FREGE'S THEORY OF RELATIONS AND THE SEARCH FOR A WORKABLE ALTERNATIVE

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0. *Introductory remarks*

The problems I'm going to tackle in this paper can be viewed as originating with two Aristotelian themes: the first one results from trying to cope with ontological difficulties by splitting reality into act and potency (form and matter) and then regarding those entoids as inseparable; the second one stems from the riddle surrounding relations: as Aristotle sees it, a relation is an accident of one entity, its subject, only it's had by the entity towards (*pros*, with respect to) another entity; what lacks explanation within Aristotelian metaphysics is what that toward-anotherness (*adalietas*) consists in. Both issues get intertwined and connected in the present approach, since most contemporary accounts of relations have resorted to some kind of structure, an Aristotelian form of sorts, added to a matter consisting of the related entities —even if, unlike the form, the matter is now held to be separable.

Let me briefly put what makes up the heart of the difficulty attendant upon hylemorphism: matter itself is nothing (nothing actual, hence nothing in fact) while it is not actualized by form; but then, once actualized and "informed", matter is not matter any longer. As to form, all its ontological status and role lies in actualizing matter somehow or other; it actualizes what is otherwise (and "prior" to the reception thereof) unactualized, but only then it becomes actualized itself —thus contradicting the principle that what produces an effect must somehow have the effect's quality itself. Odd as it may sound, just that

kind of difficulty plagues Frege's, Russell's, Bergmann's and others' accounts of relations while, on the other hand, although such approaches escape Aristotle's own trouble with relations, they are fraught with a new puzzle of their own: either they cannot recognize as valid the clipping-off rule which from 'Richard II kills Gloucester' allows us to conclude 'Richard II kills', or else they paraphrase away the conclusion as 'Richard II kills someone or other', which rules out taking the premiss as an expansion of the conclusion, contrary to what any straightforward syntactic theory would assume.

This paper examines Frege's unsuccessfull attempt to analyze relations in a clear, rigorous way. After pointing out the roots of Frege's difficulties about relations —and, more generally, about functions—, the paper tries to reconstruct Frege's ontology and theory of language so as to escape such difficulties, the proposal thus made availing itself of Frege's notion of function-correlate. However, such a reconstruction of Frege's theory is shown to fail (owing to problems germane to the two aforementioned Aristotelian themes). The paper's last section is given over to the search for a workable alternative along the lines of the author's *ontophantic* metaphysics.

1. *Frege's grappling with relations*

Frege's main points about relations and his troubles with them are best put forward in "Über Begriff und Gegenstand" ((F:1), pp. 66-80) and "Ausführungen über Sinn und Bedeutung" ((F:2), pp. 25-34); (see (F:3), pp. 118-25 and 87-117 resp.). Frege's central theme is the differentiation between objects and concepts in general. Since my own concern here is with relations, I need to emphasize the fact that, according to Frege, relations are not objects, but functions, since they are (twice or thrice, or so on) unsaturated entities, incapable of standing on their own, with all their ontological status reduced to taking two, or three, or...n... arguments given in some order

and mapping them into one of the two truth-values. Now, thus conceived, relations face two main difficulties. The first one they share with concepts —and indeed with functions— in general, namely the unnameability issue. The second one is peculiar to polyadic functions, including relations, *i.e.* such polyadic functions as always take truth-values as (functional) values.

Let's start with the former issue. A function, we have said, is not an entity standing on its own. It lacks selfbeing. That way of speaking is not Frege's but I think it's illuminating, as it reminds us of the Aristotelian theme. A function lacks any independent status: this is why it cannot be named (of course it can receive a *Funktionsname,* but not an *Eigenname*). Such entities can be named alone as are something on their own, *i.e.* as need no completion. Current interpreters are prone to reduce such a Fregean theme to the heterogeneity of function and object signs, *i.e.* their failing to be exchangeable without loss of syntactic wellformedness. This amounts to putting the question in the "formal" way of speaking. But of course to that merely syntactic issue there corresponds a semantic, indeed an ontological issue: the difference between objects and functions is a categorial one, and, what is more, that categorial boundary divides entities endowed with ontic autonomy from parasitic entoids which, far from enjoying independence or separableness, are nothing else but (objective) laws of correlation (*Zuordnungsgesetze*, (F:1), p. 86) mapping objects into objects. Frege thus faces a problem very similar to Aristotle's: functions on their own are nothing, in the very precise sense that, not being existents with the same meaning of 'exist' applicable to objects, since they lack selfbeing, they cannot be objects-of-thinking, *i.e.* no mental act can be directed to a function and therefore they can only be meant by incomplete signs, that is to say by such "signs" as result from cutting off or excising some part or other of a wellformed string of signs. However, functions somehow Aristotle-wise "actualize" some

objects (their values) in this sense that those objects are (in some cases at least, *e.g.* in the case of concepts' values, *i.e.* truth-values) just the values into which functions map their arguments. (Of course: Truth and Falseness can be named, but we are acquainted with them only insofar as they are the functional values of concepts, while concepts themselves lack any ontological independence.) What all that ontological tangle boils down to is revealed by the impossibility of concepts, in general, and hence relations too, being named. This is why the relation of taunting is not a relation: that difficulty is not easily dismissed by merely altering Frege's claim that whatever is meant by a definite description is an object. Should you waive that claim, you'd thereby undermine the very core of Frege's categorial unlevelling; for, if functions can be meant by definite descriptions, then they can be named (definite descriptions being *Eigennamen*), and even stated —as any object can be stated, even if all objects different from Truth are such that any sentence stating them is false, a statement being nothing else but a string whose functional sign is the dash, which means the function of being true, and whose argument sign is the name of an object whatever; that function maps Truth into Truth and anything else into Falseness.

Therefore, functions, while still being functions, *i.e.* undrenched, uncompleted entities, lacking selfbeing, cannot be either named or otherwise meant by any independent or separable sign which either stands on its own or at the very least is able to occupy a subject-position in a sentence. And when they have "become" objects (as Frege puts it: '*Wird eine Funktion durch eine Zahl zu einer Zahl ergänzt, so nennen wir diese den Wert der Funktion für jene als Argument'), i.e.* when they have discharged their ontological task of giving rise to an object by mapping into it a given argument, then they are no longer functions, or, more accurately, what is then there is no longer a function but an object (its value for the given argument), instead. In a sense the

difficulty is more acute for Frege than Aristotle, since the latter views the result of form's fulfilling its actualizing role as a complex entity, a σύνολον, wherein the form itself is present, whereas Frege allows for no such complexity view: the function once completed or "drenched" is no longer a function, which means that the result of the function's being completed by an argument is nowise to be regarded as a complex entity made up by the argument-object together with the function which would cling to the object (or, in the case of many-arguments functions —*e.g.* relations— by those arguments along with the relation gathering or holding them together). Such are the views of logical atomists, like Russell, Wittgenstein (when writing the *Tractatus*), and nowadays Bergmann and Hochberg. Frege has never evinced the slightest leaning to any such view. Perhaps it has not crossed his mind. Perhaps he has surmised the inner difficulties that view is laden with —and which would lead Wittgenstein to his ineffability mysticism in the *Tractatus*. Let me recall the core of those difficulties. If the meaning of the complex phrase is a complex entity containing the meanings of the signs, whether complete or incomplete, which make up the complex phrase, then, if that complex entity can enter other complex entities, there are degrees of complexity, which is liable to bring about contradictions, since all graduality produces contradictory truths unless the excluded middle principle is jettisoned. Hence, should we hew to excluded middle, we'd be compelled to rule out degrees of complexity, and accordingly to regard complex entities as categorially different from simple ones, thus banning any naming of complexes and any substitution of complex signs for names. As a result, we give up any attributing properties or relations to complex entities, whence it follows that our ontological discourse itself is meaningless.

Frege, to be sure, keeps clear of so calamitous a course, but he is bound to pay the price: the complex phrase

(the sentence, for instance) meaning a simple entity, in what sense can we (or our expressions) be said to mean a function through an incomplete sign, which can never occur in isolation and which, when it is supposed to occur in a context, is then an inseparable part of the complex phrase which means the simple entity and accordingly is not, on its own, meaning anything at all?

Can we find an escape by resorting to a higher level predicate calculus? Such way-out is a most un-Aristotelian gambit which pertains to Frege's original account. Speaking in natural language we can say nothing about a relation (in fact whatever we purportedly would say about it would indeed be said about its correlate, an object "standing for it" or corresponding to it); but in a higher level calculus we can attribute to a function a second level predicate which means a second level concept. Nothing in this procedure breaches categorial boundaries or unlevellements. Of course Aristotle would have had nothing of the sort, since it triggers an infinite progression; Frege is deterred by no such scruple. Well and good! Nonetheless, in spite of its formal blamelesness, the procedure is fraught with a serious drawback, which has been pointed out by Routley concerning any higher-leved predicate calculus (see (R:2), pp. 225 ff.) and which makes it methodologically unsatisfactory: such a calculus lacks any natural-language reading. Now, although I don't want to be regarded as a natural-language philosopher, it seems clear to me that no ontological doctrine can be shown to be plausible if it cannot be put in natural-language words —by which I don't rule out technical terms, provided they are somehow or other elucidated by means of prephilosophically more or less unproblematic terms. Furthermore, higher-order logic seems to be a mere, if shrewd, device, which shuns rather than solves the ontological difficulty; for, if the relation is an unsaturated entity which is nothing on its own, that being the ground for its unnamableness, then it is by no means clear how it can be an argument

for another function, since an argument is bound to be an entity endowed with its own ontic status and separableness and therefore able to drench and complete unsaturated, incomplete entities, filling the gap(s) within them. Frege could of course reply: first, that considerations such as those stem from our natural-language way of putting the problem; and, second, that higher-order functions are not functions in the same sense of the word 'function' as first-order ones, whence it follows that they do not have arguments in the same sense either. What Frege then faces, though, is, for one thing, an ineffability fix which worsens his troubles with literal sayability, and, for another, a predicament exactly like Aristotle's: second-order functions take as "arguments" entoids lacking ontic selfbeing and map them into objects, while they themselves also lack any selfbeing or ontic independence. Moreover however (categorially) diverse are second-order concepts from first-order ones, they share a feature with them, in virtue of which they are (equivocally or, if you like, analogically) called 'concepts', *viz.* their functional character, along with their always taking truth-values as (functional) values. Therefore such second-order concepts have at least a gap. If that gap is filled by something which is in turn subject to its own unfilledness —however little such metaphor is to be taken seriously—, it seems to follow that the result is still unsaturated, and so not an object, contrary to Frege's contention. I can see no way out. Therefore, if higher-order quantificational calculus is philosophically sound, Frege's ontological discoursed is flawed, since it has just been shown incompatible with such a calculus.

Let me now come to the second issue: polyadic functions play a double role, since they take a (definite) number of arguments in a particular order, and only then map those arguments into a value. Thus, if R is a first-order dyadic relation, a and b being objects, aRb may be a different (truth) value from bRa. We can say that R orders the arguments a,b in some way and (only) then as-

signs them a value. What is the value in question depends not just on (which are) the arguments, but on their being taken (by R) in a particular order instead of the opposite (with 3 or more places relations, the alternative orders become, in each case, more and more numerous). Therefore, the value is not the value into which R maps the arguments a,b, but the value into which R maps its own taking the arguments a,b in the order, say, $<a,b>$. That being the case, we could be tempted to say that R merely takes as its argument an ordered pair such as $<a,b>$, and nothing else, $<a,b>$ being the value into which another two-place function maps the arguments a,b taken in any order. This is in fact what the Wiener-Kuratowski reduction has enabled set-theorists to do. It fails for several reasons, chief among which is that relations would thus cease relating their arguments and would become properties of ordered pairs. Yet, loving is not a property of the ordered pair $<$Mill, Harriet$>$, but a property had by Mill towards Harriet, as the ordered pair in question does not love. Furthermore, if we acknowledge only such two-place functions as are commutative, we need to make clear what it is for a function to be commutative, and therefore what a noncommutative function might conceivably be, the very idea of an entity doubly unsaturated requiring an indication as to whether such an entity takes both arguments at the same time or one before the other, so to speak, in the latter case the order being determined by which argument is taken first. In this case, moreover, what would indeed happen would be that, on taking one argument first, the function would behave like a one-place function mapping its argument not into an object but into another one-place function (which would in turn take as its own argument the remaining one, mapping it into the final value or output) —a solution which Frege cannot have accepted, for a very good reason: the output or value of applying the first function to an object argument would be an unsaturated entity lacking self-being, and hence incapable of being

named or meant on its own; but again we have that "the value of function f for argument a" would be a definite description, hence an *Eigenname,* naming (meaning) an object; that object would then be the correlate of the one-place function we had unsuccessfully intended to mean, not the function itself. Now there is a reasonable principle according to which for any function f and argument a, 'the value into which function f maps argument a' (*i.e.* 'f(a)') means (whatever may turn out to be) the value into which function f maps argument a. How else could that value be meant? It is not meant by 'f', or by 'f(x)' if 'x' is a variable. Therefore, if the two-place function g(,) is to be seen as taking an argument first and then another, what is the output of the first step, its taking just one argument out of two objects given? Obviously another one-place function which —if at all— can only be meant in the way (admittedly bristling with difficulties, but at first blush —and up to a point— defensible) in which the one-place function f can be said to be meant by 'f( )' when this incomplete symbol "occurs", say, in 'f(b)', which is a complete expression meaning the value of f for argument b. Let us then say that in 'g(b,a)', the incomplete symbol 'g(b,)' means such an output while the incomplete symbol 'g(,)' means the original function. Supposing we don't want to commit ourselves to degrees of incompleteness (with their contradictory consequences), we are bound to admit that the function meant by 'g(b,)' is no less incomplete than the one meant by 'g(,)', as both occurring in 'g(b,a)'. But then our notation misrepresents function g, by failing to show that its value for argument b is the function meant by 'g(b,)' as occurring in 'g(b,a)', since nothing at all in our notation shows that. For one thing, we can with equal right say that in 'g(b,a)' we have 'g(,a)' as meaning the value of function g for argument b, then. For another, and more importantly, nothing in 'g(b,)' as occurring in 'g(b,a)' shows that it is a value of g at all; rather, what we *see* is precisely what Frege

himself adverted to, *viz.* that, as occurring in 'g(b,a)', 'g(,)' has two holes or gaps and so means a two-argumen function. Thus the problem remains as unresolved as ever.

Therefore it cannot be said that a two-argument function takes an argument first, and then another. Let's then assume that it takes both arguments at once and let me remind you that we are considering the hypothesis of a two-argument commutative function mapping its arguments into an ordered pair, which would in turn be the argument of the relation, thus changed into a monadic concept. By saying that the two-place ordering function is commutative, we are implicitly availing ourselves of that notion, and so of the contrasting notion of a non-commutative two-place function. Therefore, we are still presupposing order (whether immaterial or not as regards the yielding of the value) in the way of a two-place function taking its arguments. Should it be alleged that no order needs to be imposed, since taking as arguments a and b is the same as taking b and a, unless a contrary stipulation is laid down, I'd reply that that equation is just a stipulation which appears to be a possible alternative option as against the one of making allowance for non-commutative two-place functions. (For, needless to say, taking a-and-b as arguments is not the same as taking a as an argument and taking b as an argument, which even one-place functions do; taking two-arguments together immediately invites the question: how?) Last (nowise least) the nature of ordered pairs would, to be sure, need elucidation, as well as the nature of ordering functions. For Frege, ordered pairs could be conceived of as some classes, *i.e.* as some extensions of one-argument concepts, (through a Wiener-Kuratowski reduction procedure). Nevertheless, by reducing $<a,b>$ to, say, $\{\{a\}, \{a,b\}\}$ we resort to an ordering procedure since all the "process" by which such an ordered pair is reached amounts to a's being taken first and mapped into the function $\{\{a\}, \{a,...\}\}$ which is then applied the argument b.

A further argument against that way of purportedly grounding or reducing relations is that, in order to get the two-elements class {a,b} we need avail ourselves of the disjunction functor, defining {a,b} as the union of {a} with {b}, and the union of two classes as the set comprising all and only such entities as belong to the one or the other. But what is meant by 'or'? According to Frege, a two-argument relation such that whenever one of the arguments is the True, the value is also the True (and otherwise the value is always the False). Thus, not all relations have been dispensed with. True, the two-argument concept of disjunction is commutative. But then we are bound again to acknowledge that the notion of commutative two-argument concepts is clear to us only insomuch as it is set over against its contrasting notion of noncommutative ones, the question of whether *disjunction*(a,b) = *disjunction*(b,a) being a fairly warranted one. Moreover, and more decisively, in order to set up a set-theory allowing us to speak about two-element classes like {a,b}, we cannot help using a two-argument noncommutative predicate (*i.e.* concept-expression) of membership (or the like). This strikes me as a clinching remark.

But then we are back in the same situation we had tried to avoid.

The foregoing discussion's outcome is that if we accept two-place functions at all, we need to recognize that such functions take their arguments in an order, which on the other hand has been shown to lead to the existence of a function having as its value another function, rather than an object, without the latter function (or at least its being the value of the former for a given argument) being able either to be named or otherwise represented at all (and with whose recognition we might moreover be liable to embark upon the setting up of a gradualistic ontology, with its unavoidably contradictory consequences).

2. *Sketching a skew-Fregean account: the role of relation-correlates*

Couldn't we then resort solely to relation-correlates, thus dispensing with relations proper altogether? No, that is very clear from Frege's countercritique to B. Kerry's remark in "On Concept and Object". Still, that seems to me no reason for refraining from carrying such a reduction as far as possible. We can first introduce for every ordinary (two-place) relation its correlate object. Then we introduce as a primitive the three-place concept of falling-under, which of course is a noncommutative one. Thus the formula "fall-under (a,b,c)" would say that a and b taken in that order fall under the relation c; in order for the formula to be true, the relation c needs to be a relation-correlate such that a and b, so taken, fall under the relation proper whose correlate is c, even though such an explanation is of course literally nonsense. The nonsense can be eliminated though by our doing away with relations proper other than the one of falling-under, and so becoming able to mean what we say when we claim that a and b, so taken, fall under c or that a is related to b by the relation c. Can we carry that reductive process further? We can. Let us replace three-place falling-under by two-place falling-under such that for arguments a,c, the formula "falls-under (a,c)" would mean a function-correlate, d, such that "falls-under (b,d)" would be true iff a bears relation c to b. Notice though that falling-under is thus a noncommutative nonconceptual function; so, our troubles about explaining or grounding the ordering role of pluriargumental functions remain with us. Moreover, it would thus become *false* that Russell loves, the phrase (not sentence) 'Russell loves' or 'Russell falls under loving' meaning a function-correlate under which would fall Alys Smith, Ottoline Morrell, Constance Malleson and so on. (If a is any object different from the True, the statement 'a' is false, since it amounts to stating the value

of the concept meant by "... = the True" for argument a). But there is a way out. Let us replace the concept of being (nothing else but) the True by the concept of being different from the False. Let's then say that a statement is true iff it doesn't mean the False, the dash thus coming to mean the same as "... ≠ the False". Let's say that "falls-under (a,c)" means the False if c is (the correlate of) a two-place relation and a bears c to nothing (in our ordinary way of speaking). (That amounts, in virtue of extensionality, to identifing the False with the concept under which nothing falls, *i.e.* the void entity.) So, that use of falling-under allows us to run together one-place and two-place concept(-correlate)s, keeping as the only irreducibly two-place concept proper the one of falling-under. The fringe of what is literally unsayable has thus dwindled. But it remains there, all the same. Furthermore, the remaining two-place concept's twofold role (its both taking arguments and ordering them in some particular order or other) is still to be accounted for. (Don't look for a way out of the latter difficulty by keeping one-place functions proper such as the one of *love* and taking the two-place function of falling-under as a two-place heterogeneous function. That will not do at all. For one thing, as we've seen above the value of a function can never be a function, and so nothing could then —in the newest-frangled sense— fall under the value of the function of falling-under for the arguments Russell, love. For another —and this is still more damaging— the function meant by 'falls-under (,)' would be not just heterogeneous, but such that its values would be now functions proper, now objects.)

But we've gained a lot. All categorial boundaries, with the bewildering awkwardness ensuant thereupon and tying our tongues, have been gotten rid of except for falling-under, of which of course we can say nothing yet —only about its correlate can we speak. No higher-order logic is needed any longer. That the property of being an official language of Mauritius falls under two-

ness is true: both that property and two-ness are now held to be objects —in fact we can dispense with differentiating between twoness and the number two, and for that matter with extensions in general; we can also identify a concept-correlate with an extension and falling-under with membership. Isn't all that as it should?

Finally, here is the last step in my reshaping Frege's ontology and account of language. Let's part with our remaining categorial unlevellement, and so put an end to ineffableness altogether. Instead of saying that the difference between verbal phrases and nominal phrases lies in a categorial cleavage between what is meant by the ones and by the others, let us say that that difference lies in their having different semantic relations to things: while nominal phrases name their meanings, verbs signify theirs. Therefore, falling under is a relation like any other, an object. But what is named by the gerund 'falling under' is signified by the verbal phrase 'falls under'. In our regimented language all verbs are now replaced by nominalisations thereof except 'falls under', which is the only signifying expression. Of course there remains a difference between what we now can call *particulars* —such, that is, as are fallen under by no object— and non-particulars, *i.e.* properties (a difference of which Frege makes much in "On concept and object," see (F:3), p. 93). If we also want to subscribe to some extensionality principle (that having been what prompted us to identify Falseness with the void property), we can then either Quine-wise identify particulars with their singletons or regard them as urelements, making allowance for such when laying down a principle of extensionality, or else take each particular to be the property under which fall all and only the particular's parts —such a particular reducing to a Quinean one just in case it is a simple entity lacking proper parts.

3. *Improving upon the foregoing proposal*

Section 2 finished with a recast Fregean ontology which still needs a number of amendments. First of all, we notice that there is an extremely irksome result in our account: we know that what is meant by the sentence "falls under (a,b)", where 'a' and 'b' are names of objects (definite descriptions being names, too) is a truth-value if b is either a nonrelational property, or a relation which a bears to nothing, or a nonproperty or urelement (should we recognize such); otherwise, that sentence means a property under which fall the objects towards which a bears b. Now, is Truth a particular? If it is, and if we take particulars to be nonproperties, *i.e.* entities under which nothing falls, then whatever falls under a nonrelational property bears it to nothing at all, thus, we need two different accounts of the truth-conditions of 'falls-under (a,c)' according as whether c is either a relation or a nonrelational property. On the other hand, we might as well take truth to be the property such that any entity's falling under it is the entity itself. Why? Let's see.

The account resulting from our reshaping Frege's ontology had taken the function of being true, meant in Frege's notation by the horizontal dash, as a function mapping into Truth whatever is different from Falseness, and Falseness into itself. But we had as lief identify the function of being true with Truth itself, since the obvious reading of "—p" is "It is true that p" (notice that what is here involved is nonsemantic truth, truth as applied to "facts"). Yet, there's some clumsiness about "—p" meaning something different from "p". According to that construal of the meaning of '—', we'd have that while "falls under (Caesar, defeating)" would mean the property of being defeated by Caesar, the result of prefixing the dash to that phrase would instead mean the Truth. Such an anomaly can easily be removed by taking Truth, now identified with the meaning of '—', to be such that, for any entity x, the meaning of "falls-under (x,Truth)" = x; and so "—p" means the same as "falls-

under (p,Truth)". Truth is thus a redundantial property —which is not the same as a redundant one. And, to be sure, all entities are true except Falseness.

But, what is then meant by "falls under (a,b)" when b is a nonrelational property? We can still take that sentence to mean either Truth or Falseness according as a falls under b or not. Yet, our problem with nonrelational properties then become intractable. For, since Saturn rotates, it falls under rotating, so its falling under rotating is Truth; and, since the Sun's falling under Truth is the Sun itself, we're forced to conclude that the Sun (or anything else, for that matter, barring Falseness) is rotated by Saturn. Hence such properties as we ordinarily take to be nonrelational are instead relations such that whatever has one of them bears it indiscriminately to all objects except Falseness. Such an account is surely wrong.

Alternatively we can take what seems to me a far wiser tack, to wit: "falls under (a,b)" means a fact, the fact that a falls under b; and if b is nonrelational that fact is either an urelement or a property under which the fact itself alone does fall. My favourite option is the latter, since I find urelements distasteful and unwieldy. More seriously, introducing urelements brings complications we can easily and plausibly avoid. And it seems to me prephilosophically plausible to say that what is lived by someone is her/his own life (or living); what is died by someone is her/his own death, and so on. (That is the root of internal accusatives.) We then can say that a true fact is transient iff something different from the fact falls under it and that it is nontransient iff it alone falls under itself —Falseness being neither transient nor nontransient. The empty or void property is fallen-under neither by it itself nor by anything else. Therefore it is neither transient nor nontransient. If every true entity or fact is either transient or nontransiente, the void property is then bound to be nothing else but Falseness —since Falseness alone is not true. That is in agreement with our previous conclusion. (Therefore, Falseness is not a particular, as defined at the end of 2.)

We have thus managed to build up a noncategorial ontology wherein every entity is both an object and a property, and a relational property at that —if we stick to our favoured policy of disallowing urelements and instead treating a particular as an entity which is fallen-under only by all its parts, either proper or not. (A particular's falling under itself may be equated to the particular under consideration. Thus, we have a non-identity meaning of the copula while joining two names: 'Husserl is Husserl' may mean that Husserl falls under himself, that he is husserleous —just as his tongue, hands, lungs, bones and so on, are—, his being husserleous being no other thing than he himself. Notice that such an equation entails that Husserl is a relation borne by himself to his own parts, including himself —therefore a reflexive relation— as well as borne by each part of him to its own being husserleous —supposing that Husserl's tongue's falling under Husserl is a nontransient fact.)

A minor modification of the skew-Fregean ontological account I am setting up recommends itself: replacing, as the only primitive predicate (or signifying sign), 'fall-under' by 'be fallen under'. For one thing, truth now appears to be the property converse to falling-under: that a bears truth to b is meant by "falls-under (b, falls-under (a,truth))", which —in virtue of the fact that any entity x is a fixpoint for the function of falling under truth— means exactly the same as "falls-under (b,a)", *i.e.* "b falls under a" in our vernacular surface-structure English. Thus, by taking as our primitive predicate 'being-fallen-under', we're in fact taking nothing else but the dash, which seems a most plausible choice.

A further improvement upon the skew-Fregean ontology I'm trying to construct concerns identity and extensionality. We can no longer hew to the extensionality principle as commonly stated, since two different relations may share the same domain. But "p iff q" is true iff either p = Falseness = q or else both p ≠ Falseness and q ≠ Falseness. Hence, for any such relations as share their domain, r and

s, we have that, for any x, x falls under r iff x falls under s, whereas there may be three entities, x,y,z such that x bears r to y but not to z, while at the same time x bears s to z but not to y. We'd then be apparently well-advised to introduce a primitive identity-sign and formulate our extensionality-principle like this: for any entities x,y, there is an entity z such that: if z's falling under x is the same as z's falling under y, then x=y. (Thus, even if whatever has a father has a mother too, and —let's suppose— conversely, we can assume that some entities' having a father is a different fact from their having a mother, both facts' truth not-withstanding.)

Logical equivalence (in the sense of logical truth of the biconditional link between two formulae) is no longer sufficient for identity. For, any true entity's negation is Falseness, whose negation is Truth, without thereby being the case that whatever is not Falseness is nothing else but Truth. Nevertheless, a great many logical biconditional formulae may safely be taken to be identities: such are (all instances of) the laws of absorption, idempotence, associativity, commutativity and distributivity for conjunction and disjunction.

Resorting to a primitive notion of identity is a very bad solution. We could bypass such a resort by introducing a new primitive equivalence-functor, 'I', stronger than the mere biconditional, *i.e.* with the following schema as a valid one: "pIqC.p≡q" (where 'C' is the conditional —dots being inserted à la Church: a dot written immediately after a functor stands for a left parenthesis whose right mate lise as far to the right as possible, remaining ambiguities being dispelled by associating leftwards). We would also incorporate the aforementioned principles ("p+q.pIp" and the like), transitivity ("pIqC.rIqI.pIr"), and so on. That equivalence functor could be read as 'to the same extent as', or 'insomuch, and insomuch only, as'. Finally, by means of a modal logic, with a modal operator 'B', we can define identity like this: /p=q/ eq /B(pIq)/, 'B' being endowed with S5 characteristics including a Gödel rule (p ⊢Bp), valid at the very

least for any logical premiss "p", albeit preferably being a nonsystemic inference-rule.

A further, if benign, difficulty surrounding our account is that we need to make allowance for nonelements, Neumannian or —as I'll call them— garbolious entities, if we're going to accept a sufficiently strong comprehension principle according to which for any formula "p", the property of being an entity, x, such that p exists. Let's then (in order to achieve coherence, which as everyone knows Frege's original system was incapable of securing) lay down a separation principle according to which an entity, x, falls under the property of being such that p to the same extent as: while x is an element, p. An unwelcome result of that at first blush watchful policy will be that all nonelements will fail to be true, whence it would follow that the dash would no longer mean a property for falling under which every entity would be a fix-point. (Therefore, if the dash means the property of being fallen-under, to fall under something will no longer be the same as falling under that something's being fallen-under). As far as I can see, though, coherence could be achieved without so harsh a restriction of the separation principle: the softening that restriction seems liable to undergo without thereby endangering the ensuant system's soundness consists in defining 'to be an element' in a more restricted way, as 'falls under at least an ordinary property', and then define 'ordinary properties' so as to count among them neither existence nor perhaps possible-worlds or times —an entity falling under a world or time insomuch as it is true therein.

4. *Undermining the account*

Germane to the issue coped with at the end of the foregoing Section is the clumsiness attendant upon our failing to identify truth with existence. Our account makes Voltaire's rejoicing at Lisbon's earthquake as real as his distress about it, only, while the former is false, the latter is true. Untoward as thus granting existence to false states of affairs

is, what I now want to emphasize is that a clearly obnoxious asymmetry concerning a Frege-style (or chosen-object) description theory comes of that purported existence of the False. Let's identify the meaning of "the entity such that p" with the False in case there is no one entity that is alone such that p. If the entity identical to a (where 'a' is a name) is not true, either a does not exist (and then it's not the case that a is false) or a exists but is the False, whereas, if the entity identical to a is true, then a exists (and is true).

But, what if we identify truth with existence? The most troublesome result which would ensue thereupon would concern the void property: if it is the False, it would no longer exist, and then number zero would be fallen under by nothing; so it would be the void property, and accordingly nonexistent. Consequently we could no longer identify the empty property with the False. The empty property would then be recognized to exist, to be true. But then being true would no longer be the same as being fallen-under, which would shatther our account's very gist. Although I am confident a sensible way out can be found, I defer looking for it until the final Section of this paper.

However, our major troubles are to emerge yet. What renders our nice, winsome skew-Fregean ontology problematic is that it doesn't solve one of the main snarls Frege's original account labours under: the fact that a relation (in our case just one relation: being-fallen-under-by) is bound to both order its arguments and map them, thus ordered, into a value, which means that the relational fact of a thing's being-fallen-under by another is not really analyzed into its components. To be sure we an explicit (or, as linguists say, segmental) signifying sign standing for that relation can be done away with, since juxtaposition makes do: "ab" means the fact that b falls under a. Fine! But what we then have is the result of writing together 'a' and 'b' in some particular order. Juxtaposition doesn't order the juxtaposed terms. Or does it? If it does, then we have the choice of two things: either juxtaposition both orders the terms and maps them into a string in only one operation, or it first orders them

and only then makes them, so ordered, into a string. In the first case, for any two names, we'd have two different juxtapositions. Worse still: those different juxtapositions would not be functions independently definable or given which would then take arguments, but, on the contrary, would be explicitly defined for two particular arguments, once they are given: the juxtaposition of 'a' and 'b' that yields 'ab' would not be the same as the one that yields 'ba', but neither would it be the same as the one that takes 'c' and 'd' either into 'cd' or into 'dc'. Therefore, if juxtaposition orders the terms, it does so in an operation prior, so to speak, to the one of mapping them into a well formed string or phrase. What then happens is that juxtaposition maps into a string the output of its own ordering the terms with a particular order rather than the opposite. So, juxtaposition is not functional: first it orders the terms one way or the order, the ordering being determined neither by the terms nor by juxtaposition, nor by both taken together; only then, once that unanalyzable ordering has been accomplished, does juxtaposition act as a function. Exactly the same thing would go on in reality: the (relational) property of being-fallen-under-by, *i.e.* Truth, would first order two entities in a particular way rather than the opposite (the ordering being determined neither by the property itself nor by the entities nor by both taken together) and only then would make them into a functional value, namely the fact that one of them falls under the other. What is more, all that description avails itself of a further ordering: temporal ordering or process, with a *before* and an *after*, while that use is neither justified nor by itself illuminating, until the metaphor is explained and the processual order duly accounted for.

Needless to say, such a difficulty, which in our present account plagues only our primitive relational property of being-fallen-under-by, is no other than the one afflicting all and every relation both in Frege's original approach and in Russell's —or for that matter, and to the best of my knowl-

edge, in any other approach hitherto proposed. We have managed to confine the evil, not to uproot it.

We could then try some desperate solution, *e.g.* dispensing with juxtaposition as a third factor altogether, and saying instead that the left-hand term is always intrinsically different from the right-hand term: what makes "ab" differ from "ba" is that right-hand 'b' is different from left-hand 'b', as much being the case for 'a'. We know that one same arrangement can be achieved in one language through some particular linear ordering, in another through attaching functional monemes (or morphemes) to some other signs (see (M:1), 4-10, pp.109-10), *i.e.* through affixes. So we can take the stem 'a' and modify it through an affix, say the prefix '!'. Then we can say that, while 'a' without prefix names a, '!a' signifies it. For every entity there will thus be two signs, one naming it, the other signifying it. Linear order becomes indifferent: '!ab' and 'b!a' mean the same, both meaning the fact that b falls under a, *i.e.* the value into which the function a maps the argument b, rather than the other way round. But new problems arise. First a minor point: 'a' without prefix may rightly be seen as having a contrasting flexional beginning, a zero-morpheme (some linguists would however contest that, and we can here refrain from going into details of the issue). Second, and more important: do unprefixed 'a' and '!a' share a common stem? If they do, new queries are bound to besiege the stem's semantic role, as well as the affix', and we don't need too much cleverness to see that a Bradleyan infinite regress has been thus triggered. Accordingly, we had better take '!a' as an uncompound word. But then the sentences 'ab' and 'ba', or in our new notation 'b!a' (or '!ab') and '!ba' (or 'a!b') have no element in common at all! Moreover, the same duality will be bound to exist for variables: we'll then have two sorts of variables, functional variables "!x" and argument-variables, "x", even if they both have the same range. Existential (and universal) quantificational prefixes, 'E' and 'U' respectively, will thus be ambiguous, of course. All those results will remain true even if we come back to our old

notation and write again 'ab' for '!ab' and 'ba' for 'a!b', unless we forswear our unwise move of assuming that in any two-term string or phrase one term signifies its meaning while the other names its own, the difference thus indicating which of the two is acting as a function and which of them is acting as the argument for the function. The move is unwise for what we are then positing is, over and above the entities involved, a further "factor", to wit: one of the entities acting as a function, or taking the other as an argument. So, we are again encumbered with a third element, the relation of taking-as-argument, this interposing element directly affecting one of the two entities only, which raises the same questions anew. Hence, the move has led nowhere.

Here is a further difficulty besetting our account. What is the ontological footing of the difference between naming and signifying? Well, yes, we can say that an entity (truth or the property of being-fallen-under, in our account's preferred version) is signified "when" it is acting as a relating relation, whereas it is meant "when" it is being related. False! In our account "Truth(a,b)" and "ab" mean the same thing, as does "(Truth a)b", each of those formulae meaning that a bears truth to b, *i.e.* that b falls under a; besides, what on earth is meant by those 'when'? We can alternatively retort that what makes the difference needed is that, while language arranges two terms into a composed sign or phrase by juxtaposing them, reality itself acts in a different way, since what really happens is that an entity acting as a property maps another entity, taken as an argument, into a value, which is the fact that the latter falls under the former; the difference between the linguistic arrangement (some kind of composition) and the real arrangement (a purely functional proceeding) explaining the need for two different semantic relations. But that will not do. For, even if we insist that a's falling under b is not a composite entity wherein a and b are present as 'a' and 'b' seem to occur in 'ba', we cannot deny all the same that both a and b are involved in the so described "process" by which a's falling under b is gotten at, this fact being so described

as nothing else but the result of the process: then either we identify the process with its result, or else we are bound to acknowledge a new entity, the process itself, which also needs explanation and analysis. But if we choose to identify them, we can no longer deny that, somehow or other, both a and b are in the process, or perhaps vice versa, in some peculiar and nonliteral sense of 'in' needing an explanation and, like any other metaphorical sense, requiring some common ground shared with the plain, literal meaning. (We can cunningly stave off that argument by pointing to the contrast between an expression's being able to be dug into, the thus punched "expression" emerging with a hole within it —that was Frege's own way of viewing syntactic analysis—, and a nonlinguistic entity, whether simple or complex, being unable to undergo any such hollowing-out. That contrast would show that, while the linguistic arrangement involved composition, the nonlinguistic one was a different pattern which would not rule out for an outcome or (functional) value to be simple. Well, so far so good. But by itself that asymmetry does not free the nonlinguistic meaning from needing to have *some* structural similarity or other with the linguistic expression it is meant by, for there to be a meaning-relation between a complex phrase and an entity dependent upon the meanings of the phrase's components, somehow like the phrase depends on those components. And the parallel has been shown to go still further: if we resort to a functional structure as the one pertaining to the extralinguistic reality, our talk will need to mention a (processual) proceeding from the argument(s) to the value through the relation itself, a way of speaking whose unpacking seems unlikely to succeed at all unless we recognize that the relational fact, being such a process or proceeding, is indeed somehow complex not unlike the linguistic complex representing it.)

Therefore, there is bound to be a stricter parallel between the ontological or real arrangement and the linguistic one than we had flippantly supposed, which entails that the same Bradleyan regress we have encountered as regards

our proceeding from the two terms given to a well-formed string does also affect the real "process" from the related entities to the fact of one falling under the other —or, if the process is nothing else but the ensuing fact, the proceeding from one entity to the other, like in the string's being written the former term is passed-from while the latter is passed-into, the string itself being possibly described as nothing else but that passage or proceeding, as is most cogently shown in the case of verbal messages.

5. *Sketching out a non-Fregean proposal*

What I'm going to outline in this Section is a decidedly un-Fregean way out of the difficulties we've encountered hereinabove. My proposal will be best understood on the background of the logical, ontological and set-theoretical (or lambda-calculus) systems put forward in some previous papers (see (P:1), through (P:6)). In (P:7) I broached issues closely related to those brought up in the present paper, and I there put forward a formal system (a kind of lambda calculus) which is a tool for coping with some of the difficulties besetting standard accounts of relations. However, the solutions drawn up there resemble the skew-Fregean account set forth in Section 3 of this paper and therefore fall afoul of the objections levelled against that account in Section 4. Nothing of what was put forward in (P:7) needs to be withdrawn, though; only some basic issues were not taken account of there, and accordingly that paper's proposal calls for a more radical foundation able to cope with the two most nettling difficulties that have hitherto thwarted our hope of analyzing relational facts. Let me sum up those difficulties.

(1) If a relational fact is to be analyzed into its components, one of them is bound to account for the sense of that relational fact, *i.e.* for the order through which its (other) components are involved in that fact, for one of the related extremes to be the referent or subject, and the other the relatum or term —for simplicity's sake I confine myself to

binary relations. (Notice that such a question ought carefully to be distinguished from that about the sense of the relation, as Russell set it in *Philosophical Essays* and other papers written toward the same period. Russell doubtlessly conflated both issues: one of them is whether, assuming, as Russell surely does, that the relation of begetting and that of being begotten are one and the same, that relation enters the fact of Henry Cromwell's being begotten by Oliver in its "active" or in its "passive" sense; the other is whether, taken in one of those senses, the relation proceeds from Oliver to Henry or the other way round.) But, if one component of the fact accounts for the order in which the two extremes are taken by the relation, that component needs in turn analyzing in a similar way, which triggers an infinite regress, unless of course we drop our analyticity principle, *viz.* that two complexes differ insomuch only as they have a different composition.

(2) The foregoing difficulty's outcome could be taken as the need for a relational fact to be acknowledged as simple rather than complex. But then for that fact to be the "result" of the relation in question proceeding from the referent to the relatum calls for an explanation as to how such a proceeding is to be accounted for and how it is related to its so-called "result", which indeed seems then to become idle and futile. Besides, the purported simplicity of the "resulting" fact can be queried, since even though the involved entities are nowise taken to be "parts" of the fact, they are obviously involved in the fact's production, whence a complexity turns out to be there by way of the link —whatever it may consist in— between the fact and the entities involved in the process by which the fact is produced. Should we again try to shun the problem by resorting to function-talk, saying, that is, that the "link" tying the fact to those entities is in turn the "result" or value of those entities' being taken, in a certain order of course, as arguments of some given function, we'd be launched on an infinite regress —which amounts to a most intractable Bradleyan paradox.

Those two difficulties are obviously closely connected.

The former lures us into an infinite regress of composition of relational facts and at once has us beware thereof. The latter entices us into another infinite regress —which would be triggered by taking the relational fact to be a simple "outcome" of the relation's proceeding from the referent to the relatum (or of its taking both as arguments "in that order")— but it forthwith warns us against it.

My own proposal's gist is to take that process or proceeding seriously enough. What among other grounds may deter us from doing so is that any process, whether temporal or not, is beset by difficulties of its own, which are best underlined by Zeno's paradox of the arrow. Since I don't have any time or place to pursue that question here, I refrain from tracing alternative ways of coping with that difficulty, being content with remarking that in (P:3) I've developed a contradictorial account of movement, based on a paraconsistent infinite-valued tensorial logic upon which the account of relations summarized herein below is going to hinge.

1. I take a relational fact to be a (nontemporal) process consisting in the involved relation proceeding from the referent to the relatum. That process is a (nontemporal) movement taking place along an "order of nature" or series of nontemporal stretches or intervals (on which presently, points 5 through 8) in such a way that at any interval within the whole stretch taken up by the relational process the relation both is and is not in each of the extremes, but the later or more advanced the interval is, the more the relation is in the relatum and the less it is in the referent. (This doctrine will be uninteligible to such as cleave either to classical logic or any other overconsistent system. Let me briefly summarize the logical basis of this account. My metaphysical doctrine is a contradictorial gradualism. There are infinitely many degrees of truth and as many degrees of falseness. Each truth-degree different from the wholly true is also a degree of falseness. There is no absolute falseness, though; talk about complete falseness is to be paraphrased

away as total lack of truth. In addition to classical negation, 'F' —for which classical laws hold, including Scotus' rule (p, Fp ⊢ q), and which, unlike classicists, I refuse to read 'not', reading it instead as 'not. . . *at all*'— there is a nonclassical negation, 'N', which is natural negation, the mere 'not', such that for some formulae, "p", both "p" and "Np" can be true —to some extent, *viz.* at most 50% true, while one or the other is at least 50% false. As regards the mere equivalence functor, 'I', introduced above in Section 3, the schema "pINqI.NpIq" is to be valid, entailing as it does the involutivity of simple negation —whereas, as was there shown, the classical negation 'F' is not involutive for equivalence 'I'.)

2. The whole relational process just described is infinitely complex, consists of a (continuous) function mapping each interval within the stretch into both a degree of the relation's being in the referent and a degree of its being in the relatum. (The process is simple in a way, though, since it cannot be analyzed into any finite series of components.)

3. Every relation different from *comprising* (or being-fallen-under) can be reduced, like this: for a relation to obtain between a referent and a relatum is for the relatum to be comprised by the relation's comprising the referent. When analyzing a comprising fact, all that needs specifying is, for each interval within the stretch taken up by the fact referred to, in which measure each of the two extremes is then the siege (of the one primitive relation, namely comprising). The danger of an infinite regress, which, as we could possibly fear, might be raised should each link in any chain or series into which the relational-fact can be analyzed turn out to be a couple of further relational facts, each of which would consist in the given relation bearing the relation of being-in to one of the initially given extremes, is successfully parried, since the couple in question is simply a couple of nonrelational facts, each provided with a degree of existence. That those two facts involved in each link of the chain

are nonrelational is shown as follows. First, the comprising relation needn't be specified since it is a constant in all and every fact; hence the only remaining entities to be specified are the relation of being-in (or having-as-one's-siege), and the extreme in question, be it the referent or the relatum. Second, since that relation of being in is a constant, too, for all facts of that kind, the only variable element is the extreme (as well as of course the degree in which the comprising relation is therein; but on that presently, in point 4). Third, as we have seen above, for x to bear relation z to y is nothing else but for z's comprising x to comprise y, and accordingly for the comprising relation to be in something is the same as for that something to be comprised by comprising's being-in; now, comprising is —as we are going to see below, in point 9— nothing else but existence or being; being's being-in is a nonrelational fact which thus turns out to be constant for all the facts involved in the chain under consideration; besides, such a fact can obviously be named; that fact is in the present ontological account a property, since —as I'm going to propose hereinbelow, in point 10— all categorial differences are abolished by identifying each entity with its existence, *i.e.* with the fact that it is comprised by existence as well as with the property of being exemplified by that entity (exemplification being the same as the property of being comprised-by). As a result, each fact belonging to each of the couples making up any chain or series into which a relational fact can be analyzed is one of the extremes initially given exemplifying some constant property, which is being's being in. (Notice though that in this ontology all facts are relational. When we say that some fact is nonrelational, that only means that for the purposes at hand it can be perspicuously represented by a subject-predicate sentence, its deeper relational structure notwithstanding.)

4. Nor need we feel any uneasiness over the couple of facts just mentioned being instead a couple of relational facts, each of them involving the relation of being's being (pres-

ent)-in, either the initially given referent or the initially given relatum as an extreme (subject) and a degree as the other extreme (term). A fact's being real (true) or an entity's being there in a degree is nothing over and above the fact or entity itself. To be sure, from a classical-logic viewpoint, it indeed is, the classicist being unable to regard a thing or fact taking place or being present in a degree in any other way than as a relation between the thing or fact and the degree. But from the nonclassical viewpoint underlying my account, if a complex consists of several components, c^1, c^2, . . . c^n, each in a degree (respectively d^1, d^2, . . . , d^n), what is to be said is that, for any i such that $1 \leq i \leq n$, the complex does in degree d^i have as a component c^i. Moreover, in virtue of the *acquiescence rule* (or "endorsement rule" as I had formerly called it) whatever is to some extent or other true (existent) is true (existent). The fact that something is real in some degree is therefore, provided it exists, simply the fact that that something is real, period; only, that fact is true in the degree in question. Furthermore, the fact that something is real, or true, or existent, is nothing else but that something itself. Consequently, each of the infinitely many links making up any chain into which a relational fact can be analyzed is a mere couple of entities, embracing each of them in a certain degree. Nor needs the interval at which such couple exists and embraces its two members in exactly those degrees be specified as a third element also involved, since there is a one-one correlation between the intervals and the couples of both entities, each couple being determined by the respective degrees those entities belong to it.

5. The set of intervals correlated by a bijection with the class of couples referred to in the foregoing point is (partially) ordered by a priority relation. That bijection being a morphism, a similar ordering relation is defined on the set of such couples. The priority relation is (not a total but only) a partial order since (partially) overlapping intervals are not properly said to be prior one to the other. That relation can in turn be analyzed like any other. (That is not an infinite

regress even though each relational fact thereby evinces an infinite complexity.) That relation comes in degrees, too. For an interval to be prior to another is for the former not to be posterior to the latter. Therefore each interval is as prior as posterior to itself, while the more prior it is to another interval, the more posterior the latter is to the former, and conversely. (The restriction of the domain of applicability of the priority relation I have for convenience's sake laid down is much tougher than necessary, since we surely can take an interval to be fairly posterior to another if an ending subinterval of the latter is a beginning subinterval of the former.)

6. The nature of those intervals, the several series they form, and the priority relation obtaining among them needs elucidation. But I am confident we are in fact acquainted with such kinds of series, as is shown by our use of temporal and processual metaphors in any such cases and by philosophers' explicitly resorting to *ordines naturae* as Scholastics used to put it. It seems to me abundantly clear that a metaphor cannot be used unless one feels a sufficient similarity between the entity the word literally applies to and the one to which it comes to be metaphorically applied. We surely could dispense with positing such intervals at all, being content with (partially) ordering the couples of entities the relational fact is analyzed into. We would thus eschewed troublesome questions such as whether two relational processes are "simultaneous" or successive or whether they take place along different and unconnected series of nontemporal intervals, questions which might be looked upon as idle and far-fetched. However, there is a rationale for positing the intervals, as I'm going to show below, in point 7. What I want to emphasize here is that common talk about a relations's proceeding from subject to the term and thus being more in the former "before" and more in the latter "afterwards" is a token of our having prephilosophically grasped what those "before" and "after" are, at least to some extent. What is incumbent on a philosophical theory

is to bestow further credentials upon them by showing that they may be thought to comply with certain postulates rigorously formalized. (Such a task I put off for a later occasion.) By means of that axiomatization what is until then a metaphoric use of words can be duly unpacked, while the common content shared by that use and by literal use can be preserved and made explicit.

7. A ground for keeping the reference to the nontemporal series of intervals is that by so doing we can acknowledge speed differences between relational facts. The swifter a relational process is, the more real it is (at least *caeteris paribus*). If Maud is cleverer than Virginia then Maud's cleverness is more real or existent than Virginia's, which entails that the comprising relation proceeds from cleverness to Maud faster than to Virginia. That means that the series of degrees of the comprising relation being in Maud (coupled with degrees of its being in cleverness), along the relational process of that relation passing from cleverness into Maud, is more rapidly increasing than the corresponding series of degrees of that relation being in Virginia (also coupled with degrees of its being in cleverness), along the process of the comprising relation passing from cleverness into Virginia. A series s is more rapidly increasing than a series s' iff, for any two intervals, e and e', e being fairly prior to e', if the distance between them is the same as that between e'' and e^3, with e'' fairly prior to e^3, and if e,e' are intervals at which two members of s, *viz.* s(e) and s(e'), take place while s' takes place at a stretch of which e'' and e^3 are subintervals, then the divergence between s(e) and s(e') is larger than that between s'(e'') and s'(e^3). (I've assumed that any such process has uniform speed throughout its nontemporal "duration", since I have as yet been unable to figure out any point in doing otherwise.) What all that means in concrete terms is that, if Eamon loves Robin more than he does Jean, then love passes from Eamon into Robin more quickly than it passes from Eamon into Jean.

8. An untoward difficulty my present account is amenable to is that by thus analyzing relational facts, I am taking for granted an ordering relation among nontemporal intervals. So, my analysis of order in relational facts, if it succeeds at all, does so only on account of its falling back on some ordering relation which it reckons to be more basic. Should we take instead those intervals to be ordered just the other way round, every relation would be transformed into its converse. But, most of all, order is anyway there, as an underlying structure to which we help ourselves. My reply to that objection is that I had not meant to explain away or analyze order in general (as, *e.g.*, unsuccessfully do set-theoretical approaches, via Kuratowski reductions, or Bergmann's closely akin gambit). I have been content with explaining the sense of any given relational fact, even if that involves reference to some "deeper" order in the world. (Heed the difference between my own aim and kind of analysis and those I' ve just mentioned: they try to explain away or ground order in general, and in fact let in order back, treating the referent and the relatum on an unequal foot, but there is —outside the relational fact or beyond, or under, or above the entities therein involved— no deeper or more basic order, prior (*in naturae ordine*) to the one among the relational fact's extremes, which they deem it proper to resort to.) That alone, I submit, takes care of my analysis' point and genuineness. Moreover, order among nontemporal intervals I hold to be supervenient on properties thereof. As I'll say pretty soon (points 11 and 12) any interval t is to be regarded both as the property of taking place at t and as the relation borne by a property x to an entity z insomuch as z's exemplifying x takes place at t. Thus any two such intervals differ by content. This is why the ordering relation between them might be analyzed, but such an analysis has no finite (or even denumerable) limit whatever.

9. The comprising relation is the same as existence or truth. I postulate a least truth-degree, identifying the emptiest

property (or relation) with the one thing existing in that degree. A thing's having a certain property is then nothing else but its being existed by the property, *i.e.* existence's passing from the property into the thing. More generally, a thing's bearing a certain relation to another is nothing else but existence's proceeding from the former thing's exemplifying the relation (*i.e.* its being comprised by that relation) to the latter thing. Ted's love is existence's passing from love into Ted; Ted's loving Mathilda is existence's passing from Ted's love into Mathilda.

10. Every entity, being the same as its own existence, is nothing else but existence's passing (from itself) into the entity. By identifying each entity with its own existence, *i.e.* with the fact that it exemplifies being (existence), I am able to build up a noncategorial ontology wherein all entities are facts, as well as properties (each entity being the property of being exemplified by that entity —I here take over all that I set forth above, in Section 2, concerning both transient and nontransient facts, and accordingly I identify, say, someone's death with a property comprising itself and, at least to an appreciable extent, nothing else).

11. I have thus far disingenuously pretended to believe that any fact has just one degree of truth or else no truth at all (absolute falseness). Still, that is an over-simplification. Besides degrees of truth (or existence) there are aspects of truth. The nature of those aspects needn't concern us here much, but we can safely take them to be possible worlds and/or time intervals or the like. (Our own nontemporal intervals can also be regarded as aspects of truth or reality.) Thus, I choose a tensorial logic, which means that for any formula, "p", /p/, the truth-value of that formula, is an infinite sequence of scalar truth-components, each truth-component being either a gap or a hyperreal, h, such that $0 < h \leq 1$, a hyperreal h being the result of adding to or subtracting from (or both) a real some given infinitesimal. I can alternatively unfold that view as follows. Let there be an

infinite number of alethic functions, f, such that, for any fact, p, f(p) is a scalar truth-degree or else nothing. Let the set of those alethic functions be well-ordered. Let p be a fact. Then /p/ is p's truth-content, which is an infinite sequence such that $/p/_i = f_i(p)$, where f_i is the ith alethic function. I assume that if /p/ = /q/, then p = q, for any facts, p,q. (Alethic functions are to comply with a number of postulates: f(pIq) = f(p)If(q), f(Np) = Nf(p), and so on, where the operators N, I and the like are appropriately defined.) To each aspect of reality, w, there corresponds a sequence s of alethic functions, s_1, s_2,. . ., such that, for any fact, p, /wp/ $= <s_1(p), s_2(p),. . .>$, where wp is w's comprising p, as well as any sequence equipolent to s (where two sequences, s' and s'' are equipolent iff, for any i and fact q, $s'_i(q) = s''_i(q)$). (I thus identify each aspect of reality, possible world or anything of that ilk, with a property comprising such facts as are true in it.) Reality as such ("the real world") is that aspect, w, such that there is a sequence, s, corresponding to w, such that, for any i, $s_i = f_i$. An aspect, w, encompasses another, w', iff for any sequence s corresponding to the former, there is a sequence s' corresponding to the latter such that s' is a subsequence of s. (Reality thus encompasses all of its aspects.) An important application of that semantics is that we can thus safely take any subinterval of an interval to be encompassed by the latter, whence it follows that, for any two intervals, whether temporal or not, e and e', if e' is a subinterval of e, then for any fact p, /e'p/ is a subsequence of /ep/. Therefore, all that was said above about a fact's degree of truth at an interval needs correction: we ought instead to have spoken of that fact's sequence of degrees of truth at the interval, or of the fact's truth-content at the interval, which is nothing else but the truth-content of the fact's being comprised by the interval. Finally let me point out that within such a framework, such facts are alone truthfully assertable as are, to some extent or other however small, true in all respects (or aspects), which means that, from "p", we can draw the conclusion "it is in all respects true

that p". The "extensionality" principle's thrust and meaning thus undergo a deep change.

12. A consequence of what was laid down above, in points 3 and 9, is that for any property x and entity z, x's comprising z is nothing else but x's bearing to z the relation (or property) of existence. I now want to generalize that account by laying down as much as regards any truth-aspect: for any such aspect, w, and entities x,z, wxz = w(xz): w's comprising x comprises z insomuch, and insomuch only, as w comprises x's comprising z. (In order to preserve the theory's solidity or coherence we might need some restrictions to that principle, but I take it to be a plausible principle anyway, deserving to be kept in the strongest formulation compatible with the theory's nondeliquescence.) Hence, aspects of truth (or reality) are relations between properties and the entities they comprise at (or in) those aspects (respects). (The 16th-century is thus a relation borne by the property of being a world-power to Spain; the 20th-century is not.)

13. My *present* treatment (unlike all those I set forth in previous papers) handles all relations on an equal foot: binary connectives (or functors) are no exception. The formal system within which this ontology can be rigorously axiomatized is a combinatory logic with no primitives but unary operators. It will be evolved soon, in a more technical paper. (The set-theories and lambda-calculi I proposed in (P:7) and (P:9) are still encumbered by too many combinatorial restrictions, which my new combinatory logic is apparently able to overcome.)

14. As for the relational facts, so for the relational formulae. My account of language avails itself of a fuzzy-set theory (which, as I've just pointed out, I set forth in a number of papers, among them (P:7) and (P:9), and whose philosophical relevance has been explored in (P:1), (P:5) and elsewhere), but my basic ideas are borrowed from some "structuralists" or functionalists, like Mar-

tinet (see again (M:1), esp. pp. 131 ff.) and, most of all, Rodríguez Adrados (see (R:1), pp. 21 ff. about general principles and *passim*): for any linguistic classifications, there always is some intermediary or transition case to be found. Even the distinction between first and second articulation is just an indication of two poles with a number of articulations inbetween, wherein some unit is neither altogether significative nor purely distinctive. Derivative and compound words fall into segments of that kind. And, in accordance with what I'm going to propose, so do in fact all complex expressions: the simpler expressions which make them up are not merely there combined among themselves: they coalesce until they thus blend or get welded. Therefore I also regard a complex sign as a process. Such a view can be backed up by showing what is the case with spoken signs: as usually understood, they are events which take up time —I'm referring to token signs, of course, since talk about type signs is to my mind a mere abbreviation. I suggest heeding what goes on in writing or reading and so identifying a (token) written-language sign with one of those two processes. (I am aware this is a departure from the so far unchallenged view of written-language signs as bits of matter —paper and ink, say— having some shape.) When writing a sentence 'ab' (which in our notation means a's comprising b, juxtaposition standing for the comprising relation as we are wont to say) we do not write 'a' and 'b' separately and then combine them to form the formula. Far from it! We in fact write a single "complex" sign. There are no writing 'a' and writing 'b', but solely one writing 'ab', whether or not our proceeding from the left-hand half to the write-hand one of the thus written unit is "interrupted" by lifting the pen, which lifting is a part of our whole movement, too. My view is then that in such a complex sign each of the components both is and is not there, or if you like that that complex sign is a proceeding from the one to the other, never completely resting or lying in

either. When writing 'ab' we can never be said quite truly to be writing either 'a' or 'b', but yet we are up to a point writing both. (Notice that, even if my writing 'ab' is by some cause stopped in the middle of the process, that does not make it (altogether) true that I was writing 'a'.) And of course, the earlier a subinterval of our writing's whole duration is the truer it is that we are then writing 'a' rather than 'b'. All that sounds pretty familiar by now. And I hope you at this stage appreciate how important considerations tell for that view.

15. The foregoing account is not spared its own difficulties. Most of all some troublesome questions are to be answered. Here is one of them: what is the nature of the consisting-in relation that a relational fact bears to a chain (or series) of couples of "nonrelational" facts, each of which is an entity (either the referent or the relatum in the relational fact under consideration) exemplifying being's being-in? (A similar question concerns movement: even if a body's travelling can be said to consist in a series of functions, f, such that for any location, l, included in the body's whole travelling stretch, f(l) is some truth-content —the truth content of the body's being in l at the time corresponding to f—, it is obvious that the body's travelling is not the same as that series.) I guess it is safe to say that such a relation of consisting-in (whose converse is the relation of constituting) is to be defined from a relation of consisting-of (whose converse is the relation of making-up) borne by the relational fact to each of those couples. (There are different ways for a thing to consist of others without necessarily having them as its own parts or members. Supervenient facts, *e.g.*, can be rightly said to consist of that on which they supervene.) Still, I am aware of the kind of objections likely to be levelled at such an answer. Another riddle raised by the present account concerns the precise nature of the relation of being-in a property (or relation) bears to a thing which exemplifies it. Is that

relation connected with anything like a bundle-theory of things? If so, it rings odd that, when, say, Eamon loves Robin very much, and consequently it surely is very true that Eamon loves, love should proceed from Eamon to Robin and, by so doing, lie less and less in the former as if through that process Eamon's love were exhausted and quenched. I'm afraid editorial limitations don't allow this paper to go into such difficulties. They will hopefully be dealt with in another paper. None of them seems to me overpowering.

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RESUMEN

El artículo brinda una reconstrucción de la ontología fregeana y, tras someterla a una crítica, hace someras indicaciones para una alternativa a la misma. El problema aquí tratado aparece ya planteado por el propio Frege en "Über Begriff und Gegenstand", en la interesante discusión con Benno Kerry, y surge así: los desnivelamientos categoriales en Frege acarrean que lo que puede afirmarse o negarse de un ente de cierta categoría no pueda ni afirmarse ni negarse de un ente de otra; dentro de un mismo nivel categorial hay barreras categoriales por la adicidad de los conceptos y por la categoría diversa de los argumentos que puedan tomar los conceptos pluriargumentales; surgen así las dos dificultades que acarrean: por un lado, las nominalizaciones de expresiones no nominales, las cuales nominalizaciones son sintagmas nominales conmutables con nombres propios sin desmedro de la corrección sintáctica; y, por otro lado, la regla de cercenamiento que aparentemente opera en la lengua, por la cual, en idiomas como el español al menos, puédese amputar un complemento directo sin pérdida de corrección sintáctica. A esta última dificultad, Frege responde por un procedimiento de catálisis: la oración 'Ismael come' abreviará a 'Ismael come algo'; pero eso tiene el inconveniente de que no puede tomarse 'Sí, el pastel' como respuesta *literal* a la pregunta '¿Come Ismael?' A la primera dificultad responde Frege con su noción de correlato de función (en general y de concepto en particular). Por otro lado, existe un problema particular para las funciones pluriargumentales: no sólo asignan un valor a los argumentos, sino que lo hacen al tomar a los argumentos en cierto orden; pero el tomarlos en un orden determinado en lugar de otro no es algo funcional, no depende de cuáles sean los argumentos; si puede ser meramente de papel y no de naturaleza el distingo entre el actuar como primer argumento de una función biargumental y el actuar como segundo argumento de la misma, ¿por qué no va a ser también meramente de papel, y no de naturaleza, el distingo entre ser (actuar como) un objeto y ser (actuar como) un concepto? Surgen en fin problemas múltiples de inefabilidad de la propia teoría que postula tales barreras categoriales —problemas a los que también sucumben la teoría de tipos russelliana y las demás teorías pluricategoriales. Para solucionar algunos de tales problemas puédese diseñar una teoría que es una reconstrucción de la de Frege. Se reemplazan los conceptos por sus correlatos, salvo que —como primera aproximación— mantiénese un único concepto, siendo éste el concepto biargumental de primer orden significado por 'caer bajo' (que no es idéntico al significado en la teoría de Frege por ese sintagma verbal, pues para Frege se trataba de un concepto biargumental mixto, o sea

para argumentos heterogéneos —e.d. de diverso nivel categorial). Así hemos confinado, ya que no eliminado, el problema de las barreras categoriales. La reconstrucción de la teoría fregeana va operándose por estadios consecutivos; en cada uno de ellos se consideran ciertas hipótesis, se examinan sus resultados y, al encontrarse dificultades, pásase al estadio ulterior por introducción de rectificaciones apropiadas, hasta llegar a la (re)construcción final. Primer estadio: como correlato de un concepto tómase un objeto, z, que es tal que el valor que al par $<x,z>$ asigna la función de caer-bajo es: si (el concepto cuyo correlato es) z es uniargumental, entonces o bien V o bien F; si z es biargumental, entonces el correlato del concepto fregeano de caer bajo z, siendo u tal correlato y, por ende, tal que, para cualquier objeto v, v cae bajo u (en el nuevo sentido de 'caer bajo') ssi con v guarda x aquella relación en que consiste el concepto biargumental inicialmente tomado. El inconveniente de esa primera aproximación es que, entonces, "Es verdad que p" —donde 'es verdad que' es un sinónimo de la raya fregeana— significará la Falsedad cuando "p" sea una fórmula como 'Mauricio ama', o sea con un verbo transitivo pero sin complemento directo; pues 'Es verdad que' significa para Frege la función significada por "$=V$". Pásase, pues, al segundo estadio de reelaboración: 'Es verdad que' significará lo mismo que "$\neq F$", siendo, por lo tanto, verdaderos todos los objetos salvo F. Mas entonces "Es verdad que p" seguirá significando algo diverso de "p". Resuélvese eso si la raya (y tal es el tercer estadio) significa una función que sea una transformación nula o idéntica, de suerte que x = el ser verdad que x (para cualquier x). Sólo que, entonces —y como seguimos manteniendo que, si "ϕ" significa (el correlato de) un concepto uniargumental, entonces "x cae bajo ϕ" significará o bien V o bien F—, si la Verdad es (cual parece natural) el correlato de esa función significada por 'Es verdad que', para cada verbo intransitivo ϕ y para dos sintagmas nominales cualesquiera, "x" y "z" tales que es verdadera la oración "xϕ", la oración "x ϕ a z" será también verdadera siempre que "z" signifique un objeto diverso de la Falsedad. Llegamos así al 4° estadio: en lugar de que la función de caer-bajo asigne V o F a todo par $<x,z>$ cuando z sea el correlato de un concepto uniargumental, en lugar de eso lo asignado será o bien F, si x no cae bajo z, o bien un hecho, el de que x cae bajo z, si eso es verdad; también serán hechos los correlatos de conceptos uniargumentales; un hecho que sea el correlato de un concepto cero-argumental (o sea: el significado de una oración a la que no quepa añadir ya, ni con verdad ni con falsedad, ningún complemento directo, p. ej. la oración 'Lupe es guapa') será tal que él y sólo él caerá bajo sí mismo, en tanto que el correlato de un concepto uniargumental (p. ej. significado por "xϕ" donde "ϕ" es un verbo transitivo y "x" un sintagma nominal —o, en nuestro lenguaje regimentado, por la fórmula "x cae bajo el ϕ-ar", donde "el ϕ-ar" es la nominalización de "ϕ") será un objeto z tal que a un par ordenado $<u,z>$ le asigne la función de caer-bajo o bien un hecho (verdadero) o bien F. Surge empero,

con esa concepción, el problema de que vendrían —por el principio de extensionalidad— indentificadas dos relaciones cualesquiera que compartan el mismo dominio. Resuélvese eso al relajarse ese principio; puédese introducir para ello un signo primitivo de identidad; mejor sería, sin embargo, introducir como primitivos dos signos: uno monádico con las características de un operador modal dotado de la regla de Gödel, y otro diádico de equivalencia, tal que valgan las equivalencias impuestas por los principios de absorción, conmutatividad y asociatividad tanto de la disyunción como de la coyunción, y distributividad mutuas (pero no cualesquiera bicondicionales lógicamente verdaderos podrán transformarse en equivalencias). Con ayuda de esos dos signos, el de equivalencia, 'I', que es binario y el operador modal unario, 'B', defínese así la identidad: si "p" y "q" son dos expresiones bien formadas, "p = q" abreviará a "B(pIq)"; el principio de extensionalidad será, en versión prenexa, éste:
"$\exists x(((x \text{ cae bajo } z) = (x \text{ cae bajo } u)) \supset (z = u)$". Por otro lado, y para evitar las paradojas lógicas, puédese articular esta teoría con instrumentos como los de una teoría de conjuntos axiomática, p. ej. los de *ML* de Quine.

Alcánzase el último estadio en la reconstrucción de la teoría fregeana al abatirse la restante barrera categorial ontológica; estatúyese que la diferencia categorial sintáctica entre la única locución verbal que queda en nuestro lenguaje regimentado ('caer bajo') y las locuciones nominales estribará, no en una desnivelación categorial ontológica entre lo significado por aquélla y lo significado por éstas, sino en que la primera guarda con su significado una relación semántica diversa de la que guardan las segundas con sus respectivos significados.

Aunque el tratamiento así propuesto constituye un gran avance sobre el originario de Frege, encierra todavía una seria dificultad con la que nos la habíamos al comienzo: la verdad tiene que ordenar sus argumentos y, una vez ordenados de determinada manera, hacerles corresponder un hecho como valor. En el plano lingüístico reprodúcese un problema similar. A solventarlo iba destinada la solución de Frege, que ya hemos visto cómo fallaba. Una teoría sintáctica que de manera interesante puede confrontarse a este respecto con la de Frege es la de Martinet, que, como se revela, también encierra problemas de la misma índole, pese a todo. Tras forcejar con esa dificultad sintáctico-semántica, muestro que nos enfrentamos a un verdadero problema de regresión bradleyana al infinito, y que, si bien parecíamos habernos librado de las formas inasequibles de Aristóteles o de las funciones innombrables de Frege, hémoslo logrado sólo a expensas de desestructurar tanto la realidad como el lenguaje (o más exactamente, el mensaje lingüístico).

Apunta todo ello a la necesidad de una alternativa radicalmente diferente y que utilice un utillaje, un planteamiento y un enfoque muy alejados de los de Frege, a saber: una concepción contradictorial que tome en serio la vieja idea de que, en el hecho relacional la relación pasa del referente (sujeto) al relatado (término). Semejante alternativa puede en-

tenderse tomando como base una lógica transitiva como la puesta en pie por el autor del presente artículo.

La Secc. 5ª (y última) del artículo está, pues, consagrada a delinear en sus grandes rasgos tal alternativa. Un hecho relacional es (visto como) un proceso no temporal que transcurre en un "orden de naturaleza" o serie de lapsos atemporales de tal modo que en cada uno de esos lapsos la propiedad relacional está y no está en el referente y, a la vez, está y no está en el relatado, pero sin embargo está más en el primero y menos en el segundo cuanto más inicial sea la posición del lapso en cuestión dentro del orden (parcial) entre dichos lapsos. Ese proceso es infinitamente complejo, y consiste en una función continua que proyecta cada lapso sobre un par de grados de verdad, uno para el referente y otro para el relatado (siendo cada grado un tensor cuyos componentes son grados escalares, de suerte que, si e es un sublapso de e', el grado que el proceso hace corresponder a e para uno de los extremos es un subtensor del que hace corresponder a e' para el mismo extremo). Cada ente es luego "reducido" a un hecho, el de que ese ente existe; la existencia es identificada con la relación de abarcar, de suerte que cada ente resulta ser su propio ser abarcado por la existencia (un hecho relacional, pues). En el plano lingüístico, en lugar de entender los signos como inscripciones (trozos de papel, o de tinta sobre el papel), entendémoslos como actos, como *prolaciones*, con lo cual ya deja de ser verdad que en el signo 'ab' hay una ocurrencia del signo 'a'; antes bien, (escribir) un signo complejo 'ab' es un pasar de escribir 'a' a escribir 'b', sin ser nunca un escribir 'a' y sin llegar nunca a ser un escribir 'b'. (Los signos de que se trata son muestras: un signo-tipo no es sino una propiedad de signos-muestra.) Llegamos así a un paralelismo lingüístico-ontológico que, a diferencia del de Wittgenstein en el *Tractatus*, entiende un estado de cosas (y similarmente a una oración) como un transcurrir (de un extremo a otro), y no como dos (o más) cosas tomadas en combinación: una concepción dinámica, pues, frente al combinacionismo estático del *Tractatus*. El enfoque aquí propuesto es una teoría formalizable mediante una lógica combinatoria no clásica.

[L.P.]