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LEIBNIZ'S THEORY OF RELATIONS

David Wong

I. Introduction

DISCUSSION of Leibniz's theory of relations has focused on the question of whether he thought that propositions about relations between substances are reducible to propositions containing nonrelational predicates only. Russell and Rescher have interpreted his doctrine that relations between substances are ideal mental entities as entailing the reducibility of relational propositions to nonrelational ones. Hintikka and Ishiguro have argued that the doctrine should not be interpreted as yielding such a strong result. I agree with Hintikka and Ishiguro on the question of reducibility. I will argue, however, that there is an important connection between relational and nonrelational propositions in Leibniz's theory which has been overlooked. The connection is not quite one of reducibility, and it has been overlooked because commentators have been preoccupied with the question of reducibility. I will explain how Leibniz's assertion of the connection is consistent with his distinction between possibility and compossibility. I will also explain how his assertion sheds new light on Leibniz's doctrine of expression. I conclude by applying the theory of relations to the relations between simple substances or monads and explaining how the world of monads makes up the world of everyday experience. If my interpretation is correct, Leibniz's theory of relations is the key to understanding some of his most central and notoriously obscure doctrines.

II. The Ideality Doctrine

It is well known that in Leibniz's ontology there are only substances and their modifications. Relations can only be considered as abstract mental entities, if they are considered apart from substances and their modifications:

I do not believe that you will admit an accident that is in two subjects at the same time. My judgment about relations is that paternity in David is one thing, sonship in Solomon another, but that the relation common to both

is a merely mental thing whose basis is the modifications of the individuals. [L, 609]¹

David's paternity is a relational property. He is the father of someone. His relational property is different from the relation common to him and Solomon.

To explain the difference between a relation and a relational property, Leibniz gives the example of the ratio between two lines L and M . L has the relational property of being greater than M , while M has the property of being less than L . If we conceive of the ratio as a relation rather than a property, we conceive of it as "something abstracted" from L and M , "without considering which is the antecedent, or which the consequent; which the subject and which the object." This way of conceiving of the ratio is "useful," but we must not forget that a relation is a "mere ideal thing." (LC, 71)

This conception of the relation corresponds to the open sentence ' xRy ' with two free variables x and y , reading ' x and y have the ratio of greater to lesser'. Because we are using two variables, we are not "considering which is the antecedent, or which the consequent; which the subject, and which the object." The relation is an abstraction formed by us upon consideration of pairs of lines with relational properties that seem to have something in common. Leibniz was worried that we may think the relation exists independently of the pairs of lines.

III. THE IDEALITY DOCTRINE AND REDUCIBILITY

The doctrine of the ideality of relations is taken to have implications for the reducibility of relational propositions. Relational propositions contain relational predicates. I characterize a rela-

¹The following abbreviations will be used for Leibniz's works: A for *Sämtliche Schriften und Briefe*, Academy edition (Darmstadt and Berlin, 1923-), cited by series, volume, and page; C for *Opuscles et fragments inédits*, ed. L. Couturat (Paris, 1903); DM for *Discourse on Metaphysics*, trans. P. G. Lucas and L. Grint (Manchester, 1953); G for *Philosophische Schriften von G. W. Leibniz*, ed. C. I. Gerhardt (Berlin, 1875-90); L for *Philosophical Papers and Letters* 2d ed. (Dordrecht, 1969); LA for *The Leibniz-Arnauld Correspondence*, ed. H. T. Mason (Manchester, 1967); LC for *The Leibniz-Clarke Correspondence*, ed. H. G. Alexander (Manchester, 1956); LP for *Logical Papers*, ed. G. H. R. Parkinson (New York, 1966); M for *The Monadology*, trans. Robert Latta (London, 1898); NE for *New Essays Concerning Human Understanding*, ed. Alfred Langley (Chicago, 1916); T for *Theodicy*, trans. E. M. Huggard (Ontario, 1966).

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tional predicate as involving essential reference to some thing other than the one to which it is attributed. It may be explicitly relational. Following Rescher, I will say that the form of the explicitly relational predicate is the following:

$(\lambda z)zRa =$ the characteristic of standing in the relation R to the object a .²

An implicitly relational predicate does not refer to particular individuals:

$(\exists x)bRx = b$ has the characteristic of standing in the relation R to something.³

I maintain that the doctrine of the ideality of relations entails no more than

R1) All relational propositions are logically equivalent to subject-predicate propositions containing relational predicates.

The doctrine that relations are abstractions entails that relational propositions do not have any additional content beyond that which can be expressed by subject-predicate propositions containing relational predicates. Relations do not really exist, so all that can be said about what exists can be said with relational and nonrelational predicates along with subject terms. For instance, propositions about spatial relations between objects are always logically equivalent to propositions about the spatial properties of the objects. The ideality doctrine does

² Nicholas Rescher, *The Philosophy of Leibniz* (Englewood Cliffs, 1967), p. 73.

³ Jaakko Hintikka treats this sort of predicate as monadic ($(\exists x) \dots Rx$ to b). See his "Leibniz on Plenitude, Relations and the 'Reign of Law'," in *Leibniz: A Collection of Critical Essays*, ed. Harry G. Frankfurt (New York, 1972), p. 162. Still, ' R ' is originally a two-place predicate, and the truth conditions for a proposition containing its ascription to a subject involve essential reference to some individual other than the one explicitly named. I prefer to call nonrelational those predicates which do not have these characteristics.

not require that relational propositions be reducible to propositions with nonrelational predicates only. Russell and Rescher suggest that the doctrine does require this, but the passages cited above contrast 'ideal' relations to relational properties.⁴ Relations are ideal because they cannot be present in two subjects at once. Relational properties belong to one subject only and cannot be called ideal, at least for the reason that relations are. Hintikka and Ishiguro claim that the ideality doctrine entails nothing more than R1, and I must agree.⁵

An examination of Leibniz's actual attempts to reduce relational propositions provides support for their interpretation. Some of his reductions contain nonrelational predicates only. "Peter is similar to Paul" is reducible to "Peter is A now and Paul is A now" (LP, 13). However, Leibniz reduces "Paris loves Helen" to "Paris loves, and by that very fact (*et eo ipso*) Helen is loved" (LP, 14). The reduction contains a non-truth-functional operator, "*eo ipso*,"⁶ and it contains implicitly relational terms, 'loves' and 'loved'.

It is possible that Leibniz never meant the above reduction to be viewed as an ultimate reduction, but there is no evidence to suggest that he had another one in mind. Parkinson points to a letter of 1679 in which Leibniz states that the purpose of reduction is to cast all reasonings in a "certain and indubitable form" (A, ii, I, 498).⁷ He recognized that some arguments requiring the use of relational propositions could not be explicated in terms of traditional subject-predicate logic. He presents as an example the "oblique inference": "Jesus Christ is God; therefore the mother of Jesus Christ is the mother of God" (NE, 560). Elsewhere, Leibniz argued that subject-predicate logic needed

⁴Rescher, *Philosophy of Leibniz*, pp. 72–75; Bertrand Russell, *A Critical Exposition of the Philosophy of Leibniz* (London, 1937), pp. 12–14.

⁵Hintikka, "Plenitude," pp. 164–168; Hidé Ishiguro, "Leibniz's Theory of the Ideality of Relations," in *Leibniz: A Collection of Critical Essays*, ed. Harry G. Frankfurt (New York, 1972), pp. 198–200; see also Hidé Ishiguro, *Leibniz's Philosophy of Logic and Language* (New York, 1972), pp. 88–93.

⁶As Ishiguro points out, material equivalence does not capture the sense of the operator; there are many propositions which can be related through material equivalence and which cannot be related through the "*eo ipso*" operator, e.g., "Snow is white $\equiv 2 + 2 = 4$ "; Ishiguro, "Leibniz's Theory," p. 208.

⁷G. H. R. Parkinson, *Logic and Reality in Leibniz's Metaphysics* (Oxford, 1965), pp. 51–52.

supplementation, a "rational grammar" which could be used to transform relational arguments into forms which traditional logic could handle (C, 36, 244). Leibniz's main purpose in giving reductions may have been to transform relational arguments into a form whose validity can be commonly agreed upon, and it is not clear that this requires the reduction of relational propositions to ones containing nonrelational predicates only.

IV. THE DOCTRINE OF EXTRINSIC DENOMINATION

So far, the evidence shows that Leibniz held a reducibility doctrine R1 but nothing stronger in the way of a *reducibility doctrine*. I argue that he believed in a connection between relational and nonrelational propositions which is not one of reducibility. My argument begins with his doctrine of extrinsic denomination:

There is no denomination so extrinsic as not to have an intrinsic one for its foundation. [L, 526–527. See also L, 268.]

Ishiguro points out that Leibniz probably used 'denomination' as the medieval logicians did.⁸ Anselm means by 'denomination' the appellation of an object by an expression which refers to a quality the object has. Extrinsic and intrinsic denominations are probably different properties. A passage from *Opuscles et fragments inédits* indicates that the contrast between the properties boils down to a contrast between relational and nonrelational properties:

the category of relations such as quantity and position do not constitute intrinsic [nonrelational] denominations themselves, and furthermore, need a basis taken from the category of quality, or intrinsic denomination of accidents. [C, 9]

Leibniz never explicitly stated what he meant by saying that nonrelational properties are the 'basis' or 'foundation' of relational properties. The result has been that the doctrine of extrinsic denomination is not taken seriously as an expression of an important connection between relational and nonrelational propositions. Take John Earman's interpretation of the passage, for instance.⁹ If the doctrine is interpreted as a claim about what

⁸ Ishiguro, "Leibniz's Theory," p. 193, n.6.

⁹ John Earman, "Perceptions and Relations in the Monadology," *Studia Leibnitiana*, Band IX (1977), p. 223.

is true in the ordinary world of physical objects, says Earman, it involves nothing more than Leibniz's belief that all propositions can be translated into subject-predicate form and his containment theory of truth. Leibniz was merely pointing out that the relational predicates of ordinary physical objects are contained in their corresponding subject concepts, in such a way that the predicates are derivable from the subject concepts.¹⁰

However, in the passages quoted above, Leibniz is not merely claiming that relational predicates are derivable from subject concepts. He is saying relational properties need a foundation in *intrinsic* or *nonrelational* properties. Furthermore, there are other passages which strongly suggest that Leibniz meant something quite significant when he said there must be a foundation for relational properties in nonrelational properties. In the *New Essays*, Locke's spokesman says that a subject may remain unchanged even though its relation to some other substance may change. A father may be unchanged by his son's death, for instance, even though he is no longer a father. Leibniz replies,

That statement may very well be made in view of things which are perceived; although in metaphysical strictness it is true that there is no entirely exterior denomination (*denominatio pure extrinseca*) because of the real connection of all things. [NE, 236]

Elsewhere, Leibniz remarks that

there are no extrinsic denominations, and no one becomes a widower in India by the death of his wife in Europe unless a real change occurs in him. [L, 365]

These passages suggest that a change in the relational properties of a substance must be accompanied by a change in its nonrelational properties.

It does not seem too great a leap to infer that Leibniz believed

¹⁰ Earman believes the doctrine of extrinsic denomination can be interpreted as the claim that there must be a founding of the world of physical objects with their relational properties on the world of monads with nonrelational properties only; I believe there must be some kind of founding, but not the kind Earman has in mind. I also believe that the founding involves relational properties of monads. Of course, I differ from Earman in interpreting the doctrine of extrinsic denomination as saying something significant about the connection between the relational properties of physical objects and the nonrelational properties of those *same* objects. Earman holds nothing like R2, but it should be noted that R2 is compatible with his interpretation of Leibniz.

the relational properties of a substance to be determined by its nonrelational properties. Given that a substance has a certain set of nonrelational properties (and perhaps certain other premises), it follows that the substance has a certain set of relational properties. Given changes in the nonrelational properties (and perhaps certain other premises), changes in the relational properties follow. This interpretation gives a natural sense to the claim that the relational properties of a substance have a foundation in its nonrelational properties.

To complete this interpretation, it is necessary to specify the sense in which the relational properties of a substance and changes in these properties follow (at least in part) from its nonrelational properties and changes in these properties. There is no direct textual evidence on this matter. A highly plausible interpretation is suggested by Leibniz's distinction between two ways in which a predicate may be deduced from a subject concept.

One of Leibniz's most notorious doctrines is that the nature of a substance is to have a concept so complete that it is sufficient to allow the deduction from it of all the predicates truly attributable to the substance (DM, 12–13). God can clearly apprehend the notion of Alexander and can deduce all that ever happened to him, all the predicates truly attributable to him. A predicate can be deduced in one of two ways. One kind of deduction or "consecution" is absolutely necessary, in which the contrary of what is deduced entails contradiction. The other kind "is only necessary *ex hypothesi*, and so to speak by accident, but in itself is contingent, the contrary implying no contradiction" (DM, 19–20). Examples of predicates that must be deduced in the second way are predicates attributable to Caesar which would inform us why he "resolved rather to cross the Rubicon than to stop at it and why he won rather than lost the day at Pharsalus." To deduce the predicates is to know "that it was reasonable and consequently assured that this would happen, but not that it is necessary in itself nor that the contrary implies contradiction" (DM, 21). In order to perform the demonstration, it is necessary to suppose the "sequence of things that God has freely chosen and which is founded on the first free decree of God, the import of which is always to do what is most perfect, and the decree which God

made with regard to human nature, which is that man will always do that which appears to him best.” Thus contingent truths about a substance are deducible only on the supposition of God’s free decrees and the resulting physical laws. Necessary truths are deducible solely on the basis of the principle of contradiction, without regard to the free decrees of God (DM, 22).

The predicates which are contained in necessary truths about a substance could be said to be more basic to it, and indeed, in correspondence with Arnauld, Leibniz writes of “basic” predicates:

For all the predicates of Adam depend or do not depend upon other predicates of the same Adam. Setting aside, therefore, those which do depend upon others, one has only to consider together all the basic predicates in order to form the complete concept of Adam adequate to deduce from it everything that is ever to happen to him, as much as is necessary to be able to account for it. [LA, 48]

Perhaps the basic predicates are contained in necessary truths about Adam, while other predicates are contained in contingent truths about him. From the basic predicates, all the others can be deduced according to supposition of the free decrees of God and ancillary physical laws.

In different possible worlds, a set of nonrelational properties could be combined with different sets of relational properties. In the best possible world, a certain set of relational predicates is deducible from a given set of nonrelational ones on the supposition that God chooses to create the best. In a mediocre world, the relational predicates are deducible from nonrelational ones on a different supposition, that God chooses to create the mediocre, for instance. Thus each conception of a possible world contains God’s possible decision. God considers his own possible decisions when he surveys the possible worlds and chooses which one to create.

It is important to note that the conception of contingency which Leibniz uses in distinguishing between two kinds of deduction differs from the conception that has become standard for us. Under the standard conception, to say that a relational predicate is contingently true of Adam is to say that in some possible world Adam lacks that predicate. Leibniz denies that an individual could lack a predicate in the actual world but possess it in another:

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For by the individual concept of Adam I mean, to be sure, a perfect representation of a particular Adam who has particular individual conditions and who is thereby distinguished from an infinite number of other possible persons who are very similar but yet different from him (as every ellipse is different from the circle, however much it approximates to it), and to whom God has preferred him, because it has pleased God to choose precisely this particular order of the universe. . . . There is a possible Adam whose posterity is thus, and an infinite number of other Adams whose posterity would be different; is it not true that these possible Adams (if one may so call them) differ among themselves and that God has chosen just one who is precisely our Adam? [LA, 15–16]

Each merely possible Adam stands in relation to the actual one as each ellipse to the circle. Each is a unique individual.

When Leibniz says that a contingent truth is a proposition whose contrary does not entail a contradiction, he is using “does not entail a contradiction” to attribute a proof-theoretical property to the proposition; that is, that its truth is deducible only through infinite analysis:

In contingent truths, however, though the predicate inheres in the subject, we can never demonstrate this, nor can the proposition ever be reduced to an equation or an identity, but the analysis proceeds to infinity, only God being able to see not the end of the analysis indeed, since there is no end, but the nexus of terms or the inclusion of the predicate in the subject, since he sees everything which is in the series. [L, 265]

That this world is the best of all possible worlds is deducible only through infinite analysis. One would have to examine the infinite characteristics of this world in order to assign a value to it and then compare it to an infinite number of other worlds in order to establish it as the best (see C, 19). Since any deduction of a relational predicate of Adam must proceed on the supposition that this is the best of all possible worlds, it must be a proof of a contingent truth. For Leibniz, the contingently true is true by virtue of the relations of subject and predicate concepts.¹¹

¹¹ It would therefore seem that possible world semantics must be applied carefully to Leibniz's talk of contingent propositions, if it is to be applied at all. For a discussion of the application of possible world semantics for modal logic to Leibniz, see Fabrizio Mondadori, “Leibniz and the Doctrine of Inter-World Identity,” *Studia Leibnitiana*, Band VII (1975), pp. 21–57, and Benson Mates, “Individuals and Modality in the Philosophy of Leibniz,” *Studia Leibnitiana*, Band IV (1972), pp. 81–118. For discussions of the difficulties of applying the semantics to Leibniz, see Robert M. Adams, “Leibniz's Theories of Contingency,” *Rice University Studies: Essays on the Philosophy of Leibniz*, ed. Mark Kulstad (Houston, 1977), pp. 1–41, and Dennis Fried, “Necessity and

That is why he can assert that two possible individuals who do not share the same predicates cannot be the same individual.

Having specified Leibniz's conception of contingency, I am now in a position to state the sense in which the relational properties of a substance can be said to follow from its nonrelational ones. The corresponding relational predicates are deducible from the corresponding nonrelational predicates, and the deduction is of the kind that results in contingent truths. The basic predicates of a substance are its nonrelational ones, or some subset of them. If there is a change in the relational predicates which apply to a substance, then it must be deducible from some change in nonrelational predicates which apply to the substance.

Earman was partly correct in saying that the doctrine of extrinsic denomination involves nothing more than subject-predicate logic and the containment theory of truth. However, he neglected some important features of the containment theory and the way in which Leibniz applied the theory to the question of the deducibility of nonrelational predicates from subject concepts. If I am correct in my interpretation, Leibniz believed in an important connection between relational and nonrelational propositions, but it is not a connection of reducibility:

R2) All relational propositions concerning a substance *S* are deducible from the free decrees of God and ancillary physical laws together with propositions containing only nonrelational predicates attributable to *S*, and the deduction is of the kind that results in contingent truths. Propositions describing a change in the relations of *S* are deducible from the above premises and propositions describing a change in *S*'s nonrelational properties.

The second sentence of R2 covers Leibniz's claim that no one becomes a widower in India by the death of his wife in Europe unless a real change occurs in him. The claim seems far-fetched but is understandable given Leibniz's view that everything which happens to an individual is deducible from his basic, nonrela-

Contingency in Leibniz," *The Philosophical Review*, LXXXVII (1978), pp. 575–584. The Adams article contains an enlightening discussion of Leibniz's proof-theoretic conception of contingency.

tional predicates and the free decrees of God with ancillary laws. If God chooses the best world, a man becomes a husband because it is best for a man with his intrinsic properties to become a husband. If he becomes a widower, that is best also. Since God has changed the man's status, he must have a reason for the change. The reason is to be found partly in the man's intrinsic properties. There is a change in his internal state which makes the relational change one for the best. Perhaps the man's character has changed so that it is no longer best that he have a wife. In the *Discourse on Metaphysics*, Leibniz says that God can know a priori whether Alexander died a natural death or by poison. Indeed, "we can say that there are at all times in the soul of Alexander vestiges of all that has happened to him and the marks of all that will happen to him" (DM, 13).

V. POSSIBILITY AND COMPOSSIBILITY

A test for any interpretation of Leibniz's theory of relations is whether it permits him to make a distinction he wanted to make: the one between possibility and compossibility. A possible substance is one whose existence does not involve contradiction. Two substances are compossible when they can coexist. Not all possible substances are compossible. A possible world is composed of possible substances which can coexist, and there is more than one possible world. Hintikka expresses the distinction between possibility and compossibility by comparing

$$\text{a) } M(\exists x)Ax \ \& \ M(\exists x)Bx$$

$$\text{b) } M((\exists x)Ax \ \& \ (\exists x)Bx)$$

where ' M ' is "it is possible that."¹² a) says that substances of the kind ' A ' are possible and that substances of the kind ' B ' are possible. b) says that substances of both kinds can coexist.

If ' A ' and ' B ' are nonrelational, monadic predicates,

$$\text{c) } (\exists x)Ax \ \& \ (\exists x)Bx$$

is satisfiable if and only if $(\exists x)Ax$ and $(\exists x)Bx$ are both separately satisfiable. a) and b) are not really distinct. However, if ' A ' and ' B ' are complex, relational predicates, it may happen that $(\exists x)Ax$ and $(\exists x)Bx$ are both 'satisfiable while c) is not. For instance, "There exists everybody's master" and "There exists

¹² Hintikka, "Plenitude," pp. 159-160.

nobody's slave" are separately satisfiable but incompatible. Hintikka claims that Leibniz will lose the distinction between possibility and compossibility if he holds that all relational predicates can be reduced to nonrelational ones. Relational predicates must be included as nonreducible parts of subject concepts if Leibniz is to preserve the distinction.

In fact, Hintikka's claim is false if the distinction between possibility and compossibility is interpreted in such a way that it is sufficient that a) not entail b) for some choice of 'A' and 'B'. Suppose all relations are deducible from nonrelational predicates of the relata (such as 'x is the same color as y'). Let 'Ax' be '($\exists y$) ($y \neq x$ & (y) ($y \neq x \rightarrow x$ is the same color as y))' and let 'Bx' be '($\exists y$) ($y \neq x$ & (y) ($y \neq x \rightarrow x$ is not the same color as y))'. Then a) is true and b) is not. On the other hand, suppose the distinction between possibility and compossibility is interpreted in such a way that it is required that it be impossible for two possible individuals in different worlds to coexist in the same world. Since the impossibility of their coexistence cannot be derived from their nonrelational predicates alone, Hintikka has a case for saying that Leibniz loses the distinction between possibility and compossibility if he does not include relational predicates and nonreducible parts of subject concepts.¹³

Under my interpretation, Leibniz could have held the second interpretation of the distinction (which seems a reasonable one to me) and preserved the distinction at the same time. Under my interpretation, he held that the relational predicates which apply to a substance can be deduced from a set of its basic, nonrelational predicates and the free decrees of God, but he did not hold that relational predicates can be eliminated from the concept of the substance. Indeed, we have seen that Leibniz's special conception of contingency is such that he believed predicates which are contingently true of a substance cannot be eliminated from its concept. Human beings are not able to know a priori that a relational predicate belongs to a possible substance, but God can know this when he examines its concept. He will know

¹³ I thank the referee for *The Philosophical Review* for pointing out to me the consequences of the different interpretations of the distinction between possibility and compossibility. The choice of 'A' and 'B' described in the example was suggested by the referee.

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that two possible substances with conflicting relational predicates do not exist in the same possible world, even though the non-relational predicates are compatible.

VI. RELATIONS AND EXPRESSION

A standard puzzle for readers of Leibniz has been the expression doctrine:

Each individual substance is an expression of the entire universe after its own manner, and . . . in its concept all events that occur in it are included with all their circumstances and the whole succession of external things. [LA, 5]

Hintikka has suggested that the expression doctrine means that the concept of an individual substance includes "complex predicates," which seem to be implicitly relational predicates. The complex predicates which apply to a substance implicitly refer to all other substances standing in some relation to it. Because its concept contains these predicates, a substance expresses everything in the possible world containing it.¹⁴

This could be part of what Leibniz meant by expression, but it cannot be all:

One thing expresses another . . . when there exists a constant and fixed relationship between what can be said of one and the other . . . this expression occurs everywhere, because every substance is in harmony with every other and undergoes some proportionate change which corresponds to the smallest change occurring in the whole universe, although this change is more or less noticeable to the extent that other bodies or their actions have more or less connexion with ours. [LA, 144. See also GI, 383; C, 15; GVII, 263.]

It is possible to interpret the talk of "constant and fixed relationship" in a way that is consistent with Hintikka's interpretation. However, the talk of change indicates that a fuller interpretation is needed.

A natural interpretation is the following: a substance stands in some relation to every other substance in the same possible world; if it undergoes a change in nonrelational properties, all the other substances will undergo a change in their relational properties (if a thin man becomes fat everyone now has some property of

¹⁴ Hintikka, "Plenitude," pp. 168–170.

being related to a fat rather than a thin man); by R2, this means that each substance undergoes a change in nonrelational properties.

There is some evidence that this is the reasoning which led Leibniz to postulate the wave effect of expression. In "First Truths," Leibniz affirms his doctrines that there is no purely extrinsic denomination and that each substance expresses the entire universe. Then he says that each created substance exerts action on all others:

For if a change occurs in one, *some corresponding change results in all others, because their denomination is changed.* This is confirmed by our experience of nature, for we observe that in a vessel full of liquid (the whole universe is such a vessel) a motion made in the middle is propagated to the edges, though it may become more and more insensible as it recedes farther from its origin. [L, 269; italics mine]

The change in denomination occurs because of the change in relational properties and because change in relational properties does not occur without change in nonrelational properties.

VII. RELATIONS BETWEEN MONADS

I have discussed R2 as it applies to all sorts of individuals, including ones like Caesar and Adam. R2 can be used to explain the relations between simple substances or monads.

Leibniz believed each monad was characterized in terms of its perceptions of the entire universe or possible world to which it belongs. I agree with Furth's claim that these perceptions must be interpreted as purely intensional entities. To say that a monad perceives an object is not to presuppose that the object exists.¹⁵ When Des Bosses asserts that God cannot create any one monad without creating the rest because their perceptions must correspond with each other and be perceptions of the same universe, Leibniz replies,

There would be no deception of rational creatures, however, even if everything outside of them did not correspond exactly to their experiences, or indeed, if nothing did, just as if there were only one mind; because everything would happen just as if all other things existed, and this mind, acting with reason, would not charge itself with any fault. For this is not to err. [L, 611]

¹⁵ Montgomery Furth, "Monadology," *Leibniz: A Collection of Critical Essays*, ed. Harry G. Frankfurt (New York, 1972), p. 103.

Elsewhere, Leibniz says that each monad represents the entire universe but is "confused as regards the variety of particular things in the whole universe, and can be distinct only as regards a small part of things." Monads are "limited and differentiated through the degrees of their distinct perceptions" (M, 250). Thus the internal state of a monad is constituted by its perceptions along with the intensity and clarity of its perceptions.

I suggest that the nonrelational predicates which apply to a monad specify such a state. Relational predicates apply to a monad also, but these predicates do not stand for perceptions only. They stand for relational properties which make it possible for monads to constitute individuals like Adam. Adam was composed of a collection of monads which constituted his organic body. A "dominant" monad unifies the collection, makes it into the body of one individual. A relational proposition about a monad might inform us about what collection of monads it belongs to.

When we apply R2 to monads, we get the claim that all relational propositions about a monad are deducible from the free decrees of God and ancillary laws together with propositions about its perceptions. To understand how such a deduction could be made, we can start with the plausible supposition that a dominant monad unifies a collection of monads into a single body through its perceptions. Perhaps the clearest and most intense of its perceptions are of certain monads; as intentional objects these monads correspond to the collection it unifies into a body. That is, the dominant monad perceives the monads it dominates. The latter are differentiated by *their* perceptions, so the dominant monad perceives monads with certain perceptions. The following passage is some evidence that Leibniz thought of the relations between monads in this way:

And each outstanding simple substance or monad which forms the center of a compound substance (such as an animal, for example), and is the principle of its uniqueness, is surrounded by a mass composed of an infinity of other monads which constitute the body belonging to this central monad, corresponding to the affections by which it represents, as in a kind of center, the things which are outside it. [L, 637]

Perhaps all monads perceived by the dominant one have similar perceptions in that they perceive approximately the same part of

the universe. By perceiving the perceptions of the monads constituting its body, the dominant monad could represent, as “in a kind of center, the things which are outside it.”

R2 tells us that the relational proposition that a monad belongs to the body of Adam could be deduced from a proposition about the perceptions of the monad, together with the free decrees of God and ancillary laws. Presumably, God can see through infinite analysis that in the best world a monad with certain perceptions and not others belongs to the body of Adam and is perceived by the dominant monad of Adam.

VIII. CONCLUDING REMARKS

If I am right in my interpretation, there is a remarkable and previously unnoticed coherence among Leibniz’s doctrine of truth, his theory of relations, his doctrine of expression, and his theory of monads. The key to discovering this coherence is to shift the focus of attention from the question of the reducibility of relations to the question of how relational properties are founded upon nonrelational properties. Once this shift is made, Leibniz’s theory of relations assumes a central place in his philosophy and is the link between the theory of truth and the metaphysical doctrines.¹⁶

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