10. CONVENTIONS IN NAMING

J. VAN BRAKEL
UNIVERSITY OF UTRECHT

ABSTRACT. Conventions in the use of names are discussed, particularly names of linguistic expressions. Also the reference of measure terms like 'kg' is discussed, and it is found analogous in important respects to expression names. Some new light is shed on the token-type distinction. Applications to versions of the liar paradox are shown. The use of quotation marks is critically examined.

I. NAMES OF LINGUISTIC EXPRESSIONS

If a name is used to name an individual (that is, a single or particular entity that cannot have instances), I shall say that the name used points to this individual. If a class of objects is named I shall say that the name of the class (which is not the name of the members or elements of the class) designates its designation. If it is unclear (or irrelevant) whether either an individual or a class is named, I shall say that the name refers to its reference. If a concept is named I shall say that the name expresses its sense.1

A linguistic expression is a string (of finite length) of primary symbols of a language. Most of the time I shall discuss written expressions (in which case primary symbols are letters, numerals, and similar signs). The most common convention for naming expressions, say:

the sky is blue
(1)

is to use quotation marks (singly or doubly). This convention is illustrated in the following two sentences:

"the sky is blue" consists of four words
(2)

'the sky is blue' consists of four words
(3)
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When using this convention I will use single quotes, as in (3). Double quotes will be used for other purposes, for example when quoting from another written text or to indicate that an expression is used in an unusual or intentionally metaphoric way. If quotation-mark-names are used I shall say that the name denotes its denotation. Under this convention names of names can be formed by doubling the (single) quotes, for example:

"the sky is blue" denotes 'the sky is blue' (4)

However, because quotation-mark-names, or quote names for short, have certain peculiar properties (which I will discuss in section VI below), I introduce here a less common convention: Expressions that are to be referred to are placed on a separate line. These lines are numbered consecutively similar to the way mathematical equations are placed on separate lines and numbered in scientific texts. Of course this convention cannot be used when introducing it, but it is not difficult to show how it works. In the following two sentences both the quote names and the new convention are used:

'(1)' refers to the expression written on the line marked '(1)' (5)

(1) = 'the sky is blue' (6)

I shall later discuss whether (6) is both meaningful and true. In general I will use quote names to form names of names. The need for quote names can be eliminated completely by using a more sophisticated coordinate system than the one introduced so far. For example, assume the present text is typed on sheets of paper, each of which contains $10^4$ small squares (100 x 100). Each square contains exactly one letter, or similar symbol (counting a void ["space"] as a symbol too). Numbering the sheets of paper, the convention could be such that, for example, '(2, 24, 48-50)' refers to the sequence of symbols to be found in squares 48 to 50 on line 24 of page 2. Once the convention is introduced all linguistic entities have well determined coordinates which function as the name. As a name is a linguistic entity its name will be a similar triple of coordinates. It is only for practical reasons that a slightly simpler convention is used in this paper.

Names such as '(1)' are ambiguous in that it is not clear what exactly it refers to. The following references are possible:

(a) the individual spatio-temporal object that is to be found on the line marked '(1)' on the original from which the piece of paper the reader has in front of him has been copied or printed; this is the master-copy and I shall point to the object to
be found on the line marked '(1)' on the master copy using '](1)[['.

(b) the individual spatio-temporal object that is to be found on the line marked '(1)' on the copy the reader has in front of him; I shall point to this object using '](1)[['.

(c) the class of expressions on the line marked '(1)' on all copies of the master copy mentioned under (a); new members can always be added to this class; I shall designate this class using '](1)';

(d) the class of expressions that consist of the same linguistic signs as the elements of (1); I shall designate this class using '][(1)]';

(e) the class of expressions that have the same sense and/or reference\(^2\) as (1), for example, translations of (1) into another language; I shall designate this class using '][[(1)]]'.

Further refinements and additions are possible. For example: The master-copy mentioned under (a) may be any sort of master kept by the printer. (Depending on the reproduction technique this may also be a mirror image of the copies that are made of it.) The printer's master copy is probably based on a typescript and this again on a manuscript. In special circumstances a dispute may arise about what is to be considered the true master copy (for example when the author's name is misspelled on the cover of his first published book). In practice our working hypothesis is that

\[ ](1)[[ = ](1)\] (7)

where the relation ' =' between empirical objects means that the two objects are indentical for all practical purposes (except their location in space-time) and the identity is established by empirical investigation. Communication would fail if it could not be normally assumed that all elements of (1) are identical and that the master against which dubious elements are checked is the copy the writer has submitted or is identical to the writer's original writing. All manner of errors and frauds are possible. Copies of copies may not be as reliable as a copy of the master-copy. (Of course this also depends on the reproduction technique.) But when a problem or suspicions arise it is just a matter of empirical investigation to find out which copies are not identical with what is the accepted master copy.\(^3\) In the sequel I shall usually point to individuals on the copy of the reader, assuming that the same holds for individuals on the master-copy. The relations between categories (b), (c), and (d) can be further illustrated as follows:

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\[(1)[ \in (1) \tag{8}\]

which says that the empirical object \([1)[ \text{ is an element of the class (1). Further, if we also consider the sky is blue } \tag{9}\]

then the following sentences are true:

\[(1)[ = j(9)[ \tag{10a}\]
\[(1)[ \in [(9)] \tag{10b}\]
\[(9)[ \in [(1)] \tag{10c}\]
\[[1)] = [(9)] \tag{10d}\]

Expressions (10a-d) are empirical statements. If any of the four is established to be true all others are true. The expression

\[(i) \neq (8) \tag{11}\]

can be considered an analytic statement. It is true a priori because of the way classes like (1) and (8) are defined. (It is not necessary to inspect elements of these classes.)

The translation of (9) into French is:

le ciel est bleu \tag{12}\]

If the reference of (9) and (12) is the same (viz., that the sky is blue), then

\[[[(9)]] = [[[12)]] \tag{13}\]

There are two reasons why I prefer to use the sign ' ' in (13) instead of '=':

(a) In order to establish the truth of (10a) or (10d) we usually do not need to know the meaning of (1) and (9). In order to establish the truth of (13) we certainly need to know the meaning of (9) and (12).

(b) Strictly (13) says that \[[(9)]] and \[[[(12)]]\] have the same elements, but I want to make the association with the equivalence of sentences or propositions.

It is not necessarily so that

\[[(9)] \subset [[[9)]\]

because, as Tolhurst and Wheeler (1979) note in a criticism
of the theory of textual individuation, a text must be un­
derstood not as a word sequence but rather as a particular use of a word sequence. Two objects can instantiate the same word sequence and yet constitute different texts be­cause of their differing contexts of production. In fact it may be argued that by beginning this paper by asking the reader to consider (1) and continuing as I did, I provided a very meagre context of producing (1). Perhaps most readers would guess that I meant "Consider (an element of) [(1)]," in which case (((1))) is meaningless or undetermined. The context would be much clearer if I had added that I mean (1) to be a purely descriptive statement. An alternative is to ask the reader to consider.

in melancholy realm big tears are shed

where ](15)[ is a replica of line 7 of canto II of John Keats' The Fall of Hyperion. In this case the context is fixed.

In the literature only two levels are distinguished for linguistic entities: the level of tokens and the level of types. Typically, an example of a type is [(15)] and quota­tion mark names are used to denote types. Typically, an example of a token is ](15)[. The following quotation from Carnap (1964) illustrates how these tokens are named:

let us now designate the position on page 33 at which 'x=2' begins, by 'a'

Most writers when concerned with pure syntax or semiotics consider the types as the individuals, because the tokens do not occur in their ontology. Writers such as Goodman, Quine, Tarski, and Carnap tend to take physical inscriptions (tokens) as the building blocks of a given language and sen­tence-tokens as the bearers of truth (nominalism). From this point of view types can be viewed as an equivalence relation on the set of inscriptions of a given language. However, in practice these authors usually take the types as individuals, because "any well-defined domain may be taken as individuals" (Church, 1976, p. 752). What I want to show in this paper is that the relation between token and type warrants more detailed analysis and, in particular, that the conventions used to name types and tokens do seem to lead to ambiguities, which can easily be overcome by using the con­ventions of naming illustrated above.

I shall restrict myself to written expressions, though an extension to spoken utterances also seems straightforward. Although most of this paper is about naming lin­guistic entities, I see this as a prolegomenon to naming artefacts and in the next section I give one example to il­lustrate the similarity between naming linguistic entities and at least some artefacts.
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II. NAMES OF UNITS OF MEASUREMENT

Consider the measurement of mass. Mass is a property which induces an order in a set of physical objects. Considering only the property mass, the set of objects forms what is called an extensive structure (with respect to mass). This implies that mass can be measured directly, that is to say, independent of the measurement of other properties. Furthermore, it is measured on a ratio-scale, which means that the scale has a zero-point and is invariant except for the choice of a unit (in the case of mass only positive values being possible). It has been agreed (internationally, S.I.-units) to choose as the unit of mass the kilogram (abbreviation: kg). What is the reference of the term 'kilogram' or 'kg'? 'Kilogram' is the name of the unit of mass in the S.I.-system. It is not the unit of mass itself, which is the mass to which the numerical value 1 is assigned. It is instructive to distinguish similar levels of reference as in the case of names of linguistic expressions:

(a) The expression 'kg' points to a particular platinum-iridium cylinder kept at the International Bureau of Weights and Measures at Sevres (near Paris). This is the basic unit of mass. (More precisely: this particular mass of platinum-iridium has been chosen as the unit of mass in the S.I.-system of units.)

(b) The expression 'kg' designates the class of objects kept at such institutes as the U.S. National Bureau of Standards of which the mass is 1, where the fact that the mass is 1 has been established, checked, and rechecked with the greatest care, so that these objects can be used as standards of mass measurement. The class ]kg[ is defined with reference to ]]kg[[. We can also say: ]]kg[[ is the defining prototype of ]kg[. If 'm' is a variable which designates objects of which only the property mass is considered we could write:

\[ ]kg[ \equiv_{df} \{m/m = ]kg[[\} \quad \text{(21)} \]

However, two points should be noted then. First, the relation of empirical identity used in (21) is a very precisely defined relation. All kinds of conditions have to be met in order to establish that a "regional" standard of mass is equal to ]]kg[[. Second, according to the conventions outlined in section 1, ]]kg[[ (or ](21)[) is an element of (21), but ]]kg[[ is not an element of ]kg[[.

(c) The class kg is defined in terms of ]kg[. It is
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the class of all objects that are assumed to have a weight of exactly one kilogram. That is to say it includes all masses of one kilogram used in laboratories, trade, industry, and elsewhere to measure masses (or weights).¹

(d) The expression 'kg' designates the class of objects having the property of mass. It is also the dimension of the quantity mass (see below).

In physics it is usually assumed that variables such a m which designate physical quantities are equivalent to the product of the numerical value (or the measure)—which is a pure number—and a unit. Above I have introduced the unit or standard of measurement as a physical object (at least in the case of mass). I think it is necessary to distinguish categories clearly. In order to avoid multiplying pure numbers (conceptual entities) with material objects, I introduce the following assumptions and conventions (applied to the property mass):

\[ \text{m} \] is a variable whose domain is \([kg]\)  
\[ \text{m} \text{e} \] is a variable whose domain is \(kg\)  
\[ \text{m} \] is a variable whose domain is \(Ra\)  
\(\Phi\) maps \([kg]\) into \(Ra\), i.e. \(\Phi(\text{m}) = \text{m} \)  
\(\Phi(\text{m}_\text{e}) = 1 \)  
\(\Phi(\text{m}_1 \circ \text{m}_2) = \Phi(\text{m}_1) + \Phi(\text{m}_2) \)

where \(\circ\) is the operation of physical concatenation. In the terminology just presented \(\text{m}\) designates pure numbers (not the product of a number and a unit); \(26b\) is a definition, \(26c\) states an empirical property of the operation of physical concatenation. The unit of mass is given by the operational, ostensive or stipulative definition of \([kg]\). What is called the dimension of \(\text{m}\) can be defined (Krantz, 1971) as:

\[ [M] = [kg] = \{\Phi^{-1}(\alpha, \text{m}_\text{e}) \mid \alpha \in Ra\} \]

The extension of \('[M]' and 'kg' is the same. We write 'kg' instead of '[M]' if we want to provide the extra information that it is understood that the chosen unit is kg. If we should choose the British pound (lbs) as the unit, \([kg] = [lbs]\), the designation of \(m_e\) would change. To illustrate the conventions just introduced I shall now analyse some aspects of Kripke's discussion of the difference be-
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tween the phrase

one meter (28)

and the phrase

the length of S at t₀ (29)

where S is a certain stick or bar in Paris (the standard meter)² and S is one meter long (Kripke, 1972, pp. 273-276). Kripke accepts that:

stick S is one meter long (210)

is true and then discusses whether (210) is a necessary or a contingent truth. Because "length might vary in time," Kripke adds that "We could make the definition more precise by stipulating that one meter is to be the length of S at a fixed time t₀." Kripke's main conclusions are that:

(210) is a contingent a priori truth (211)

(28) designates rigidly a certain length in all possible worlds (212)

(29) is not a rigid designator (213)

The analysis stresses the importance of the distinction between "definitions" which fix a reference and those which give a synonym (214)

Without entering here into the general discussion of what are rigid designators and what not, I want to show how Kripke's analysis fits into the conventions of naming outlined above for the unit of mass. I prefer to use the unit of mass because the unit of length Kripke refers to is no longer the standard meter. [See (216) below for the present definition.]

(a) First, I think, accepting Kripke's point of view about rigid designators, (212) is not true. If Kripke says 'one meter' (or 'one kilogram') is a rigid designator, I think the meaning of 'one kilogram' is not one kilogram, which is either 1]kg[, or 1][kg[, or (which I think is the best choice) kg. Probably what Kripke has in mind is:

the unit of mass (215)

and (215) is a rigid designator. In the world of metric units (S.I.-units), (215) points to ]]kg[. If a standard British pound is kept in London, named '1]]lbs[', then (215) points to ]]lbs[ in the British system of weights and measures. Per-
haps this is stretching the concept of possible worlds too far, but I think it is a stimulating assumption to say that if we choose a different system of units (which is not the same as choosing a different language), we choose to live in another possible world.\(^3\)

(b) Kripke argues that (210) is contingent, because under certain counterfactual conditions \(S\) would not have been one meter long. I think that is not taking the meaning of the definition (210) as it should be. Kripke takes (210) out of its context; he concentrates on [(210)] instead of \([(210)]\). \(S\) is one meter long if and only if it is supposed as it is, provided the temperature is kept at a constant specified value, and so on. The definition-in-context implies:

(i) If circumstances are not as specified, \(S\) is not one meter long and (210) is not true. In that case we do not have a unit of length in our world and all lengths are undetermined, including that of \(S\).

(ii) If it were discovered that the length of \(S\) or the mass of \(\text{kg}\) are slowly changing due to a known physical process (for example very slow radioactive disintegration), the definition will be adjusted such that for all practical purposes and taking into account certain correction formulae the length of \(S\) or the mass of \(\text{kg}\) are constant.\(^4\)

(iii) As long as we have not changed the definition (210), it is true by convention anytime. Kripke makes the definition more precise by stipulating that \(S\) is one meter long at \(t_0\), thereby making it useless. Certainly it was not the intention of the international meeting, at which it was decided to accept (210), that \(S\) would only be one meter long at the time the decision was made (or any other particular time-point). It was decided that \(S\) would be one meter long provided that all measures were taken such that the length of \(S\) would be kept constant.

(iv) If circumstances are as specified, the length of \(S\) is assumed to be constant. Whether the length of \(S\) is in fact constant, or whether the mass of \(\text{kg}\) is in fact constant, is irrelevant (whatever 'in fact' would mean).

(c) Confusion may easily arise by not distinguishing carefully between the property mass and its meas-
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urement on ratio scales. It is much more difficult to imagine a world in which there are no objects having the property mass, than it is to imagine a world in which there is no unit of mass (in which (215) is void of reference). Kripke suggests that, when Wittgenstein remarks that one can say neither that the standard meter in Paris is one meter long nor that it is not one meter long, "Part of the problem which is bothering Wittgenstein is, of course, that this stick serves as a standard of length and so we cannot attribute length to it." But I think that is not relevant. A stick is not a stick if it does not have the property length. What is typical of S is that in the metric-system-world it is the only stick of which the length in meters is given and need not be measured.

(d) If we want to discuss what rigid designators are and are not, we should not talk vaguely about the meaning of 'one kilogram', but we should discuss separately the status of [']kg[', ']'kg', 'kg', '[kg]', '[M]', and (215).

(e) Kripke stresses (210) is not to give the meaning, but to fix the reference of 'one meter'. (Again I think he does not mean one meter but the unit of length.) I would say that the context of (210) fixes its meaning for all practical purposes. At present the definition of one meter is:

one meter is equal to 1,650,763.73 wavelengths of the orange-red light of excited krypton of mass number 86 (216)

Either (216) or (210) is true a priori. If one is chosen to be true the other is at best true a posteriori (within the error of measurement). Note that Kripke's stipulation that the definition should refer to a particular to seems absolutely meaningless when appended to (216). According to Kripke (29) is not a rigid designator, but what about

the wavelength of the orange-red light of excited krypton of mass number 86 (217)

I think both (210) and (216) do not only fix a reference but also have a meaning that is determined by the context they stem from, that is to say, Kripke has analysed an element of [(210)], which is not necessarily an element of [[(210)]].

If during World War I the building in which S and ]kg[ were kept had been destroyed, at least temporarily ',]kg[' would have lost its reference. However, because of its sense, the reference and sense of ']kg[' would not have been severely shattered; a new ]kg[' would soon have been "ap-pointed" and would have re-established the firm basis of
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In my terminology this event would have brought us from one possible world into another. Because at any one time there are many possible worlds in existence (based on different units of mass), all cross-linked by empirical identities, the contingent disappearance of one of these worlds, would not disturb the sense and reference of 'M' very much.

III. APPLICATION TO THE PARADOX OF THE LIAR

It is assumed by Tarski (1956) that the sentence form

\[ X \text{ is true iff } p \]  \hspace{1em} (31)

with \( p \) a particular sentence and \( X \) a name of this sentence exemplifies the meaning of the Aristotelian concept of truth (which we take to be a useful concept of truth). A more precise definition of this correspondence concept of truth would entail all substitution examples of (31) such as

\[ (1) \text{ is true iff the sky is blue} \]  \hspace{1em} (32)

As Tarski points out, the problem with (31), when applied to colloquial language, is that it admits paradoxes such as the paradox of the liar. For example, consider

\[ (33) \text{ is not true} \]  \hspace{1em} (33)

Substitution in (31) yields:

\[ (33) \text{ is true iff (33) is not true} \]  \hspace{1em} (34)

This is a contradiction, provided (33) is either true or not true. If (33) is an apple, (34) is not a contradiction. However, I do not want to pursue the question whether (33) is a proper sentence which is either true or not true. Instead, I would like to look in more detail at the way Tarski presents the paradox, which I will first quote in full from page 158 of Tarski (1956).

For the sake of greater perspicuity we shall use the symbol 'c' as a typographical abbreviation of the expression 'the sentence printed on this page, line 5 from the top'. Consider now the following sentence:

\[ c \text{ is not a true sentence} \]  \hspace{1em} (35)

Having regard to the meaning of the symbol 'c', we can establish empirically:

\[ (a) \text{ 'c is not a true sentence' is identical with } c \]  \hspace{1em} (36)
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For the quotation-mark name of the sentence \( c \) (or for any other of its names) we set up an explanation of type (2):

\[
(\beta) \text{ 'c is not a true sentence' is a true sentence if any only if c is not a true sentence}
\]

(37)

The premises, \((c)\) and \((\beta)\) together at once give a contradiction.¹

The names in the right hand margin do not form part of the quotation. The explanation of type (2) refers to an element of \([(31)]\), also known as Tarski's Convention T. The sentence that is printed on line 5 from the top of the page (i.e., the page the above quotation is taken from) is an element of \([(35)]\).

As Ubbink (1977, 1978) has pointed out in detail, it is not clear what (36) means. This comes out clearly if I try to transliterate the above quotation from Tarski using the conventions outlined in section 1 above. I think this would give

\[
[(38)][\text{is not a true sentence}]\quad (38)
\]

and

\[
[(38)] \text{is identical with } [(38)][\quad (39)
\]

If this is a faithful transliteration, (38) should be an element of \([(35)]\), and (39) should be an element of \([(36)]\). There is no need to transliterate further, because (39) is definitely not true. A class cannot be identical with an element of that class. What went wrong?

For Tarski "terms like 'word', 'expression', 'sentence', etc., do not denote concrete series of signs but whole classes of such series which are of like shape with the series given; only in this sense shall we regard quotation-mark names as individual names of expressions."

However, if that is so, I find it difficult to understand what the sentence printed on this page, line 5 from the top (310)

would mean.² I think most people who understand English would agree that (310) points to \([(35)][\text{, that is to say, the element of } [(35)]\) which can be found on the copy of Tarski's article I have consulted, or that (310) designates the subclass of \([(35)]\) which consists of all sentences of this form found on page 158, line 5 from the top in any of the copies of Tarski's article. However, according to Tarski
neither of these are sentences. Sentences are classes of series of signs of like shape, that is, \([ (35) ] \) is a sentence. But if that is so, then all the trouble about what (310) means in this context could be forestalled by just writing:

\[
(311) \quad \text{is not a true sentence}
\]

If (311) is a faithful (and more unambiguous) transliteration of Tarski's \([ (35) ] \), the problem with the meaning of (36) does not arise either. Because we can apply (31) directly to (311) which yields:

\[
(312) \quad \text{is a true sentence iff } (311) \text{ is not a true sentence}
\]

which is a contradiction similar to (34). Apparently, by just changing the conventions of naming, one can derive the paradox at once, without using an empirical premiss such as (36). On the assumption that conventions of naming are wholly arbitrary, I think this is an odd result. I think the main cause of the trouble is the peculiar properties of quotation mark names—I will discuss this more fully in section 6 below.

Proposing (31) as a partial definition of truth, I think, implies that the only sentences that can be considered without complications are sentences of which tokens can be produced at will, and all tokens have the same truth value. For example, I think it is doubtful whether (34) makes sense. In applying (31) we have to substitute for 'p' a particular sentence and for 'X' a name of this sentence. Now if '(33)' is the name, we cannot really substitute (33), or an element of (33), for 'p'. Also (32) is incorrect. We should write

\[
(1) \text{ is true iff the sky is blue (313)}
\]

Even (313) is still ambiguous. It is only true if the sentence written on the right hand side of the 'iff' in (313) is an element of \([ (1) ] \). For spoken sentences such as

\[
\text{It is two o'clock now (314)}
\]

(that is, any utterance of which (314) is a faithful representation), Tarski's convention \( T \) needs adjustment. I shall not work this out here.

If we contemplate the meaning of (311), it seems self-evident that for any \( x \), \( (x) \) is a subclass of \([ (311) ] \) if and only if \( x \) satisfies

\[
(315) \quad '[(x)] \text{ is not true}' = [(x)]
\]
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IV. TRANSFERRING THE NAME SYMBOL INTO A SYMBOL FOR THE REFERENCE OF THE NAME

In an article discussing Tarski's semantic definition of truth, Black (1948) considers the following sentence:

For all x and y, if x is a sentence and y uniquely designates x, then y is true if x. (41)

As Geach (1950) pointed out (41) is not meaningful. This can be seen by considering that:

'(41)' uniquely designates (41) (42)

Therefore, a substitution example of the consequent in (41) is:

'(41)' is true iff (41) (43)

which is nonsense. Black proposes (41) as a replacement of

For all x, if x is a sentence, then 'x' is true iff x (44)

Formula (44) is nonsensical as Black says, following Tarski, because, according to the usual conventions for quotation marks, the symbol occurring immediately after the word 'then' in (44) refers to a constant, not a variable.2

In order to improve upon (41) and (44), we introduce the convention that the reference of the name of a linguistic entity can be formed by underlining the name.3 For example, instead of

the sky is blue (45)

we may write:

the sky is 'blue' (46)

or:

'the sky is blue' (47)

or:

(45) (48)

The meaning of (48) is that the sky is blue. The context of (48) is the same as the context of (45). Therefore (a priori)

[(45)] = [(48)] (49)

but it is not necessarily so that

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(41) = (45) \hspace{100pt} (410)

Using this convention, we discover that what (41) and (44), unsuccessfully, try to say is

For all x, if x is a sentence, then x is true iff \(~(41)\)

where 'x' is a variable, the domain of which are names of sentences. A substitution example of (411) is:

(45) is true iff \(~(41)\) \hspace{100pt} (412)

(412) is also a substitution example of (31), if we accept that (45) is a particular sentence. In connection with (31), I noted in the previous section that we can substitute in (31) only sentences which can be produced at will, and not, for example, \(\lceil(45)\rceil\) or even (45). The convention just introduced removes this problem, because this convention allows us to say to use sentences out of context when we are interested in consideration on the metalevel. Because

\[\lceil(45)\rceil \equiv \lceil(45)\rceil \equiv (45) \equiv \lceil(45)\rceil\] \hspace{100pt} (413)

any of them can be used in a substitution example of (31) or (41). The convention also gives a convenient way to deal with sentences the truth of which depends on the time, the place, and/or the person who utters them. However, I shall not work this out here.

I want to give one further illustration of the convenience of this convention. For this I choose the construction of the paradox of the liar for the case when no self-reference is allowed and the sentence in the object language can be either true (T), false (F), or undetermined (U). I follow Carnap (1964, pp. 214-5), but I change terminological conventions. I need one more convention of naming. The coordinate system of naming sentences is extended to include names of words in sentences. The following sentence illustrates this convention:

(414.3) consists of two letters \hspace{100pt} (414)

(414) says that the third word of (414) consists of two letters. The operational definition of a word is that it is preceded and followed by a space (a void). It is possible that a word so defined is itself a sentence. Let us take 'x' and 'y' as variables, such that '(x)' and '(y)' are variables having names of sentences as its substituents. We start with the following three assumptions:

\begin{align*}
\text{either } & T(x) \text{ or } F(x) \text{ or } U(x) \hspace{100pt} (415) \\
\text{if } & T(x) \text{ then } (x) \text{ and if } (x) \text{ then } T(x) \hspace{100pt} (416)
\end{align*}
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(415) tells that any sentence of the object language is either true, or false, or undetermined; sentences of the metalanguage are either true or false according to (417); (416) corresponds to (31) and (411). The following are direct corollaries:

if $F(x)$, then not $T(x)$, therefore not $x$. \[ (418) \]

if not $x$, then not $T(x)$, and therefore $F(x)$ or $U(x)$. \[ (419) \]

Consider the ordered pairs \([x,y]\) for which:

$T(y) \equiv (x)$ \[ (420) \]

$F(x) \equiv (y)$ \[ (421) \]

Both \((x)\) and \((y)\) come under (417). Therefore:

either $T(y)$ or $F(y)$ \[ (422) \]

Assume $T(y)$. Then, by (416), \((y)\), which is the same as $F(x)$, by (421). Therefore, by (418), not \((x)\), which is, by (420), the same as not $T(y)$. Our assumption leads to its own opposite and is therefore refuted. Hence, by (422), $F(y)$; then, by (418), not \((y)\). By (421), not $F(x)$. By (417), either $T(x)$ or $F(x)$, hence $T(x)$, and, by (416), \((x)\). Also, if $F(y)$, by (422), not $T(y)$, and by (420), not \((x)\). We see that from $F(y)$ we can derive both \((x)\) and not \((x)\). Hence (422) is a contradiction.

V. REPLICA NAMES

Consider the following statement:

the mass of the earth is $6.10^5$ kg \[ (51) \]

The name 'the earth' points unambiguously to an individual. Names of individuals I shall call proper names. Other proper names are 'Bertrand Russell', 'The Netherlands', 'World War II', 'the first landing on the moon'.

What kind of name, if any is 'kg' in (51)? The answer depends a bit on what we take to be the meaning of (51). Let us assume (51) means something like the following: We know what we mean when we say that two masses are equal. Operational criteria and rules are available to establish in any given case by direct or indirect means whether two masses are approximately equal. Statement (51) means that the mass of the earth is equal to $6.10^5$ times the mass of the standard kilogram in Paris, i.e., $\text{kg}$[... or any other elem-
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ent of $\text{kg} -$ compare section II) or that the mass of the earth is equal to the mass of $6.10^5$ replicas of the standard $\text{kg}$. I shall call names such as 'kg' in (51) replica names because, in a way, they both point to an individual and designate a class defined in terms of this individual.

Replica names can be associated with many types of artifacts. I will give some more examples to bring out the different aspects of replica names. First consider the following sentence from a scientific publication:

the measurement was carried out using a Wicke-Kallenbach diffusion cell

The name 'Wicke-Kallenbach diffusion cell' is a replica name which would seem to refer to at least three different things at the same time:

(a) The (unique) diffusion cell which was used by Wicke and Kallenbach about 50 years ago and which was described by them in the literature. Although the actual parts of their equipment probably will not exist any more, the equipment they used can be considered as the prototype of a particular kind of diffusion measurements.

(b) The (unique) diffusion cell which was used by the authors of the article in which an element of [(52)] appeared.

(c) The class of diffusion cells which are based on the principle of Wicke-Kallenbach. The two unique diffusion cells referred to above are each a member of this class.

It may be argued that in so far as the progress of scientific research is concerned only the universal names counts, designating the class described under (c). Even at the time that there was only one such diffusion cell (in the laboratory of Wicke and Kallenbach), the implication of Wicke and Kallenbach publishing their diffusion measurements was simply that the same results would be obtained in another laboratory using a similar diffusion cell. Wicke and Kallenbach gave the instruction or prescription how to make such a cell. It is a normative demand of scientific research that other researchers should be able to follow the instruction to see whether they obtain the same result. It is more the content of the instruction (and the whole context in which it is to be carried out) which characterizes the meaning of the universal name than the accidental properties of the prototype. The interest of science in the "Prescription of the universal" over and above the "checking against the prototype" is well illustrated by the historical development of the standards of measurement. 2
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The preference of science for universals, of course, cannot change the fact that our world is made of individuals. In establishing historical facts or when making decisions in particular situations we cannot do without proper names. The following sentence is another example where it seems that at the same time a proper name and a universal name is used:

Chopin's Mazurka Op.17 No.2 consists of 68 bars (53)

The name 'Chopin's Mazurka Op. 17 No. 2' is a replica name. If we restrict ourselves to the written version, the name refers to at least two different things. An alternative way of saying this is that (53) is the conjunction of two statements:

(a) an empirical (synthetic) statement concerning an historical fact, viz., that the mazurka which is now named 'Op.17 No.2' consists of 68 bars in the prototype copy Chopin wrote himself;

(b) a definitional (analytic) statement concerning one of the characteristics of Chopin's Mazurka Op.17 No.2, which has been printed and reprinted many times over the past 150 years in various editions.

The definitional statement is similar to a statement such as:

a chess-board has 64 squares (54)

There is no need to count the squares. If the number of squares would be different from 64 on an object which is alleged to be a chess-board, it would not be a chess-board. Although the name 'chess-board' does not point to a prototype (whereas the replica names in (51), (52), (53) did), I think there is no very fundamental difference between a prototype and a set of defining rules. Therefore, I propose names such as 'chess-board' as also replica names.4

An ambiguity of long-standing philosophical interest can be found in certain types of probability statements:

The probability that there will be one disintegration in this sample of radioactive material in the next two seconds is 0.6 (55)

On the first view the probability is ascribed to the individual event named in (55). But many writers argue that, if that is so, then (55) is meaningless. Instead the probability should be ascribed to a class of repeatable events, which class is defined by implication in (55). Series of events which display statistical regularities I would also like to refer to using replica names.
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In this section I have only given a few of what I hope are suggestive examples of replica names. A fuller worked out analysis of what the function of replica names is, as distinct from proper and universal names, is needed. But I hope to have at least convinced the reader that this might be a fertile research programme.

VI. QUOTATION MARK NAMES

Quotation marks have been hailed as a paradigm of opacity. I think the only advantage of quotation mark names is that it is often the easiest convention to use—and that is why I resort to quotation mark names now and then. However, apart from this practical attraction, I think the unlimited use of this convention has led to quite a number of ambiguities and confusions.

To start with, quotation marks can be used to form a name of a linguistic entity (when the intention is to predicate something of that entity) and they can be used to quote, that is, to indicated that a reproduction of a certain original is presented. In the literature this distinction is rarely made in a clear way. An exception is Marciszewski (1979). Quine (1953) says that one might protest

\[(2) \quad \text{is false} \quad (61)\]

is meaningless, on the ground that an attempt to expand the reference of '(2)' in (61) into a specific quotation of an actual statement leads into an infinite regress. I think this is confusing naming with quoting. As has been pointed out by many authors, self-reference in or cross-reference between sentences is absolutely normal in many cases, so that we cannot get rid of the semantic paradoxes by stipulating that self-references or cross-references are not allowed. Consider the following example of cross-reference:

\[
\begin{align*}
\text{the next sentence is in Dutch} & \quad (62) \\
\text{de voorgaande zin is in het Engels} & \quad (63)
\end{align*}
\]

If we attempt to expand the references 'the next sentence' in (62) and 'de voorgaande zin' in (63) into a specific quotation of an actual statement, this leads to an infinite regress. But surely, there is nothing unacceptable to the system of naming sentences I use in (62) and (63). If (62) and (63) cannot be transliterated using quotation mark names, this shows a disadvantage of the convention using quotation marks to name sentences and not that there is something wrong with the sentences that cannot be transliterated. On the other hand, the fact that sentences such as (61)-(63) cannot be transliterated in such a way that quotation mark names are used does not prevent us from being able
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to quote these sentences. In fact, (61) is such a quotation of the sentence (in the copy of Quine's paper I consulted) Quine puts forward for consideration.4

As noted in previous sections I use either double quotes or italics when quoting; I use single quotes when forming a quotation mark name. A quotation mark name shows an individual and defines a class of individuals of like shape as the individual displayed. In that sense it is a special kind of replica name. A quotation is itself a more or less exact reproduction of an original. By no means is it a name of that original. The context in which the quotation is used provides the information where to find the original. When quoting, the emphasis may be either on reproducing the form of what is quoted as well as possible, or on quoting the meaning of what is quoted as well as possible. If we quote Caesar as having said

I came, I saw, and I conquered (64)

this is perhaps historically true as far as the meaning is concerned, but it is not correct as to form, because Caesar did not speak in English. As Marciszewski analyses in some detail, oblique speech does not exclude a verbatim reproduction, for example, in

Caesar said, "Veni, vidi, vici". (65)

but sometimes "we have to give up reproducing the shape or sound of the text we reproduce and confine ourselves to preserving its meaning; sometimes even part of the meaning has to be abandoned." Note that the last quotation in the previous sentence only functions as a courtesy to Marciszewski. In the context of the meaning of this sentence as part of the arguments in this article the fact that the last part of the sentence is quoted from Marciszewski is quite irrelevant. Certainly this last part is not a name of any sort.

Having separated quotations from quotation mark names, I think the latter have three important disadvantages as a convention of naming linguistic entities:

(a) Although quotation mark names have the "overwhelming practical convenience of visible reference" (Quine, 1960, p. 189), this has the disadvantage that the name and the thing itself look very much the same, and are therefore more easily confused than if the name and the thing itself would look very differently.5

(b) Quotation mark names denote series of signs of like shape (of which the series of signs within the quotation marks is one specimen). That is to say, they name the class of expressions of category (6) in section I, and we have for example6
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[(1)] 'the sky is blue' (66)

As noted before, this is the category of least importance, because if this category is taken to constitute the level of individual sentences, these sentences are usually not truth-definite.7

(c) Certain sentences cannot be named using quotation mark names only, for example (61)-(63) above. I think this is a fundamental disadvantage and I find it surprising that in the very many publications on the paradox of the liar since Tarski's (1944) this point has not come out more clearly.

Tarski himself, and many publications since, stress that an empirical premise is used in the construction of the paradox. As I have shown in section III, if a different convention of naming is used, no empirical premise is needed. In the literature it is also often noted (but not always) that Tarski (1944) also presented a variant of the paradox in which no empirical premiss occurs. It is of interest to investigate what the difference is between these two variants. In the terminology here proposed the second variant of the paradox runs as follows. Consider the class of sentences of the form

all sentences (...) (67)

in which some predicate is substituted for the dots. If this predicate is true of a substitution example of (67), this substitution example is called autoclitic. If not, the substitution example is called heteroclitic. For example

all sentences are universal (68)

and

all sentences consist of words (69)

are autoclitic, whereas

all sentences contain a ternary predicate (610)

is heteroclitic. Consider the sentences

all sentences are heteroclitic (611)

(611) is heteroclitic (612)

According to the conventions governing the use of 'heteroclitic' and 'autoclitic' we have

(611) is autoclitic iff (612) is true (613)

(611) is heteroclitic iff (612) is false (614)
According to Tarski's Convention I, we have

\[(612) \text{ is true iff } (611) \text{ is heteroclitic} \quad (615)\]
\[(612) \text{ is false iff } (611) \text{ is autoclitic} \quad (616)\]

Both (613) and (615), as well as (614) and (616), lead to the conclusion that (611) is autoclitic if it is heteroclitic, and (611) is heteroclitic if it is autoclitic. In (612)-(616) we have used universal names for (611) and (612), not the coordinate names \[(611)[] \text{ and } (612)[]\]. It is easily checked that we could have used quotation mark names as well. The reason that Tarski needs an empirical premiss in the construction of the paradox of the liar is that he cannot use quotation mark names in all cases when he needs a name for a sentence. This problem does not arise in the paradox of the heteroclitic sentences.

Occasionally, alternatives for quotation mark names have been proposed and used. Usually, the preference is then for what are called structural-descriptive names. Examples of structural names of \[abc\] \[(617)\]
\[\text{[(617)] = ay bee see = ABC = abc} \quad (618)\]

It is easy to think up many other alternatives. It will also be clear that the interest in structural-descriptive names stems from the interest in pure semiotics. Structural descriptive names are still subject to the disadvantages mentioned under (b) and (c) above. I would like to argue for an approach from the empirical side. In that case a convention based on coordinate names suggests itself at once. If we are able to identify all individuals unambiguously using a system of coordinate names, it is time to investigate the structure of the relations between the individuals (but not before).

VII. COORDINATE NAMES

Individuals have proper names. Individuals are most easily found if an efficient system of coordinate names is used. I have already introduced a system of coordinate names to name individual sentences and words in sentences. For example:

\[(71.2)[\text{ is a two-letter-word} \quad (71)\]

which says that the individual in \[(71)[\text{ which is equiform to 'is' consists of two letters}]. The extension of this convention of naming to letters in words in sentences is straightforward. For example
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\[(71.2.1)\) and \[(71.4.13)\) are vowels \[(72)\)

The operational definition of a letter is that it is a sign in a string of signs between spaces. According to the conventions introduced the sign 'a' in \[(71)\) is both a word and a letter. The reference of \[(71.3)\) and \[(71.3.1)\) is the same, but the sense differs.\(^2\)

Replica names refer to classes of artifacts which are defined in terms of a prototype, a master-copy, or a set of rules that define which entities belong to that class. For linguistic entities the replica names are derived from the coordinate names, for example:\n
\[(72)\)

If sentences are taken to have a subject-predicate scheme, coordinate names can only occur in subject position. In this case the copula is the relation of class membership. Replica names can occur in either subject or predicate position. If they occur in subject position the copula is the relation of class inclusion.\(^3\) Identities do not fit the subject predicate scheme. The different meanings of 'is' in this context may be illustrated by considering:

the second word in the sentence on the line marked '(71)' is 'is' \[(74)\)

This could mean any of the following\(^4\):

\[(75)\]

\[(76)\]

\[(77)\]

\[(78)\]

Replica names are a special kind of universal names. I would say '[(71)]', 'kg', and 'chess-board' are replica names, whereas 'shrimp', 'blue', and 'two-letter-word' are not. I am aware that this asks for a more detailed argument to delineate what are replica names and what are "normal" universal names. However, I shall not take that up here. For the moment universal names are just what is left after having described coordinate and replica names in some detail.

In science coordinate systems are not used particularly to gather knowledge about unique entities. Exceptions are parts of geology, astronomy, and history. In physics the role of coordinate systems is primarily to be able to determine distances in space and time. The measures of these distances are taken to be the values of variables that enter
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into some functional relation between variables. There is no fundamental difference between the "coordinate-names" used to refer to linguistic entities in this note and the coordinate systems used in some other areas of knowledge or human activities. To be practical, the accuracy of the coordinates should be in proportion to the size of the objects that have to be referred to. In man-made systems (artifacts) which consist of discrete entities (lines in a computer program, fields on a chess board, the words in this piece of writing) the accuracy is rarely a problem, unless the boundaries between the discrete entities are vague.

The coordinate system for linguistic entities that we use locates the entities on an ordinal scale. Because a name is available for every object and the objects are rigidly separated the system is exact and unambiguous. If our universe is New York and we make an appointment at building 48 in West 38th Street, the system of naming is very similar to that just introduced.\footnote{5}

If a coordinate system is used only to find objects, an ordinal scale always suffices as long as the "original grid" is fine enough to be able to name the place of every object. In physics it is more common to define a coordinate system using ratio scales, for example, the coordinate system used to name places on earth with the North Pole, the South Pole, and Greenwich as reference points. In that case the subject of naming cannot be separated from the subject of scales and accuracy of measurement.

Our linguistic coordinate system is simple in another respect: time is not included. All our discussions about linguistic entities are based on the assumption that they do not change in time. The empirical hypotheses on the basis of which we assume that the statement we receive from the tax inspector still contains the same signs as when it was dispatched from his office is similar to the hypothesis that we won’t find London all of a sudden lying next to Kuala Lumpur.

One might argue that although we have to make this assumption with respect to linguistic tokens, it does not apply to linguistic types. But this doesn't help us, because linguistic types depend on "token-prototypes" for their meaning and in communicating about linguistic entities (whether types or tokens) we use tokens not types. This suggests that it is not altogether arbitrary what we choose to be the level of linguistic individuals.

VII. FACTUAL AND OPERATIONAL MEANING

In a discussion of Russell’s arguments against Frege’s distinction of "Sinn" and "Bedeutung", Ayer (1971, pp. 30-32) reviews the possibilities of relating the sense and refer-
The first line of Gray's Elegy (81)

This expression is the name of a particular sentence (or line, in case it refers to a non-sentence). A similar expression is

the first indented line of section VIII of this article (82)

which is (81). The relation between (81) and (82) is:

(82) = (81) (83)

Note that the truth of (83) can be established without consulting an element of (81). Ayer wants to consider the sense and reference of (81), not the sense and reference of (81). Nevertheless, it is instructive to consider the latter first. Ayer writes (p.31):

Now if we speak of the meaning [sense] and denotation [reference] of the first line of Gray's Elegy, without putting this denoting phrase in quotation marks, what we shall be speaking of will be the meaning and denotation of 'The curfew tolls the knell of parting day', which is not what we want. (84)

Apparently Ayer assumes that:

(81) = 'The curfew tolls the knell of parting day' (85)

The analogon of (85) would be:

[(81)] = 'the first line of Gray's Elegy' (86)

Now, in the case of a descriptive statement such as (81) it seems safe to assume that for all practical purposes all elements of [(81)] mean the same thing--whatever the context and whatever the theory of meaning one adheres to. But, as I argued in section I, this is not generally so. In the case of

the curfew tolls the knell of parting day (87)

probably not all elements of [(87)] have the same meaning, and we should restrict ourselves to the elements of (81). I think this illustrates another case where the use of quotation mark names as in (84) and (85) leads to confusion, which does not happen if coordinate and replica names are used.

Let us now return to the possible sense and reference.
of (81). Following Ubbink (1978) I shall distinguish between the factual meaning and the operational meaning of coordinate names. The same coordinate name, say '[(82)[[ has the same operational and factual meaning wherever it occurs in the text. The operational meaning specifies the search project which has to be carried out in order to find the individual designated. The factual meaning is what we find there. We may say that all coordinate names of the same kind (using the same convention), for example, '][(81)[[ and '][(82)[[' have the same operational meaning; in general they will have different factual meaning. This terminology can be extended to replica names. I suggest that for coordinate names of linguistic entities the operational meaning corresponds to the sense and the factual meaning to the reference of the expression. The relation between sense and reference then seems to be straightforward. In order to understand the meaning of a coordinate name, we first need to know the operational meaning: we need to know how to carry out the search project. If we do know the operational meaning and we carry out the search project successfully, we find what the name referred to. Note that in this case it is impossible to know the factual meaning, without first knowing the operational meaning.2

On the account just outlined no specific problems arise if a name does not have a factual meaning. Consider

(81.9) = the present king of France (88)

This seems to be an acceptable way of saying that neither (88.1) nor (88.3-7) have a factual meaning, whereas in both cases the operational meaning is perfectly clear.

Koj (1979) argues that

The only capital letter in (89) (89)

refers to an empty class, whereas

The only capital letter in (89) (810)

refers to (89.1.1). The reason for this is that he formulates a principle of transparency according to which a name may not refer to its own part.3 I see no good grounds for this requirement. If we have chosen a certain convention of naming by means of coordinates, the operational meaning of the coordinate name is fixed a priori (by convention) and does not depend on the context. If the operational meaning is known we are able to discover the factual meaning by empirical methods. We cannot stipulate that it is forbidden to find something at the place pointed to if in fact it is there.
FOOTNOTES

Notes to Section 1

1. Neither in colloquial English nor in the language used by logicians, philosophers of science, or others, is there an accepted terminology to distinguish different types of naming. Using Fregean terminology, I am analysing in this paper different kinds of reference; I am not very interested at this point in the sense-reference distinction. The terminology I use is different from any other I know of. This not because I prefer to use a new terminology, but because I have not been able to find in the literature a terminology in which I could express the ideas I want to convey. In using the verb 'to point to' when naming individuals, I want to express that the name (either directly or indirectly) is directing to a particular point in space and time. I also want to suggest the association with egocentric particulars. Some authors use 'to label' in this case, but I think 'to point to' is more apt. I have chosen 'to designate' to name the relation between a class of objects and the name of this class, because when naming linguistic entities Carnap and others use the term 'sign-design'. Also for many other classes of empirical objects the association with a "design" or prototype seems attractive to me. Rather arbitrarily I have chosen 'to refer to' to cover both 'to point to' and 'to designate'. Because in my opinion quotation marks names are a very special kind of name, I reserve a separate term for this case: 'to denote'. Following Church and others I shall say that a name expresses its sense, or alternatively that it connotes its connotation. The verb 'to name' and 'to mean' are used without special restrictions, that is they are used as in ordinary English.

2. If expressions have the same reference they do not necessarily have the same sense (evening star, morning star). I shall argue in section 8 that '[1]' and '[2]' have the same sense but not the same reference. The conventions of naming could easily be extended to split up category (E) in three sub-categories.

3. This does not only apply to written texts but to all artefacts which are produced in large numbers of identical copies or samples: bank notes, stamps, cars of a particular brand and year, bottles of milk (both the bottles and the milk), and so on. In all such cases a list of defining criteria or a prototype exists against which any individual is checked.

4. Friedman (1975), amongst others, gives examples to show how difficult it is to identify similarity classes. For example, how do we account for different spellings. In my classification, category (D) is taken in the narrow sense; for example, 'realise' and 'realize' do not consist of the same linguistic signs. However, I would say 'realise' and 'REALISE' and also 'ReAlIzE' do consist of the same linguistic signs.

5. Quine (1960) uses square brackets when referring to a proposition, thus '[(Socrates is mortal)]' would amount to the words 'that Socrates is mortal'. This convention is similar to using quotation marks and
is subject to the same constraints (see section 6).

6. For example Carnap (1964, p. 15) and Quine (1970, p. 14). In recent years the interest in sentence tokens has increased considerably, for example in connection with the cluster theory and direct reference view of (proper) names; see Mc Kinsey (1980), Mc Kay (1981) and references given there. Also for the analysis of sentences containing egocentric particulars (token-reflexive signs) it is necessary to consider sentence tokens (because truth conditions for the type are not determined).

7. In the case of utterances the master-copy is the expression uttered by a particular person at a particular time. A suitable convention would be to use names such as '](1), t1, a1[', which points to the utterance of person a1 at time t1, and }[1] is a written representation of the spoken expression. In this case pronunciation, intonation, and other characteristics of instances are lost. Using tapes to record the original utterances (and naming them by their place on that tape) would be a more faithful representation. But in the end this is only a matter of technical detail and the trouble we want to go to and the practical possibility we have to represent the original as faithfully as possible. (This does not apply only to things like intonation; it may also be relevant who a1 addresses (if anybody), who else is present, whether a1 knows who hears him, etcetera.). As, for example recently, Jellör (1980) and Mc Kay (1981) illustrate, the truth conditions of utterances are often dependent on a and t, in particular (but not necessarily) if egocentric particulars are used. On this basis it seems a bit odd not to include a and t in the name of the utterance. For example Mc Kay (1981) uses '(2)' and '(3)' to refer to two utterances which have the same written representation. Mc Kay then comes to conclusions such as "(2) is true and (3) is false." This looks very odd if the written representations are also named '(2)' and '(3)'.

Notes to Section 2

1. Nowadays most measurement techniques are very complicated and, practically speaking, direct measurement hardly exists any more. For an analysis of this, one would seem to need a cluster theory of meaning, but I think this development can be kept separate from the argument of this paper, which is simply to illustrate the use of a particular convention of naming.

2. Kripke talks about S being a certain stick or bar in Paris. Actually the standard meter he is referring to is the distance between two lines on a platinum-iridium bar kept in the same building where the standard kilogram is kept.

3. I also think the following is a fruitful analogy. Firstly, the discussion in the literature about another possible world where water has all the properties it has here, except that it is XYZ, and not H2O (what if it is D2O?). And secondly that the metric unit of mass has all the properties of the British unit of mass, except that one is ]]kg[[ and the other is ]]]lbs[. 

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4. I think this aspect also forces one towards a cluster theory of meaning.

Notes on Section 3

1. In the original (35), (36), (37), and the symbol 'c' are in italics; the rest is in normal type.

Note that in this quotation Tarski already uses four different typographical conventions in relation to naming sentences (or propositions, or sentence forms). It is nowhere explained what the difference is between the entities that are named by such symbols as '(a)', '(2)', 'c', and by quotation marks.

2. It is not even clear whether Tarski accepts (310) to be the name of the sentence he is considering. He writes: "For the quotation-mark name of the sentence c (or for any other of its names) . . ." This suggests that 'c' is not one of the names of the sentence, because if it were an explanation of type (2) could be set up for 'c'. In the literature different conventions are used in presenting Tarski's presentation of the paradox of the liar. Out of many the following are five sources which all use different conventions of naming: Beth (1968, p. 485), Brander (1969), Fraenkel et al (1973, p. 10), Herzberger (1973), Mackie (1973). It goes too far and is not very interesting to analyse all these conventions in detail. What it shows I think, is that nobody bothers very much whether Tarski's convention I can be applied to tokens such as the only sentence uttered by John Doe on December 1st, 1970; whether the paradox relies on factual assumptions or not; or what precisely we choose to call sentences.

3. It is because of this that Marx (1978) argues against Tarski (1956) and Ubbink (1977) that the symbol 'c' in (35) should be taken as a variable, not a constant. Marx incidently, argues that a solution of (315) does not exist, because a sequence of words can only be accepted as a sentence if this sentence itself provides the information necessary to establish its truth. Substitution examples of (315) do not provide this sort of information. Therefore, they are not sentences, and no paradox arises.

Notes to Section 4

1. It seems that Black is not aware that (41) is meaningless. He does not consider (41) as a suitable definition of truth, because it is a sentence in the meta-metalanguage and the term, 'uniquely designates', is no less problematic then the term, 'truth', which is to be defined.

2. I have not found a recent publication in which arguments for and against quantification into quotation marks are given. Tarski gives reasons for not doing this and more recently Wallace (1972) states without further adstruction "no sense is attached to quantification into quotation marks." But there are also publications in which it is stated that a semantic definition of truth should entail (44)--see for example Ayer (1963, p. 162) and Fodor (1972).
3. Conventions for this purpose have also been used by other authors, for example Geach (1950) and Wallace (1972), but they all confine themselves to sentences in pure semantics.

4. Because [(45)] designates expressions of the same form, which may well have different meanings in different contexts, [(45)] is ambiguous and I think it is best stipulated that such sentences are not used.

5. In practice typing or printing errors are possible and inter-punctuation may be confusing. In such cases knowledge about what are well-formed words may be necessary to use the system of naming successfully.

Notes on Section 5

1. See the terminology introduced in Section 1. The term 'individual' is used to characterise those spatio-temporal objects, events, or things which differ in some respect from every other spatio-temporal entity. Hence, ontologically, 'individual' when attributed to a given entity refers to a relational property between that entity and every other existing entity.

2. Compare (210) and (216).

3. If the name is also meant to refer to performances of this Mazurka distinctions have to be made. In the literature the relationship between a work of music and a performance is often described as a type-token relationship. However, I would like to support Sharpe (1979) who argues that a work of music "is not a type whose tokens are performances. Rather performances are tokens of an interpretation of that piece of music; the interpretation is the type."

4. Probably this leads to the conclusion that I propose to call all names of artifacts replica names. But as yet I have not investigated other types of artefacts. I do not propose to consider natural kind names to be replica names. Although one can make definitional statements about natural kinds that seem to be similar to (54), these definitions are less conventional (more empirically determined) than in the case of artifacts. Also I do not consider the various sorts of fictitious name Margalit (1980) discusses to be replica names. As Margalit points out names such as 'the monster of Loch Ness' or 'Adam' can be taken to be either a proper name (if it points to exactly one entity) or as a universal name (if it designates a class of entities which have certain characteristics in common); but this does not make them replica names.

Notes to Section 6

1. "Quotation marks have been hailed as a paradigm of opacity, and rightly so." (Wallace, 1972).

2. Quine "silences" this protest by resorting to a more complex version of the liar paradox: "'does not produce a true statement when
appended to its own quotation' produces a true statement when appended to its own quotation'. It can be easily shown that this version of the paradox has the same syntactic structure as the paradox of the heteroclytic sentences discussed below.

3. I use ordinary English on purpose when referring to (62) in (63) and to (63) in (62). The translation of [(63)] into English is: the previous sentences is in English.

4. When Suszko (1979) (in an analysis of the semantic theory of truth and the antimony of the liar) writes "For every expression, we can form and use its quotation, to do so it suffices to write that expression in quotation marks," I think he is also blurring the distinction between naming and quoting.

5. Whether there are also other reasons for easily confusing the name and the thing itself (distinguishing use and mention), I find difficult to judge. I suggest we first try out a different convention of naming for some time. The following example may support the contention that it can be very difficult to be accurate about use-mention distinctions. Church, whom I think we may accept as a very accurate logician, writes in note 17 of his (1976): "In this sentence, those who wish to be very accurate about use-mention distinctions may enclose . . . in Frege's single quotation marks to show that they are mentioned rather than used. But observe that nothing else in the sentence is to be enclosed in single quotation marks . . . [Added in proof]: The writer has just noticed that the use of quotation marks that is suggested in the first sentence of this footnote is itself inaccurate;"--and we still do not know what is the accurate use of quotation marks in this context (which is a discussion of Russell's antimony).

6. The reference to the two names used in (66) is the same. Therefore the classes they refer to are identical. The sense of the two replica names is different in that '[(I)]' points to a prototype somewhere else, whereas 'the sky is blue', so to say, brings the prototype with it.

7. See note 2 to Section 1 and also section 8 about the first line of Gray's Fleeg. In special circumstances quotation mark names may name expressions of category (E). This is the case when the name is at the same time a quotation. That is to say, what is enclosed in the quotation marks is a copy of an original (the source of which is referred to somewhere in the context where the quotation mark name is used).

8. See, for example, Wallace (1972), Carnap (1953) and Quine (1960), already quoted in other contexts. Wallace uses the convention of drawing a line over the expression. The convention of using capitals can be found in Black (1948). As Quine (1960) points out, another disadvantage of quotation mark names is that they give rise to non-referential positions. For example, if Tully = Cicero, it is not the case that

'Tully was a Roman' = 'Cicero was a Roman'

However, it is disputable whether we can speak at all of "positions"
Notes to Section 7

1. Because "is" denotes a class, we should in fact say, more accurately: the individual which is equiform to an element of 'is'. Czezowski (1979) purposes to use what he calls "quasi-quotation marks" if we want to form a token for a token. For this he uses reverse brackets, for example in any element of ')a(" the reverse brackets have the function of pointing to the token between them. Hence, using this convention we would say: the individual which is equiform with )is(. As Czezowski illustrates such a convention is useful when analysing token-reflexive expressions.

2. See also Section 8. Any physical description of ](71.3)[ and ](71.3.1)[ would be the same. The situation is analogous to the following case from music analysed by Bar-Ellii (1981): In classical, tonal music 'A-sharp' and 'B-flat' refer to the same thing, the same musical sound, but substitutivity evidently fails in phrases such as "A-sharp is a leading tone in a B scale". If the notes were nothing but performative instructions, the distinction would be arbitrary and pointless. In the coordinate system I use, I distinguish between sentences, words, and letters. However, note that what is a word and what is a sentence is defined in an arbitrary, operational way. In a more elaborate coordinate system (such as the one mentioned in Section 1) the distinction is not needed. Ajdukiewicz (1979) uses a notation to indicate the syntactic place in sentences, which looks very similar to the coordinate names I use. However, Ajdukiewicz wants to indicate the syntactic place and I am interested in the location in physical space. Ajdukiewicz does not distinguish between tokens and types and what he calls the syntactic place might well be located in a conceptual universe.

3. Austin (1952/53) gives a lucid discussion of what it means to misname, to misrefer, to misperceive, to mistake, and to misidentify for a model world consisting of numerous individual items (individuals) each of one and only one type. Numerous items may be of the same type, but no item is of more than one type. Austin's analysis is directly applicable to the world describable with the coordinate and replica names I have introduced so far.

4. In (78) the right-hand side means: the second and the third sign in the thirteenth word of (78).

5. Askanas and Kittay (1978/79) use the street system of New York to explain Frege's distinction (and relation) between sense and reference. They discuss various cases in which a coordinate name points to a certain place and no individual is found there. The distinctions they make are also applicable to my system or coordinate names.

Notes to Section 8

1. This point can also be emphasised in another way. Both (85) and (86) are true; in both cases inspection of the (an) acceptable pro-
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totype should settle the truth of these statements. However, a priori, it may well be that neither (87) nor (81) have either a sense or a reference. In (84) it is, perhaps unwillingly, suggested that the meaning of a linguistic expression depends only on its form.

2. The question as to whether the location itself is to be included in the factual meaning leads directly to a discussion of Leibniz's principle of identity. I will not enter into this here.

3. If I understand the principle, it would also exclude the use of quotation mark names, because the use of this convention implies that the reference of the name can only be found by looking at a part of the name.

References


