quantifying into propositional attitude expressions, but now it takes the form of not quantifying into names of intensions. We can still represent relational belief as, e.g., by (19) in which 'Cicero' occupies a quantifiable position. In place of the troublesome (17), we get the relatively unproblematic

(21) $(\exists x)$ (Tom believes $y(y$ denounced Catiline) of $x)$.

I call this 'relatively' unproblematic because it, along with (18), (19), and (20), contains a name of an intension. These, for Quine, are 'creatures of darkness'.

In the final section of his paper Quine suggests a way of retaining the merits of the above analysis while avoiding the intensions. 'Instead of speaking of intensions we can speak of sentences, naming these by quotation. Instead of:

w believes that . . .

we may say:

w believes-true " . . .".

[17] Ibid., p. 149.

Instead of:

w believes $y(. . . y . . .)$ of x

we may say:

w believes "$. . . y . . .$" satisfied by x.'

An argument against any analysis which takes linguistic expressions as objects of the propositional attitudes is put forth in the short paper by Alonzo Church in this volume. A statement of the form 'w believes-true "$. . .$" in L' cannot convey the same meaning as one of the form 'w believes that $. . .$' for neither follows from the other in the absence of some extraneous information about the language L. Church makes the point by appeal to a translation test. The statement

Meinong believes that there are objects such that there are no such objects, does not convey the same information as

Meinong believes the proposition meant by 'there are objects such that there are no such objects' in English.
These go into German respectively as

> Meinong glaubt, dass es gibt Gegenstände, von denen gilt, dass es dergleichen Gegenstände nicht gibt.
> Meinong glaubt diejenige Aussage, die „There are objects such that there are no such objects" auf Englisch bedeutet.

A German speaker innocent of English gets entirely different information from the German sentences, so the English sentences also convey different information. This argument does not disturb Quine, turning as it does on the notion of synonymy. The difficulty he sees in taking sentences as objects of the propositional attitudes is that these sentences must be referred to a language if the sentences containing them are to have their desired senses. But Quine finds the principle of individuation for languages as obscure as it is for intensions. Thus he finds his best efforts to legitimize the propositional attitudes defeated.

David Kaplan, with his quantifiers, goes where Quine fears to tread, into the propositional attitudes. Quine tends to treat terms in all opaque contexts in conformity with his treatment of them in the context of quotation. Quotation, for Quine, is the referentially opaque context *par excellence*. In quotation, terms occur as mere accidents of orthography, not in any logically or semantically relevant sense. Contrast this view with Frege's. Where Quine sees an accidental occurrence, Frege sees ambiguity. Instead of failure of reference, Frege sees shift of reference. The contexts which Frege calls 'oblique' and Quine 'opaque', Kaplan calls 'intermediate'.

The occurrence of 'nine' in 'Nine is greater than seven' is a *vulgar* occurrence, and its occurrence in 'Canine' is an *accidental* occurrence, while its occurrence in 'Necessarily nine is greater than seven' is *intermediate* between these.

Even terms in the context of quotation, according to Frege, perform their referential function. He does not hold that they are mere orthographic accidents there, parts of larger terms including the quotation marks. An expression in the context of quotation denotes itself. On this view it makes sense to quantify into the context of quotation and this is the foundation of Kaplan's approach to the problem of quantifying into necessity and propositional attitude contexts.

Kaplan takes sentences within the scope of 'necessarily' and 'believes' to denote themselves, so in his analysis they appear between quotes after these words. Using corners to represent Frege-quotes and Greek variables to range over expressions there is then nothing obscure about

(22) $(\exists\alpha)$ (α numbers the planets and $N^\ulcorner\alpha$ is greater than five$^\urcorner$),

which is simply false because expressions do not number planets. The difficulty is that '$. . .$ the Fregean formulations appear to lack the kind of recurrence of a variable both within and without the necessity context that is characteristic of quantified modal logic. $. . .$' This difficulty can be overcome by taking advantage of the fact that numerals, although they do not number planets, denote the things that do. Kaplan uses Church's denotation predicate 'Δ' to attain the desired connection between expressions within and without modal contexts. The following corrects what is wrong with (22):

$(\exists y)$ (y numbers the planets and $\exists\alpha(\Delta(\alpha, y)$ and $N^\ulcorner\alpha$ is greater than five$^\urcorner$)).
And there is no obscurity about

(23) $(\exists\alpha)$ ($\Delta(\alpha$, nine) and $N^\ulcorner\alpha$ is greater than five$^\urcorner$),

which is true and avoids essentialism. (23) is a Fregean version of Quine's relational

(24) Nec('x is greater than five', nine),

with 'nine' in referential position. The trouble now is that the corresponding Fregean version of

(25) Nec('x = the number of planets', nine)

is also true understood as

(26) $\exists\alpha(\Delta(\alpha$, nine) and $N^\ulcorner\alpha$ = the number of planets$^\urcorner$)

in view of the facts that

N ⌜the number of planets = the number of planets⌝

and

Δ('the number of planets', nine).

At this point Kaplan introduces an idea already hinted at by Mrs. Marcus and Føllesdal, standard names. These are names '. . . which are so intimately connected with what they name that they could not but name it. I shall say that such a name *necessarily denotes* its object, and I shall use "Δ$_N$" to symbolize this more discriminating form of denotation.' This leads to replacement of (23) with

∃α(Δ$_N$(α, nine) and N⌜α is greater than five⌝)

as the analysis of (24), and replacement of (26) by

(27) ∃α(Δ$_N$(α, nine) and N⌜α = the number of planets⌝)

as the analysis of (25). (27) has the advantage of being false. Similar difficulties affect Kaplan's Fregean treatment of belief and similar 'solutions' are available, except that another notion is needed for the propositional attitudes, that of a *vivid* name. The analysis in terms of standard names and vivid names, of course, does not avoid essentialism. It embraces it.

I

REFERENCE AND MODALITY

W. V. O. Quine

I

ONE of the fundamental principles governing identity is that of *substitutivity*—or, as it might well be called, that of *indiscernibility of identicals*. It provides that, *given a true statement of identity, one of its two terms may be substituted for the other in any true statement and the result will be true*. It is easy to find cases contrary to this principle. For example, the statements:

(1) Giorgione = Barbarelli,

(2) Giorgione was so-called because of his size

are true; however, replacement of the name 'Giorgione' by the name 'Barbarelli' turns (2) into the falsehood:

Barbarelli was so-called because of his size.

Furthermore, the statements:

(3) Cicero = Tully,

(4) 'Cicero' contains six letters

are true, but replacement of the first name by the second turns (4) false. Yet the basis of the principle of substitutivity appears quite solid; whatever can be said about the person Cicero (or Giorgione) should be equally true of the person Tully (or Barbarelli), this being the same person.

In the case of (4), this paradox resolves itself immediately. The fact is that (4) is not a statement about the person Cicero, but simply about the word 'Cicero'. The principle of substitutivity should not be extended to contexts in which the name to be supplanted occurs without referring simply to the object. Failure of substitutivity reveals merely that the