

## 設計イメージの実現化の手続に関する研究

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### Logical Study of Image Realization in Design Process

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#### ABSTRACT

By the logico-philosophical analysis of a statement which expresses the image of a designer in design process, the logical ontic character of the image is described and it is shown a certain condition which supports the existence of the image. Secondly it is considered the possibility of the elimination of the image-word and it is shown the possibility is by the ontic character of a designer. Finally the realization of the image is suggested to be possible in the direction of detaching the image from the designer.

#### INTRODUCTION

In statements in design process, whether the term which purports to refer to the image succeeds to refer to the image from the logical point of view or not, or in other words, if the so-called object of planning is the entity, whether or not we can find the term which refers to that entity is disputed. In the sentence, for example,

(1) The new gymnasium ought to be so and so,  
what does the term "the new gymnasium" refer to or about what

does the sentence mention? It is explicit that there is no new gymnasium. Therefore this sentence talks about the non-existent thing. But after the final construction there exists a new gymnasium. In this study I call such transition the realization of the image.

### 1. SENSE AND REFERENCE

According to Frege we can understand the above sentence because it expresses the sense. Frege asks what is identical with in equality, for example, " $a=b$ ", and answers it is not the objects designated by signs but the names or signs of objects. Furthermore the difference between " $a=b$ " and " $a=a$ " is the difference between the sense of the expressions, otherwise there is no difference from the point of the reference. Namely, there is "connected with a sign, besides that to which the sign refers, which may be called the reference of the sign, also that which I should like to call the sense of the sign.---" For example," Let  $a$ ,  $b$ ,  $c$  be the lines connecting the vertices of a triangle with the midpoints of the opposite sides. The point of intersection of  $a$  and  $b$  is then the same as the point of  $b$  and  $c$ . So we have different designations for the same point.---"<sup>1)</sup> And "morning star" and "evening star" have the same reference but are different in its sense, he says. And "If words are used in the ordinary way, what one intends to speak of is their reference." "It can also happen, however, that one wishes to talk about the words themselves or their sense." For example, in "He said, 'the flower is red'," the reference of the quotation marks is words between quotation marks, not the reference of those words. And in the reported speech "Taro believes that the fish which eats a man is a *Same* (shark in English)," if we substitute the word *Same* to *Fuka* (also shark in English) which has the same reference, that sentence may become false. Because Taro knows that the fish which eats a man called *Same* in

Japanese but does not know it is also called *Fuka*, it happens. Therefore the reference of the word *same* is not the customary reference but the customary sense (this word from Frege). Namely, the sign *same* in this sentence designates the customary sense, in other words, the indirect reference. Frege distinguishes customary and oblique (or indirect) sense. However Frege does not give the detail about the oblique sense. Linsky questions about what kind of entity the oblique sense is, if the oblique reference as the customary sense is something like "meaning" of the sign.<sup>2)</sup>

Frege asserts that the distinction holds also for the whole declarative sentence and that the customary reference of the sentence is the truth value, namely, "the True" or "the False" and that its customary sense is the thought which it expresses. By the "thought" Frege means what other philosophers call a "proposition", Linsky says. Quine gives the same comment.<sup>3)</sup>

## 2. THE PRINCIPLE OF SUBSTITUTIVITY OF IDENTITY AND REFERRING

A thing designated by term, namely an object is considered to be an existence (entity), abstract or concrete. Therefore a speaker who uses the term which has a reference is considered to insist the existence of such things. So, if the references of two terms are identical, the truth value of the sentence which contains one of them does not change according to the substitution of one for another. Conversely, the change of truth-value shows the term does not succeed in referring to in that position of the sentence (the principle of substitutivity of identity<sup>2)</sup>). Frege's distinction of reference from sense is explicated according to this law. The presupposition of indirect reference against the customary reference is explicated as follow. The substitution of the term is possible to cause the variance of the truth value but he wanted to give

something as reference. If, in the above sentence "I intend to a new gymnasium", I ask what is the reference of the term "a new gymnasium", I can answer after Frege that it is the customary sense of the term "a new gymnasium", however there is no concret gymnasium. So it would become to be a customary sense that a designer intends to do in his work.

Frege applies the law of substitution of identity to the term which refers to the indirect reference, namely customary sense, but he does not give detailed explanation about the identity condition of the customary sense. Linsky says, "Lack of clear identity conditions is an infirmity common to the so-called "intensional" objects (propositions, attributes, senses)." Quine also indicates about the difference between the attribute and the class that if the members of classes are identical classes are the same, but attributes are possible to be different. Therefore it is said to be difficult to consider that the sense is the individual to be named, namely, the entity.

If the sense is not the entity, I cannot do that in the above sentence, the indirect reference of "a new gymnasium" is to be the customary sense. Because the reference must be the individual. In this point of view, it is said that the above sentence does not succeed in referring to something.

### 3. SENTENCE ABOUT THE NON-EXISTENT THING

What does the sentence which does not succeed in referring to or does not name something talk about? For example, in "There is not a Fukuyama-University-like gymnasium," the reference of "a Fukuyama-University-like gymnasium" does not exist. However in the process of designning it is possible to think about the situation that the statement like this is true. So we can not dispense with this type of sentence.

By Frege the occurrence of the term of not having reference is owe to the incompleteness of the language, so in the logi-

cally complete language such type of the sentence is not admissible. On the other hand, Russell criticizes the Frege's dichotomy of sense and reference, and he calls the term which does not have the reference but is meaningful, "description".<sup>4)</sup> Even if it seems to be a name, "description" is not a name of something, but it is a composite sign whose meaning comes from meaning of constituents of the description, he says. And he shows the translation of a sentence which contains such a referential (or denoting) phrase as a description into the sentence which does not contain such a referential phrase and opens the way to talking about the truth value of such a sentence about the non-existent thing. For example, "The round square does not exist," is substituted for "It is false that there is an object  $x$  which is both round and square." In this sentence there is no name which is questioned about its reference. Therefore if we understand the phrase "Fukuyama-University-like gymnasium" in the above sentence not as the name but as Russell's description, the above sentence is translated into "It is false that there is an object which is Fukuyama-University-like gymnasium." The underlined phrase is not a name (or a singular term) but a constituent of the complex general term: is Fukuyama-University-like-gymnasium. A general term does not purport to designate something but is true of something. Therefore there is a procedure to convert the expression which contains the singular term to refer to an object into the expression which contains the general term not to purport to refer to an object, dispensing with the singular term. And by this conversion referring is moved to whether there is an object which satisfies the quantifier ( $Ex$ ). Therefore the realization of the image in design process is according to whether we can express the sentence in the ordinary language by the logical quantification theory using general terms and quantifiers.

#### 4. EXISTENTIAL GENERALIZATION AND REFERENTIAL OPACITY

A speaker who uses the existential quantifier presupposes the existence of the object which is the value of the quantifier. Strictly speaking, by Quine, he *says* there is such and such thing.<sup>3)</sup> Therefore, in order to be able for a colloquial sentence to be expressed by formalized way which uses the existential quantifier, the object which is the value of the quantifier must be individualized. This situation is vivid in the so-called existential generalization. If a sentence  $p$  contains a singular term  $a$  which is not a pronoun but a name or a proper name and does not contain  $x$  and  $p(x/a)$  is the formula obtained from  $p$  by replacing every occurrence of  $a$  by one of  $x$ , the transition from  $p$  to " $(\exists x) p(x/a)$ " is called existential generalization with respect to  $a$  in  $p$ . By this procedure,  $p$  is formalized by the quantification theory. However, in order to do this, the term  $a$  must be satisfied in not only sensing but also referring. Namely the term  $a$  must be successful in naming something. If it were not for referring, from the sentence naming about nothing, namely, from a sentence which is not, strictly speaking, about anything, it is impossible to obtain a sentence which is in terms of "something". For example if  $p$  is,

(2) Tom thinks that Tully wrote *Ars Magna*

and Tully =  $a$  we can get by existential generalization,

(3)  $(\exists x)$  (Tom thinks that  $x$  wrote *Ars Magna*)

But the truth value of this sentence differs according to whether the value of the variable  $x$  is "Tully" or "Cicero." Because "Tully" and "Cicero" refer to the same person in history, so it may not matter whether the value of  $x$  is "Tully" or "Cicero" but the position of  $x$  in (3) requires for it to have to be "Tully". In this case the term in such position is regarded as to refer to nothing and it is prohibited to existentially generalize (2) into (3). The position of "Tully" in (2) is called not purely referential, and (2) is called to have a referentially opaque construc-

tion. The opacity comes from the use of the verb "think," but not the use of that-clause. Besides this, there are other kind of verbs which cause the opacity.

There is another case that the sign does not refer to. Namely, in the case that it is said like description that there is only one object but that there are more than one object, the sign in question is said to fail to refer to.

Hintikka studies the quantification about the epistemic statement which contains the verb such as "know", "believe" and concludes that if the next premise like (4) is satisfied, it is possible to quantify a referentially opaque sentence.<sup>7)</sup> Suppose " $K_a$ " is the formal counterpart of the words " $a$  knows that", then

$$(4) \quad (Ex) (Ka (b=x))$$

This is read like "there is something  $x$  and  $a$  knows that  $b$  is identical with  $x$ ". The prohibition of the quantification to referentially opaque sentence comes from the indeterminacy of referring, namely in the epistemic context, we must consider the world of which is not only of a speaker  $a$  but also all of the worlds compatible with  $a$ 's world and in these worlds, term  $b$  may not refer to the same object, Hintikka says. The term  $b$  may refer to different objects. So in order to exclude this indeterminacy, the term  $b$  must refer to the same object in both the  $a$ 's world and all of worlds compatible with  $a$ 's. This condition is expressed like " $a$  knows who  $b$  is" and is formalized in (4). So, (3) holds with

$$(5) \quad (Ex) (K_{Tom} (Tully=x))$$

Namely, if Tom knows who Tully is, the truth value of (3) is determined. In other words, it becomes to be successful for referring to a certain object and so it is said to have come the object into existence. This commitment of the existence is by the term "Tully" in (5). This shows "that an existential conclusion can be drawn only from premises at least one of which is also existential (explicitly or implicitly)."<sup>7)</sup> Referential

action has something to do with the existence of things. And this commitment is by the epistemic ability of a subject.

In order for (3) to hold, (5) must hold. This shows for Tom to have to know who Tully is. But it is not at all necessary for Tom to know Tully is the same with Cicero. It is enough for Tom to know who Tully is in history without touching Cicero-attribute. Following to the above said, we consider next sentence.

(6) I intend to build a white house.

As the verb "intend" constitutes a referentially opaque sentence, so it is said "a white house" is not refer to anything. But if I know what the white house is, (6) is possibly formalized by quantification theory and I can say to be able to refer to the white house. Therefore, it may be necessary to do practice, refer the image, draw lines, present the model and so, in order to explicitly show what the white house is. But before concluding like this, I want to go another way or an inverse way.

#### 5. THE DIRECTLY EVIDENT AND THE SENSE-ACTION

I, here, want to discuss about the inverse-transition, namely the elimination of reference. If we can find such elimination, it is unnecessary to think about the realization of the image. Because I can do well with dispensing with a referential sign.

By Chisholm a sentence  $h$  is directly evident for  $a$ , if two next conditions are satisfied,<sup>8)</sup>

(7)  $h$  is reasonable for  $a$ .

(8) There is no sentence  $i$  such that it is more reasonable for  $a$  to believe  $i$  than it is for him to believe  $h$ .

And furthermore, Chisholm says,

(9) A sentence is reasonable or "beyond reasonable doubt," if believing it is more reasonable than withholding it.

Here, "evident" is defined by "more reasonable." So, we have to define "more reasonable" but if we do this by other words,



we have to define these words. And if we go on, we come to infinite ascent or face to the event (or fact) on the way. So Chisholm asks "What justification do you have for counting this thing as something that is evident?" and answers like this,

- (10) What justifies me in counting it as evident that  $a$  is  $F$  is simply the fact that  $a$  is  $F$ .

Namely, if there were given the answer "justifying merely by reiterating it," the sentences "may be said to pertain to what is directly evident." In other words, the matter which the sentence justifying by reiteration itself says is some state of affairs that "presents itself" to the speaker." This kind of sentences is divided to three types by Chisholm. Namely,

i) Sentence about thoughts

- (11) My justification for counting it as evident is that I am thinking about a gymnasium.

And others are those described by "thinking that one remembers that---," and "thinking that one perceives."

ii) Sentences refer to our actions, at least to the extent of saying what we are trying or undertaking to do at any particular time.

- (12) My justification for counting it as evident that I believe that Fukuyama is in Okayama-prefecture, is simply the fact that I do believe that it is in Okayama-prefecture.

And in the case described by "seeming to remember that---," "taking," "desiring," "hoping," "wondering," "loving," "hating," "fearing," and "wishing."

Frege analyzes these kind of sentences as described below.

- (13) Bebel believes that the return of Alsace-Lorraine would appease France's desire for revenge.

In the sentence two thoughts are expressed, namely,

- (14) Bebel believes that the return of Alsace-Lorraine

would appease France's desire for revenge.

- (15) The return of Alsace-Lorraine would not appease France's desire for revenge.

He says in the expression of the first thought, the words of the subordinate clause have their indirect reference, while the same words have their customary reference in the expression of the second thought. And he says this shows that the subordinate clause in our original complex sentence is to be taken twice over, with different reference, standing once for a thought, once for a truth value. (13), (14) are what is called direct evident, but (15) is not. The use of the word "fancy" in (13) supplies the room for being possible to say that (14) is immanent in (13). The content of (15) negates the content of Bebel's belief. As for Bebel her belief is direct evident, but it does not show the belief is also true. It may turn out to be false. So we must admit to say that some things that are evident may be false.

iii) Sentences referring to ways in which we sense or are appeared to.

- (16) That things appears white to me in this light, but I know that it is really grey.

Also,

- (17) It appears white to me in this light and I know that, as a matter of fact, it is white.

In the examples, the verb "appear" is used to describe a certain state of affairs which is not itself a belief, but which is perceived in one's consciousness. So, "appear" is said to be used in the descriptive, "phenomenological" way. Strictly speaking, "Something looks white to me" does not express what is directly evident in our sense of this term, Chisholm says. This sentence implies the existence of a certain thing that is appearing white to me, but "there is a certain physical thing that is appearing white to me" does not express what is directly

evident, because we cannot justify by reiterating it. So, to arrive at what is directly evident in this case, we must remove the reference to the appearing thing in "That thing appears white to me," Chisholm says. And he proposes next procedures.

Instead of saying "Something appears white to me," we may say, more awkwardly, "I am appeared white to by something." We may eliminate the substantival "something" by merely dropping the final clause, saying, "I am appeared white to." (But the substantival "I" remains.)

In this final sentence "I am appeared white to" there is no reference to a thing that is said to appear white, namely a white thing is not referred to. The assertion about the existence of a white thing is not implied, namely the action of referring is not implied. Nevertheless, the sentence is meaningful, and so the action of sensing is mediated. It may be said that from the point of our view, the directly evident in iii) permits the sensing action and prohibits the referring action. Similarly, as far as the cases in i) and ii), except the reference of "I", or the substantival "I", there is no referring action but only sensing action.

In this procedure, it may be said the elimination of the reference is by merging in the reference of "I" or the existence of "I". The image in design process is not considered without a designer "I", but the realization of the image or the externalization of the image is, as it were, the process of detaching of it from a designer. So we must consider the possibility to eliminate the "I". I suggest the concept of "all of the worlds which are compatible with the world of "I" has the possibility of this elimination.

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