THE'DIRECTION'OF NON-SYMMETRICAL RELATIONS

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The two sentences 'The old man loves the young woman' and 'The young woman loves the old man' differ, formally, in nothing save the position of the singular terms they contain. But they do not differ only formally. They differ in meaning or semantic content: even though the references of the singular terms be the same for some utterance of both, their truth —conditions are different. So the position —ing of the singular terms serves a semantic purpose, fulfils a semantic function. Of course, positioning is not the only formal device which can be used to perform this function. In some languages inflection does the job: one singular term is inflected in a way in which the other is not. But in any language which contains two-place predicates signifying non-symmetrical relations[1] the performance of this function will be assigned to some formal device or other; some formal distinction between singular terms will be turned to account to carry this semantic load.

Let us give a name to the semantic function in question. We will call it the function of term-ordering. The same formal distinction which, in the case of non-symmetrical relations, serves to perform the function of term-ordering may, of course, be found also in sentences containing two-place predicates signifying symmetrical relations. But in their case the formal distinction will not perform the function of term-ordering; for in their case there is no such function to perform.

[1] By 'non-symmetrical relation' I intend any relation that is not symmetrical: i.e. 'non-symmetrical' includes (as it should) 'asymmetrical'.

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It is easy to name and illustrate this function and clear that it is necessary. What is not quite so clear, I think, is what this function is. Perhaps it is something we think we understand because it is so familiar. We talk readily about the *direction* (or *sense*)[2] of a non-symmetrical relation. We can give formal definitions of the notion of an *ordered pair*. It does not follow that we have a clear grasp of the semantic (or semantico-syntactic) feature or features that are in question, and it seems to me possible that we do not clearly distinguish a familiar mode of representation of those features from what is represented. In what follows I try to make those features clear. But it may be that there is no such problem as I seem to feel; and it may be that, if there is, what I have to say is too close to the problem to count as a solution.

Logicians customarily divide non-symmetrical two-place predicates into those which are asymmetrical and those which are not. This is a sharp division. I want to begin by proposing a tentative semantic division which, for actual languages, is not a sharp one, though we may suppose it to be soo for some simple imagined language. It is a division between what I shall call *essentially directed relations* and others. There are two types of clear cases of essentially directed relations. One type of clear case is any in which the minimal requirement for the relation to hold between two actual objects is that one of the two should perform some action or hold some attitude or be in some state of mind which is 'directed at' the other or has the other as its 'intentional' object. I call this the minimal requirement because it is not necessarily excluded that the relation is reciprocal. Examples would be the relations signified by English 'seek', 'love', 'avoid', 'admire', 'detest'. Another clear type of case is any in which one term of the relation is conceived of as affecting the other, as responsible for

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[2] In what follows, to avoid confusion, I shall not use 'sense' in this special, but only in its more general, sense.

a change in state or deviation or interruption of course, of the other: e.g. 'hit', 'obstruct', 'liberate', 'wound'. Again, mutuality is not necessarily excluded. The similarity between the two types of case which I mark by calling them 'essentially directed' relations could be marked also by saying that in each type of case, when any of these relations is thought of as holding between actualities, something is conceived of as causal or intentional *object*, and something as causal or intentional *origin*, of the relation. And this is so even when, as is sometimes the case, only one thing is involved, as both object and origin, and even when, of two things involved, each has both positions vis-à-vis the other.

The two types of case of essentially directed relation are not mutually exclusive. They may overlap, as in some cases of intentional action, e.g. 'murder'. Equally clearly, they may sometimes be quite distinct. An intentional object of an attitude or action may be quite unaffected thereby; and one thing may be affected in a certain way by another without being the intentional object of any attitude of the other which may, indeed, be incapable of intentional attitudes. Again, the two types of case may exhibit a certain complementarity. If x impresses y, y is the affected object; if y admires x, x is the intentional object. But even if 'x impresses y' and 'y admires x' always and necessarily go together, they are not each other's true semantic converses. One represents things under the aspect of an *effect* which x has on y; the other under the aspect of an *attitude* which y has towards x. For true semantic converses we turn, rather, in English, to the passive forms of each: for 'x impresses y' to 'y is impressed by x', for 'y admires x' to 'x is admired by y'. These passive transformations leave the roles of the terms unchanged. If we say that John impresses Mary, we represent John as origin and Mary as objet of the relation; and so we do if we say that Mary is impressed by John.

Suppose we assumed that in some simple language all two-place predicates which signified non-symmetrical relati-

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ons signified essentially directed relations. Then the nature of the function we are trying to clarify could, it might seem, be readily explained for such a language. If, in such a language, we frame a sentence presenting two things as related by a non-symmetrical relation, we must indicate which of the two is being presented as the term of origin and which as the object of that relation. To do this will be to perform the function of term-ordering. If we were required to design a grammar for some such simple language, to choose a formal device to which to assign 'the function of term-ordering, we might suggest exploiting phrase-order: we might, for example, suggest adopting the term-ordering rule that the phrase specifying the term of origin is to precede the phrase specifying the object-term of the relation.

This suggestion, however, is open to an obvious objection. The objection is that unless we are to prejudice the existence of a form corresponding to the English passive, we must restrict the application of the rule as we have it to a form corresponding to the English active form, and be prepared to add the converse rule for the converse form; but this would imply an independent grasp of the semantic distinction between the two forms, and of such a distinction we have before us no independent account.

A reply to this objection might be attempted on the following lines. The rule proposed, it might be said, is a rule of 'basic' grammar, and by no means excludes the possibility of transformations which would reverse the phrase-order without change of semantic content. Indeed, by looking at the matter in this way, we can better understand the name and nature of the 'passive' form as we have it, seeing it as something essentially secondary and derivative. Its name registers the fact that the phrase designating the object-term of the essentially directed relation occupies the place held in the primary form by the term of origin.

Whatever the local merits of this reply, it suffers finally from the deep deficiency which infects the whole appro-

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ach: viz. lack of generality. It must surely be possible to give a single comprehensive account of the term-ordering function, an account which applies to all sentences containing two —place predicates signifying non-symmetrical relations. It would be highly counter-intuitive to suppose otherwise. Our initial restriction of such predicates to words for essentially directed relations was quite unrealistic; yet the distinction between terms of causal or intentional origin and causal or intentional object-terms has application only to essentially directed relations. Hence any account of the term-ordering function which incorporates an essential reference to that distinction must be finally unacceptable.

So we turn our attention to dyadic non-symmetrical relations which either clearly do not fall, or do not clearly fall, into the category of the essentially directed. Many such relations order their terms in respect of what might, in a narrower or a broader sense, be called 'relative position'. Relative position may be, quite straightforwardly, relative spatial position: 'to the left of', 'to the right of', 'above', 'below'. It may be position on any degree-scale, e.g. of youth or beauty; and all comparatives fall under this general characterisation: 'older/younger than', 'more/less beautiful than', 'richer/poorer than', 'hotter/colder than' and so on. Again, it may be a matter of relative position in some specific legal or social nexus: as 'ward of', 'guardian of', 'debtor of', 'creditor of'. One might be inclined to speak of relations of this again not very sharply defined class as 'ordering relations', were the phrase not already appropriated by logicians for another classification.

The contrast between such relations as these and essentially directed relations emerges clearly if we consider relations of each class together with their converses. If we replace 'John admires Mary' by 'Mary is admired by John', 'John hit Mary' by 'Mary was hit by John', John is still represented as the origin, Mary as the object, of the attitude

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or action. But if we replace 'John is to the left of Mary' with 'Mary is to the right of John' or 'John is older than Mary' with 'Mary is younger than John', there is no comparable general point to be made. There is a kind of parity of converses in the second class of cases; there is no one converse-invariant general way of regarding any two-termed fact which such a pair of sentences might be apt for stating. The same contrast is observable in the case of other twoplace predicates which do not signify essentially directed relations but which we might hesitate to describe as ordering their terms in respect of relative positions: e.g. 'husband of' and 'wife of' in a society where legal equality of the sexes prevails.

So, in the case of all non-symmetrical relations which are not essentially directed relations, we lose the converse-invariant distinction of object and origin. But from the point of view of achieving a general characterisation of the term-ordering function, the loss is no loss at all or is the loss only of an encumbrance. For it helps us to realise that it is essential to the sense of any non-symmetrical dyadic relation expression whatever that it selects or picks out or applies to *one* of the terms it relates in a way in which it does not select or pick out or apply to the other; and the general character of the difference in sense between any such expression and its converse is reflected in the fact that if both were to be used in turn to report correctly the same two-itemed fact, then each must select in this special way the item the other does *not select*. To put the point metaphorically: we can pivot our report of such a two-itemed fact on either of its terms; if we pivot it on one term, then we use one of a pair of converse relation-expressions for our report, if we pivot it on the other term, then we use the other member of the pair of expressions. Or, to change the image: we can look at the same two-itemed fact from the standpoint of either of its terms; if we look at it from the standpoint of one, we get one non-symmetrical relation, if we look at it

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from the stadpoint of the other, we get the converse relation.

But we can dispense with metaphor. We cam make the point emerge in its full literal force by reflecting on alternative notations for performing the function of term-ordering. In English we write 'John is older than Mary' or 'Mary is younger than John'. Instead we might write:

Of the (unordered) pair, John and Mary, related by the age-difference relation, Mary is (the) younger or

Of the (unordered) pair, John and Mary, related by the age-difference relation, John is (the) older.

The preamble is identical in both cases and mentions both related items, presenting them as related by the symmetrical relation of age-difference; but selection of one of the pair of converses carries with it the selection, for a *second* mention, of *one only* of the pair of related items.

Let us call the selected term the *primary* term of a non-symmetrical relation and the other term the *secondary* term. We might represent the general form of propositions of this kind as follows:

$$\text{Of the pair, } a \text{ and } b, \text{ related by the R-}\breve{\text{R}}\text{ relation} \begin{cases} (1)\,\text{R....} \\ (2)\ \breve{\text{R}}.... \end{cases}$$

To complete such a proposition we select just *one* of the numbered expressions following the bracket and fill its empty place with just *one* of the two terms. This is the primary term.

There are many variant ways of making essentially the same point. To give one more example: we can imagine a notation in which

$$(1) \quad \left.\begin{array}{c} a \\ b \end{array}\right\} \text{ to the immediate left of} \qquad (3) \quad \left.\begin{array}{c} a \\ b \end{array}\right\} \text{ younger}$$

$$(2) \quad \left.\begin{array}{c} a \\ b \end{array}\right\} \text{ to the immediate right of} \qquad (4) \quad \left.\begin{array}{c} a \\ b \end{array}\right\} \text{ older}$$

are all *complete* propositions of which (1) is equivalent to (2) and (3) to (4) —the relative positions of the names having no significance at all. (Compare: 'One of the two, *a* and *b*, is to the immediate left of the other.') But, though complete propositions, they are more general, less specific, than propositions we can obtain from them by ringing *one* of the terms in each case. In this notation, term-ringing is our term-selecting device. Mutatis mutandis, it works like gap-filling in the other notation: so that.

$$\left.\begin{array}{c} \underline{a} \\ b \end{array}\right\} \text{younger} \qquad \text{is equivalent to} \left.\begin{array}{c} a \\ \underline{b} \end{array}\right\} \text{older}$$

$$\text{and incompatible with} \left.\begin{array}{c} a \\ \underline{b} \end{array}\right\} \text{younger}$$

Now we can give a *general* characterisation of the term-ordering function. It is the function of indicating which is the primary and which is the secondary term of a non-symmetrical relation. The characterisation is quite general and applies as well to essentially directed as to non-essentially-directed relations. What I spoke of as the 'term of origin' of an essentially directed relation will figure as primary term in a sentence containing the 'active' form of a verb for that relation and as secondary term in an equivalent sentence containing the 'passive' form; and vice versa for the 'object-term'. The distinction we began with, between essentially directed relations and others, was of no help in solving our general problem, though, as just now suggested, it may have relevance to other questions about the grammar of our relation-expressions and their converses.

My attempt has been to explain what is represented, in our ordinary logical notation, by the difference between $F(a,b)$ and $F(b,a)$ where what replaces the predicate-letter is an expression signifying a non-symmetrical relation. I have suggested that it is perhaps particular difficult for us

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to separate in thought what has to be indicated from the standard way of indicating it. We can indeed say that what is represented as different in the two cases is the 'direction' of the relation. But the problem is precisely to explain what we *mean*, by saying this. The phrase 'direction of a relation' by itself explains nothing: it either simply repeats the image of a mode of representation or diverts us with other images appropriate only to a limited range of cases. Whether I have succeeded in solving the problem, or have simply re-stated it in other terms, is a question I must leave to the reader.

RESUMEN

En este artículo intento explicar lo que, en nuestra notación lógica ordinaria, representa la diferencia entre $F(a,b)$ y $F(b,a)$, donde lo que reemplaza a las letras predicativas es una expresión que significa una relación no-simétrica. Se acostumbra decir que lo que se representa como diferente en estos dos casos es la 'dirección' de la relación. Pero no es claro lo que esto quiere decir. Hay ciertamente una clase no muy bien definida de expresiones relacionales 'direccionales en esencia' (p.e. 'ama' y 'pega') de las que se podría decir que, cuando ligan dos términos, uno de ambos se presenta siempre como designando al *objeto* causal o intencional de la relación, y el otro como designando su *origen* causal o intencional. Pero este rasgo no nos da base alguna para dar una explicación general del papel semántico de la diferenciación formal de los términos por vía de su posición. Una de las razones por las que esto es así es que las posiciones del 'término-objeto' y del 'término de origen' en una proposición dada se invierten en la proposición equivalente en la que a una expresión relacional de este tipo la reemplaza su inverso pasivo. Otra razón es que hay muchas expresiones que significan relaciones no-simétricas a las que no se aplica la noción de dirección causal o intencional (p.e. 'es más joven que', 'está a la izquierda de').

Sin embargo, hay un rasgo que les es común a todas las expresiones relacionales no-simétricas que nos da una base para explicar la función semántica de distinguir formalmente a los términos (sea por la posición inflexión o cualquier otro medio que se use). Este rasgo puede caracterizarse de manera aproximada diciendo que, en cualquier proposición en la que una relación no-simétrica ligue a dos términos, sólo uno de los dos es el término 'seleccionado'; en tanto que en la proposición equivalente, en la que la expresión relacional se reemplaza por su inversa, el otro de los dos términos es el término 'seleccionado'. El rasgo lo ilustran diversas variantes del modo usual de expresar tal proposición. Por ejemplo, las dos proposiciones equivalentes (1) 'Juan es mayor que María' y (2) 'María es menor que Juan' podrían parafrasearse respectivamente: (1') 'De la pareja Juan y María, relacionados por la relación de diferencia de edad, *Juan* es mayor' y (2') 'De la pareja Juan y María, relacionados por la relación de diferencia de edad, *María* es menor'. En cada una de estas paráfrasis el término *repetido* es y aparece como el término 'seleccionado'. Si llamamos al término

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'seleccionado' el término primario y al otro el término secundario, podemos decir que la función semántica de la diferenciación formal de los términos es la de indicar cuál es el término primario y cuál el secundario.