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LEIBNIZ'S PRINCIPLE OF INTELLIGIBILITY

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IN sec. 32 of the "Monadology," Leibniz describes the principle of sufficient reason (PSR) as one of "the two great principles" of his reasoning, "by virtue of which we consider that we can find no true or existent fact, no true assertion, without there being a sufficient reason, why it is thus and not otherwise...."[1] In what follows, I do not propose to challenge this assessment of the importance of the PSR in Leibniz's thought; however, I do want to raise a question concerning the form of the "principle of reason" that he relies on in certain key philosophical contexts. I shall argue that within the world of created things, Leibniz is committed not simply to the common axiom that nothing happens without a reason [*nihil fit sine ratione*], but to the more restrictive principle that nothing happens for which it is impossible to give a *natural* reason, i.e., a reason drawn from the natures of the beings that belong to this world. In order to distinguish this principle from the unrestricted PSR, I shall refer to it as his "principle of intelligibility" (PInt). My claim in this paper will be, first, that Leibniz has important reasons for preferring PInt over the weaker PSR as a "principle of reason" governing the operations of created things; and, second, that PInt is only contingently true.

I. THE PRINCIPLE OF INTELLIGIBILITY

In response to Locke's claim that it lies within God's power to "superadd" to the essence of matter whatever qualities he pleases, Leibniz writes in the *New Essays*:

> Whenever we find some quality in a subject, we ought to believe that if we understood the nature of both the subject and the quality we would conceive how the quality could arise from it. So within the order of nature (miracles apart) it is not at God's arbitrary discretion to attach this or that quality haphazardly to substances. He will never give them any that are not natural to them, that is, that cannot arise from their nature as explicable modifications (A VI 6, 66/RB 66).[2]

In this passage, Leibniz articulates a conception of the intrinsic intelligibility of nature which directly opposes the position of Locke and at the same time goes beyond anything demanded by the PSR. He suggests that it is not enough simply that there be *some* reason why an entity has any of the qualities it does, but that "within the order of nature" it must always be possible to

conceive how these qualities arise from the *nature of* the subject in question as "explicable modifications." Put somewhat more formally, Leibniz seems to commit himself to the following principle of intelligibility:

> [PInt] Within the order of nature, for any entity a and any property F that is truly predicable of a, (i) there is a reason why a is F; (ii) this reason explains a's being F in terms of F's being an "explicable modification" of the nature of a.

From this definition it is clear that for PInt to hold within a world, PSR must also hold; however, the converse does not follow. Clause (ii) adds to the unrestricted PSR the further requirement that the reason why a particular entity a has any of the properties it does must be, in Leibniz's terms, a *natural* reason, or a reason drawn from the nature of a.[3]

At the outset it is important to distinguish two different ways in which PInt is satisfied in Leibniz's philosophy, at the level of: a) general or species natures; b) singular or individual natures. In a letter to de Volder, he draws this distinction in terms of the different senses in which properties may be conceived as "following from" the nature of a thing: namely, that "from universal natures there follow eternal consequences, from singular natures also temporal ones" (GP II 263/L 534). In this paper, I will be primarily concerned with the first of these senses, i.e., with Leibniz's application of PInt to general or species natures, although in the next section I will have something to say about the relationship between PInt and individual natures. As applied to general natures, such as *matter* or *soul*, PInt requires that for any property truly predicable of a being it must be possible to conceive how such a property follows as an "eternal consequence" of the nature of that being. What this means for Leibniz is that it must be possible to show that a being of that type *could* have such a property, insofar as it is possible to conceive of the property in question as an attribute, or as the modification of an attribute, which partly defines the nature of that being.[4] From this we see that one of the principal functions of PInt is to exclude the ascription to an entity of any quality that cannot be conceived as following from its own natural powers or capacities.[5] Thus, if we suppose that it is of the nature of a material thing to be an extended being endowed with active and passive force, it would be consistent with PInt to ascribe qualities of size, shape, momentum and resistance to such an entity, since any of these can be conceived as modifications of its principle attributes. However, it would be a violation of PInt to think of a material thing as primitively attracting another material thing, or as thinking, since neither of these properties can be explained in terms of its natural powers.[6]

Having given a sketch of the content of PInt, I now want to turn to three specific examples of Leibniz's application of this principle to issues in natural philosophy.

i) *The Science of Dynamics*[7]

In the late 1680s, Leibniz offered what he took to be a definitive objection to Descartes' conception of matter. Starting from the observation that

Descartes erred in asserting as a basic law of physics the conservation of the quantity of motion rather than the conservation of force or effect, Leibniz went on to conclude that Descartes had also propounded a mistaken account of the nature of matter. His argument rests centrally on what I have called his "principle of intelligibility": according to Descartes, matter is by nature *res extensa*; but if this is so, then all the effects of matter (including the basic laws of motion) must be explainable in terms of the notion of *res extensa*; yet the law of the conservation of force cannot be explained in this way; therefore, the Cartesian conception of matter must be mistaken. This is a pattern of reasoning that is observed repeatedly in Leibniz's writings. In a letter published in the *Journal des Scavans* in July 1691, he writes: "If the essence of body consisted in extension, this extension alone would have to suffice to render reasonable all the properties of body. But this is not so" (GP IV 464). The notion of body as a merely extended being offers no explanation of the observation that it is a quantity of *force* (what Leibniz interprets as a body's capacity to achieve a particular effect) that is conserved in dynamical interactions. Since there is nothing to material things as conceived by Descartes which could render this fact intelligible, body cannot be endowed with such a nature. Instead, it is necessary to see matter as itself endowed with an intrinsic force or activity.[8] The role of PInt in Leibniz's critique of Descartes' physics is again evident in the *Specimen Dynamicum* of 1695. There he draws explicitly on the following version of the principle:

> there is no natural truth in things for which we must find the reason in a divine action or will, rather God has always put into things themselves some properties by which all their predicates can be explained (GM VI 242/L 441).

Given this requirement, and the observation that a distinct quality of force is required for an explanation of the phenomena of motion, we may conclude, Leibniz believes, that the Cartesian conception of matter is inadequate and that the correct conception of matter must be as a *res dynamica*.

ii) *Occult Qualities*

In numerous works, Leibniz voices his disdain for what he refers to as "occult" qualities: hypothetical forms, faculties or powers which are ascribed to bodies for the purpose of accounting for a particular natural phenomenon, without an attempt being made to explain how such a quality might intelligibly follow from the nature of matter.[9] Foremost among his targets on this count are two qualities which played important roles in contemporary scientific theories: the primitive "hardness" of material atoms and the primitive "attraction" of matter, which Leibniz regards as a presupposition of the Newtonian theory of gravitation. In both cases, he traces his opposition to these qualities, and to the physical theories they support, to their violation of PInt. Concerning the first, he writes in a 1711 letter to Hartsoeker:

> If anyone claims that the mechanism responsible for the hardness [of matter]

> is unknown to him, he is right; but if he means that hardness comes from something other than mechanical causes, and if he has recourse to a primitive hardness, as do the defenders of atoms, he appeals to a quality which is so occult that it could not be rendered clear, that is, to something irrational, which goes against the first principles of reasoning through the view it includes that something happens in nature for which there is no natural reason (GP III 519).[10]

Similarly, in the late essay *Antibarbarus physicus*, he writes of the Newtonians:

> those who have shown that the astronomical laws can be explained by assuming the mutual gravitation of the planets have done something very worthwhile, even if they may not have given the reason for this gravitation. But if certain people, abusing this beautiful discovery, think that the explanation given is so satisfactory that there is nothing left to explain, and if they think that gravity is a thing essential to matter, then they slip back into *barbarism in physics* and into the *occult qualities of the Scholastics* (GP VII 338-9/AG 314).[11]

In the case of both hardness and gravity, what Leibniz objects to are not the qualities themselves, but their aspiration (in certain scientific theories) to the status of *primitive* properties of matter, i.e., properties which in principle cannot be explained in terms of the nature of matter and the mechanical properties that follow from it. In a 1715 letter to Bourguet, he frames this criticism in the form of a general statement of the principle PInt: "we disapprove of the method of those who, like the scholastics of another time, assume irrational qualities, that is, primitive qualities which have no natural reason, explainable by the nature of the subject to which this quality must belong" (GP III 580/L 663). PInt is thus specifically invoked by Leibniz to rule out brute properties which cannot be accounted for in terms of the natures which God has given to things. As he explains in the *New Essays*, such occult qualities are objectionable precisely because they are "out of reach of reason":

> if...God gave things *accidental powers which were not rooted in their natures* and were therefore out of reach of reason in general, that would be a back door through which to re-admit "over-occult qualities" which no mind can understand,...helpful goblins which come forward like gods on the stage, or like the fairies in *Amadis*, to do on demand anything that a philosopher wants of them, without ways or means (A VI 6, 382/RB 382).

Once occult qualities are admitted, he maintains, license is given to posit qualities at will as "explanations" of observed phenomena. To avoid this consequence, explanations of phenomena must always be framed in terms of properties which we can conceive as arising naturally from the beings to which they are attributed.[12]

iii) *Occasionalism*

Leibniz's attack on occult qualities is closely related to his critique of the doctrine of occasionalism. As he understands it, the occasionalist position is that in explaining the existence of regularities in nature it is sometimes

sufficient to say that God has decreed a "general law" that things should operate in one way rather than another. This might be the only reason, for example, why material things appear to have a natural attraction for one another or why minds and bodies appear to interact.[13] In Leibniz's view, however, the occasionalist does no more than posit a "perpetual miracle" in explaining such regularities by an appeal to the general will of God. Here, again, his opposition reflects his support for PInt: what the occasionalist has failed to do is to pursue an explanation of the operations of created things in terms of the natural powers of those things. As he writes in his 1698 reply to Pierre Bayle:

> [L]et us see whether the system of occasional causes does not in fact assume a perpetual miracle. Here it is said that it does not, because according to this system God would only act through general laws. I agree, but in my opinion this does not suffice to remove the miracles; even if God should do this continuously, they would not cease being miracles, taking this word, not in the popular sense of a rare and marvelous thing, but in the philosophical sense of what exceeds the powers of created things. It is not enough to say that God has made a general law; for besides this decree there must be a natural means of executing it; that is, it is necesssary that what happens can be explained through the nature that God gives to things (GP IV 520/L 494).[14]

In numerous texts Leibniz makes it clear that one of his principal criticisms of occasionalism involves its appeal to God as the immediate explanation for the effects of created things in place of their own natural powers and capacities. Again, this complaint can be interpreted in terms of the occasionalists' failure to uphold the principle PInt.[15]

The preceding examples show how some of Leibniz's most important positions in natural philosophy draw, both implicitly and explicitly, on the principle PInt. In light of this, I would suggest that it is this principle rather than the unrestricted PSR ("nothing happens without a reason") which best reflects his persistent demand for reason within created nature. This should hardly be surprising when we consider that no proponent of either occult qualities or occasionalism is committed to denying PSR. In every case, a reason can be furnished (for why a thing possesses certain qualities or why certain regularities are observed in nature) by appealing either to the absolute freedom or absolute perfection of the will of God. The distinguishing feature of Leibniz's position is that he rejects both of these strategies as failing to acknowledge the *wisdom* God has exercised in selecting this world for existence. In attempting to give a reason for a certain fact, it is never enough simply to say: that is the way God wanted it.[16] To explain things in this way, he argues in the "New System," is "to invoke what is called a *Deus ex machina*." And,

> when one does that without giving any other explanation derived from the order of secondary causes, it is, properly speaking, to have recourse to miracle. In philosophy we must try to give reasons by showing how things are brought about by divine wisdom, in conformity with the notion of the subject in question (GP IV 483-84/AG 143).

Passages such as this demonstrate, I think, that Leibniz's confidence in PInt as the principle of reason operative within the domain of nature depends ultimately on his faith that God's wisdom has directed his will in the choice of this world for existence, *and* that on account of this wisdom God "conducts himself in accordance with the natures of things, in such a way that he produces and conserves in them only what is suitable to them and can be explained through their natures" (A VI 6, 381/RB 381). Herein, I shall argue later, is a principal feature of the metaphysical perfection which marks this as the best of all possible worlds.

II. PInt and the "Predicate in Subject Principle"

The principle PInt is obviously closely related to the so-called "predicate in subject principle" (PSP), which Leibniz himself cites as a more precise statement of the PSR.[17] Given the distinction I have claimed to find between PInt and the PSR, the clarification of the relationship between these principles is of some importance.

According to the PSP, in any true proposition the concept of the predicate is contained within the concept of the subject. Properly understood, this principle has more than a merely logical or semantic significance. The deeper metaphysical import of the PSP is that it requires an objective ground [*fundamentum a parte rei*] for the truth of any proposition, based upon a relation of inclusion between the essences or divine ideas expressed by its subject and predicate terms.[18] The principle I have designated PInt claims, in a similar fashion, that (within the order of nature) no quality may be attributed to a being, for which it is impossible to give a reason drawn from the nature of that being. Now, in the case of the "eternal consequences" that follow from general or species natures, it may be difficult at first to distinguish the force of these two principles: both appear to assert that a quality F may be truly predicated of a species A, if and only if it can be conceived how F follows from the nature of A, in the sense that F can be revealed (upon a finite analysis) to be contained within the concept of A. In fact, however, the two principles assert something quite different. The proper way of understanding PInt is to see it as placing a limitation on the properties that can be predicated of an *individual* of a given species. Thus, PInt claims not simply that any property predicable of a species must be contained within the concept of that species, but that any property predicable of an individual must follow from the species nature of that individual.

This difference between the content of PInt and that of the PSP parallels the difference between their respective roles in Leibniz's philosophy. For Leibniz, the PSP functions as a condition on the very possibility of truthful discourse, as it is grounded in the eternal relations of divine ideas; PInt, on the other hand, is specifically concerned with expressing a condition on the intelligibility of the created natural order. The significance of this point can best be seen by noting that PInt, unlike the PSP, is a valid principle in Leibniz's philosophy *only* when it is restricted to the "order of nature," as

opposed to creation as a whole which includes events attributable to the miraculous actions of God. Thus, even in this best of all possible worlds, there is an important class of exceptions to a generalized form of PInt. This is because Leibniz accepts that in certain circumstances God has seen fit to grant material things qualities which do not follow from the nature of matter. For example, God may have thought it appropriate to give some corporeal being the power to walk on water; or God may have thought it appropriate that on certain occasions matter should undergo a substantial transformation: bread becomes the body of Christ, wine the blood of Christ. Such miracles would be obvious violations of a generalized PInt, since they entail the existence of properties which cannot be conceived to arise from the natural powers of material things.[19]

A similar distinction between the force of PInt and the PSP can be drawn in the case of singular predications. I have already said that Leibniz sees the principle PInt as applicable to individual natures, as well as to general or species natures. It is well-known that he conceives of the nature of any individual substance as an active *causal* principle, sufficient to determine its successive states in the order in which they occur.[20] Furthermore, to the extent that such natures are associated with the notion of an individual "law of the series," they serve also as *explanatory* principles, in the sense that were any mind capable of comprehending fully the law of an individual substance (in the manner of God), that mind would be in a position to understand why that substance possesses all the natural properties it does in the particular order in which they occur.[21] At the same time, however, Leibniz advances the PSP as the principle which leads him to the demand for a *complete* concept of an individual being. Insofar as any true predication concerning a singular thing must be grounded in a connection between the concept of the predicate and the concept of the subject, it follows that there must be some concept which includes everything that is truly predicable of the same subject; and this "complete concept" he identifies with the essence or divine idea of an individual substance.[22]

The difference between what is demanded of individual beings by PInt and the PSP can again be brought into focus by considering the possibility of miracles. What I have said about PInt suggests that there at least could be properties predicable of a thing which are, strictly speaking, unintelligible with respect to any understanding of its natural powers. In this case there would be no ground within the nature of an individual for its possessing the properties in question (i.e., they would be truly miraculous); nevertheless, the PSP requires that there be a complete concept which contains everything predicable of that substance—miracles included. If these two claims are to be reconciled it must be Leibniz's position that there can be properties included in the complete concept of an individual which do not follow from any consideration of it as a being endowed with specific natural powers. And this in fact appears to be his view. A key text is "Discourse on Metaphysics," sec. 16:

> It now only remains to explain how God can sometimes influence men and other substances by an extraordinary and miraculous concourse, since it seems that nothing extraordinary and supernatural can happen to them, given that all their events are only consequences of their nature....[I]n order that my words may be as irreproachable as my meaning, it would be good to connect certain ways of speaking with certain thoughts. We could call that which includes everything we express our essence or idea; since this expresses our union with God himself, it has no limits and nothing surpasses it. But that which is limited in us could be called our nature or our power; and in that sense, that which surpasses the natures of all created substances is supernatural (GP IV 441-2/AG 48-9).

As I read this passage, Leibniz suggests that there is a distinction to be drawn between properties which follow from the nature of an individual and those which belong to it only through the extraordinary actions of God. The latter miraculous properties would violate a generalized form of the principle PInt; however, they are not violations of the PSP, since they are included in what he calls the "essence" or "idea" of the substance, "which includes everything we express," including "our union with God." The fundamental difference between miraculous and natural properties is that the ground for the inclusion of the former in the complete concept of a substance is not God's decree to create a being with specific natural powers (a particular principle of activity and passivity), but rather an "extraordinary action" which uniquely unites certain miraculous qualities with that individual.[23]

The upshot of these considerations is that, despite their superficial resemblance, the PSP and PInt are indeed distinct principles, serving distinct functions in Leibniz's system. As Leibniz often remarks the PSP is a universally valid principle, stating a necessary and sufficient condition for the truth of any affirmative proposition—"universal or singular, necessary or contingent" (C 519/L 268). PInt, by contrast, is designed to express a condition on the intelligibility of the created natural order. Within this order, Leibniz insists, it is always possible to explain the ascription of a quality to a given subject by appealing to the intrinsic nature of that subject. This is not to say, however, that everything that happens within the world can be understood in these terms; for Leibniz is adamant that there are genuine miracles in the world, events whose intelligibility transcends the natural order and whose existence could only be explained in terms of the "universal law of the general order" to which God alone has access (GP IV 442/AG 49).

III. The Contingency of PInt

As we saw in section 1, Leibniz employs the following form of argument with some frequency: nature could not have such-and-such a form, since to suppose it did would be "contrary to reason." A good example of this strategy appears in sec. 127 of his Fifth Letter to Samuel Clarke, where the charge of ignoring the significance of the "principle of sufficient reason" is directed against a broad range of philosophical targets:[24]

> It is true, [the principle of sufficient reason] has been neglected out of carelessness on many occasions, but that neglect has been the true cause of chimeras such as are, for instance, an absolute real time or space, a void, atoms, attraction in the Scholastic sense, a physical influence of the soul over the body, and a thousand other fictions, either derived from erroneous opinions of the ancients, or lately invented by modern philosophers (GP VII 419-20/AG 346).

In each of the above instances—the supposition of a real space and time, of a primitive attraction, of a vacuum and atoms—Leibniz argues that a fiction has been created in positing entities whose existence is inconsistent with the principle of sufficient reason. As a claim about what can and cannot exist in created nature, his position is weaker than it might at first appear. When he is being his most candid, he allows that the impossibility of the existence of entities such as atoms is predicated on the exercise of God's wisdom. As such, these entities are things which are not *logically* impossible, but only things which would not exist in a world selected by divine wisdom. Thus he writes to Johann Bernoulli in 1699:

> I do not say that a vacuum, an atom, and other things of this sort are impossible, but only that they are not in agreement with divine wisdom; for although God would have produced nothing, except according to the laws of wisdom, nevertheless, the objects of power and wisdom are different and should not be confused. God chooses from among infinite possibles, on the basis of his wisdom, that which is most appropriate [*convenientissimum*] (GM III 565).[25]

Elaborating on this point in a subsequent letter to Bernoulli, he writes:

> Possibles are those things which do not imply a contradiction. Actuals are nothing except the best of possibles (with everything having been compared); thus those things which are less perfect are not for that reason impossible; for we must distinguish between those things which God can do and those things which he wants: he can do everything, he wants the best (GM III 574).[26]

According to Leibniz, none of the physical hypotheses he most frequently attacks (atoms, a vacuum, attraction) imply a logical contradiction. Thus there is a possible world in which such notions would be instantiated; phenomena such as these could have been created by God. The most we are entitled to claim, he says, is that God was not motivated to create such a world, but was instead moved by his wisdom to choose this world, whose perfection he deemed greatest. If this is true, then we are left with an important question concerning the modality of PSR. In his letter to Clarke, Leibniz argues that the hypothesis of atoms in a vacuum is to be rejected on the grounds that it violates PSR; at the same time, however, he allows in his remarks to Bernoulli that such a hypothesis represents a logical possibility that God has chosen not to realize, but which he could have realized. Our question is whether Leibniz has here committed himself to the claim that PSR, in the form of the axiom *nihil fit sine ratione*, would itself be false in worlds in which such a hypothesis were realized.

Since PSR lies at the very heart of Leibniz's system and a number of passages support its necessity, an admission of this sort would be a serious blow to the coherence of his philosophy.[27] One way of avoiding this conclu-

sion, I would suggest, is to suppose that what Leibniz commits himself to in the texts we have considered is not the possibility of a outright failure of PSR in worlds other than our own, but only a failure of the principle PInt.[28] If this is so, however, it remains a significant acknowledgement; for, I have argued, it is PInt, and not the unrestricted version of PSR, which functions as Leibniz's primary "principle of reason" within the world of created things. As we saw in section 1, Leibniz's opposition to "occult qualities," such as a primitive hardness or a primitive attraction, rests most centrally on their violation not of PSR, but of the more specific demand that for any property ascribed to material things it must be possible to find a reason for it within the nature of matter. We also learned there that this is a requirement he associates with the operation of divine wisdom. We have now seen, however, that Leibniz draws a sharp distinction between God's power and God's wisdom: the former he associates with logical possibility, or what could be; the latter, with the contingent, or what is. If, then, PInt is to be identified as a characteristic of God's wisdom rather than his power, it follows that God *could* have created a world in which PInt failed to hold, i.e., a world in which it was impossible to explain the operations of created things in terms of their own natures. The most that can be claimed on behalf of PInt, therefore, is that it is expressive of the rational order found in this best of all possible worlds; that is, it is part of God's conception of this as the possible world of greatest metaphysical perfection that the qualities of things can always in principle be comprehended in terms of the natures of those things. In less perfect worlds, this principle might well fail. As a consequence, PInt (unlike the unrestricted PSR) must be regarded as a contingent truth.

IV. Conclusion

The critical place of the principle of sufficient reason within Leibniz's philosophy was clearly recognized by Leibniz himself and has been acknowledged by almost all commentators since. In this paper, I have argued for the prominence in his writings of a stronger version of this principle which I have labelled the "principle of intelligibility." According to this principle, which Leibniz frequently cites (sometimes even referring to it as "the principle of sufficient reason"), it is not enough simply that there be some reason why everything is the way it is rather than otherwise; in addition, within the "order of nature," it must be possible to explain why any entity has the properties it does in terms of the nature of that entity.

The significance of Leibniz's demand for this degree of intelligibility within created nature can only be fully understood against the background of his theodicy. A fundamental tenet of that theory is the rejection of all attempts to explain the circumstances of things within this world through an appeal to the "mere will of God," without attributing any further reason to that will.[29] According to Leibniz, God chooses to create this world rather

than any other *because* it is the possible world of greatest perfection. This reason for acting is furnished by God's wisdom, and his will is naturally "inclined" to act on this reason by virtue of its perfect goodness.[30] Now, one way of reading the conclusion of the present paper is to see it as arguing that this conditioning of God's will by his wisdom supports the satisfaction of PSR *within* the created world in two quite different ways. In the first place, insofar as God's wisdom supplies a sufficient reason for his choosing to actualize this possible world rather than any other, there emerges a general reason why everything within this world is the way it is rather than otherwise: namely, because its being so contributes in an essential way to this being the world of greatest perfection, and God has willed that such a world should exist. As it stands, this pattern of explanation is strong enough to satisfy the demand for a sufficient reason for everything that is the case. Moreover, this form of explanation clearly contributes to Leibniz's theodicean strategy in, for example, his justification of the existence of evil. Nevertheless, it does not, I think, exhaust his conception of the rationality of created nature, and a sign of this is that this weak fulfillment of the PSR is insufficient to distinguish Leibniz's position from that of opponents like Malebranche, who also see God as acting so as to secure the best possible result overall and can thus offer a similar explanation for whatever happens in the world.[31]

What has been insufficiently appreciated is that Leibniz's conception of God's wisdom further issues in a second and stronger demand for reason within created nature. In opposition to those schools whose account of the providential order of the world is limited to a general acknowledgement of God's foresight and goodness, Leibniz insists that, in conceiving of the possible world of greatest perfection, God has has gone so far as to write the conditions for intelligibility into the very fabric of the world, such that for whatever obtains within the order of nature it is possible to understand why it obtains in terms of the intrinsic natures of the beings which comprise the world. This is the force of the principle I have called PInt. And it is only on the basis of this stronger condition, which is in effect a demand that the PSR be realized immanently within the world of created things, that Leibniz's position in natural philosophy can be clearly distinguished from such rivals as occasionalism and Newtonianism.

Given the existence of miracles, PInt clearly fails as a universally valid principle for Leibniz. Against this, however, it must be noted that miracles play a very limited role in his philosophy. Instead, Leibniz is committed to the position that the best of all possible worlds is in general one in which PInt holds sway: one in which, *ceteris paribus*, the properties of things can be conceived as following from the natural powers of those things; and this both at the level of general natures and at the level of individual substances. While there may be rare exceptions to PInt even in this world on account of miracles, it is clear that Leibniz sees PInt as a principle whose scope of application is maximized in the present world. I would argue that

this reflects PInt's status as one of the most important indicators of the order which partly defines the metaphysical perfection of a world. Orderly worlds are worlds in which miracles are minimized, in which God's intentions are carried out through secondary causes, the natural powers of the beings he has created. Less orderly worlds are ones in which PInt fails to hold even in general, worlds in which there may occur "perpetual miracles": regular instances of qualities which cannot be explained in terms of the natures of the beings to which they belong, but are simply "superadded" by God's singular decrees. Once again, this implies that PInt, Leibniz's strongest demand for reason within the created world, is at best contingently true. In every possible world there is some reason why everything is the way it is. Only in the best of all possible worlds, however, can this reason generally be given in terms of the natures of the beings which make up the world.[32]

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NOTES

1. GP VI 612/AG 217. The following abbreviations are used throughout in referring to works by Leibniz:

A = *G. W. Leibniz, Sämtliche Schriften und Briefe* (Darmstadt and Berlin, 1923), cited by series, volume, and page;
AG = *G. W. Leibniz : Philosophical Essays*, R. Ariew and D. Garber (eds.) (Indianapolis, 1989);
C = *Opuscules et fragments inédits de Leibniz*, L. Couturat (ed.) (Paris, 1903);
GB = *Der Briefwechsel von Gottfried Wilhelm Leibniz mit Mathematikern*, C. I. Gerhardt (ed.) (Berlin, 1899);
GLW = *Briefwechsel zwischen Leibniz und Christian Wolff*, C. I. Gerhardt (ed.) (Halle, 1860; reprinted Hildesheim, 1963);
GM = *Leibniz' Mathematische Schriften*, C. I. Gerhardt (ed.) (Berlin and Halle, 1849-55), cited by volume and page;
GP = *Die philosophischen Schriften von Gottfried Wilhelm Leibniz*, C. I. Gerhardt (ed.) (Berlin, 1875-90), cited by volume and page;
H = *Theodicy*, E. M. Huggard (trans.) (LaSalle, IL, 1985);
L = *Leibniz: Philosophical Papers and Letters*, 2nd ed., L. E. Loemker (ed. and trans.) (Dordrecht and Boston, 1969);
M = *The Leibniz-Arnauld Correspondence*, H. T. Mason (ed. and trans.) (Manchester, 1967);
P = *Leibniz: Philosophical Writings*, G. H. R. Parkinson (ed.), Mary Morris and G. H. R. Parkinson (trans.) (London, 1973);
RB = *New Essays on Human Understanding*, P. Remnant and J. Bennett (eds. and trans.) (Cambridge, 1981).

2. For Locke's position, see "Mr. Locke's Reply to the Right Reverend the Lord Bishop of Worcester's Answer to his Second Letter, in *The Works of John Locke*, 12th ed. (London, 1824), vol. 3, esp. pp. 460-68.

3. For Leibniz's use of the expression "natural reason" [*raison naturelle*], see GP III 519 and GP III 580/L 663 (both passages are quoted in subsection ii below).

4. According to PInt, within the "order of nature," a property F is truly predicable

of an individual a only if F can be conceived as an "explicable modification" of the nature of a. I am assuming here that this condition is at least implied by the requirement that F "follows from" the (species) nature of a, provided that we understand the latter in the following sense: a property F follows from the nature of a (let this nature be expressed by the concept A) if and only if a finite analysis reveals F to be contained within A, or a finite analysis reveals an attribute G to be contained within A and F is a modification of G. As an example of how the latter requirement is to be applied, suppose that it is the nature of a to be a *body*; if so, then it follows from the nature of a both that it is *extended* and that it has a *shape*, since a finite analysis of a's nature reveals the concept of extension to be contained in the concept of body and shape is a modification of extension. As I understand him, both of these properties would count for Leibniz as "explicable modifications" of a's nature. The equivalence of the notions of "following from" and "being explicable in terms of" a given nature is suggested by a passage from a 1710 essay: "[F]rom anything taken by itself nothing can be deduced and explained except variations of the attributes which constitute it" (GP VII 328).

5. As Leibniz writes in the Preface to the *New Essays*: "I acknowledge that we must not deny what we do not understand, but I add that we are entitled to deny (within the natural order at least) whatever is absolutely unintelligible and inexplicable. . . .[A]lthough what creatures conceive is not the measure of God's powers, their 'conceptivity' or power of conceiving is the measure of nature's powers: everything which is in accord with the natural order can be conceived or understood by some creature" (A VI 6, 65/RB 65).

6. "[W]e may take it that matter will not naturally possess the attractive power referred to above [i.e., gravity], and that it will not of itself move in a curved path, because it is impossible to conceive how this could happen—that is, to explain it mechanically—whereas what is natural must be such as could become distinctly conceivable by anyone admitted into the secrets of things. . . .As for thought, it is certain. . .that it cannot be an intelligible modification of matter and be comprehensible and explicable in terms of it" (A VI 6, 66/RB 66; cf. GP III 355-6/AG 290-1). The contrast with Locke's position here is striking: "It is true, I say, 'that bodies operate by impulse, and nothing else'. . . .But I am since convinced by the judicious Mr. Newton's incomparable book, that it is too bold a presumption to limit God's power, in this point by my narrow conceptions. The gravitation of matter towards matter, by ways inconceivable to me, is not only a demonstration that God can, if he pleases, put into bodies powers and ways of operation, above what can be derived from our idea of body, or can be explained by what we know of matter, but also an unquestionable and every where visible instance, that he has done so." (*op. cit.*, 467-8)

7. The following section draws on my paper, "'The Optimal Mean': Mechanism, Vitalism and the Intelligibility of Matter," which appears in the proceedings of the V. Internationaler Leibniz-Kongress, *Leibniz: Tradition und Aktualiät* (Hannover, 1988), pp. 833-40.

8. In a 1705 letter to Christian Wolff, Leibniz writes: "From the common notion of body, taken either as a *res extensa* or *res impenetrabilis*, a reason cannot be given for the law of nature which concerns motion. Thus the complete notion of corporeal substance must involve a *res dynamica*" (GLW 34). Cf. GM VI 241/L 441; GP VI 588/L 624.

9. Cf. Antibarbarus Physicus: "It pleases others to return to *occult qualities* or to *Scholastic qualities*. . . .But true corporeal forces are only of one kind, namely those arising through the impression of impetus (as for example, when a body is flung forward), which even have a role to play in insensible motions. But these persons imagine specific forces, and vary them as the need arises. They bring forth attractive, retentive, repulsive, directive, expansive, and contractive faculties. . . .It is

permissible to recognize magnetic, elastic, and other sorts of forces, but only insofar as we understand that they are not primitive or incapable of being explained, but arise from motions or shapes" (GP VII 338/AG 313).

10. In denouncing occult qualities, Leibniz sometimes appeals to their violation of PSR (cf. GP III 519, 530). Nevertheless, what he calls "the principle of sufficient reason" in these cases is often the stronger principle PInt. This is apparent, for example, in a later letter to Hartsoeker: "One part of my new argument depends on a great principle that is well enough known but not well enough considered, namely that nothing happens without a sufficient reason, or rather without a determining reason. By virtue of this principle, which leads us beyond our predecessors, God never changes a will or an operation without having a proper subject for it. . . .When the will of God is employed all by itself, without their being in the natures of created things the reason for this will, nor the manner in which it operates, this is nothing but a pure miracle, hardly fitting in philosophy. . ." (GP III 529).

11. See also his December 6, 1715 letter to Conti (GB 264-5) and his Fifth Letter to Clarke, secs. 113, 118-123 (GP VII 417-9/AG 344-5).

12. Cf. Catherine Wilson, *Leibniz's Metaphysics: A Historical and Comparative Study* (Princeton, 1989), pp. 125-6, 227-31.

13. Leibniz frequently links his critique of occasionalism to his attack on the Newtonian theory of gravitation. Cf. GP IV 595; GP VI 240-1/H 257.

14. Similar statements appear in the *Theodicy*, secs. 207 (GP VI 240-41/H 257) and 355 (GP VI 326/H 338-9); see also GP III 122, GP IV 594-5.

15. I discuss this topic in more detail in my paper, "Nature, Laws and Miracles: The Roots of Leibniz's Critique of Occasionalism," presented at the conference "Causation in Early Modern Philosophy," University of Wisconsin, Madison, April 21, 1990.

16. Thus, Leibniz writes to Hartsoeker: "If you claim only the will of God for [the hardness of atoms], you have recourse to a miracle, and even to a perpetual miracle: for the will of God operates by miracle whenever we could not give a reason for this will and its effect through the nature of objects" (GP III 517-8). "The will of God is not a sufficient *why* in natural things, if the reasons for willing are not found in the object and the means do not conform to the order of nature in order to execute this will" (GP III 532; cf. 529, quoted above in n. 10).

17. C 11/P 172; C 519/L 268.

18. Cf. GP II 56/M 63-4; A VI 6, 265, 397/RB 265, 397; C 401/P 93.

19. In a 1716 letter to Conti, Leibniz gives the following account of the strict (i.e., philosophical) meaning of "miracle": "I call a miracle any event that can only occur through the power of the creator, its reason not being in the nature of creatures" (GB 277). Cf. GP IV 520/L 494; GP VI 240-1/H 257.

20. Cf. GP IV 506-7/AG 158-9.

21. Cf. GP II 262-3/L 534-5.

22. Cf. "Discourse on Metaphysics," sec. 8 (GP IV 433/AG 40-1); GP II 42-3/M 46-7; GP II 49/M 54-5; GP II 68-9/M 84.

23. As Leibniz writes in his Fifth Letter to Clarke, sec. 112: "In good philosophy and sound theology, we ought to distinguish between what is explicable by the natures and powers of creatures and what is explicable only by the powers of the infinite substance. We ought to make an infinite difference between the operation of God, which goes beyond the extent of natural powers, and the operations of things that follow the law which God has given them, and which he has enabled them to follow by their natural powers, though not without his assistance" (GP VII 417/AG 344; cf. GP II 93/M 116). On this point I have been helped by the discussion

of Robert Sleigh, *Leibniz & Arnauld: A Commentary on Their Correspondence* (New Haven and London, 1990), pp. 23, 78-80, 162-64.

24. In sec. 125 of this letter, Leibniz expressly refers to the "principle of the want of a sufficient reason for a thing to exist, for an event to happen, for any truth's taking place" (GP VII 419/AG 346).

25. Leibniz offers at least three different explanations of how the existence of atoms and a vacuum would contradict God's wisdom. In the letter to Bernoulli from which I have just quoted, he continues: "But it is obvious that a vacuum (and consequently also atoms) leaves empty and undeveloped locations, in which nevertheless, with everything else preserved, something could still have been produced. But the idea of such things left to do contradicts wisdom. And I believe that nothing in nature is sterile or uncultivated, although many things may seem to us to be so" (GM III 565). In letters to Hartsoeker, as we have seen, he develops another argument based on the "occult" character of the supposed absolute hardness of atoms (cf. GP III 519). Finally, in his exchange with Clarke, Leibniz argues that atoms could not exist because of their indiscernibility: "This supposition of two indiscernibles, such as two pieces of matter perfectly alike, indeed seems to be possible in abstract terms, but it is not consistent with the order of things, nor with the divine wisdom by which nothing is admitted without a reason. The vulgar fancy such things because they content themselves with incomplete notions. And this is one of the faults of the atomists" (GP VII 394/AG 333).

26. Cf. his following letter to Bernoulli (GM III 576-77), and the Fifth Letter to Clarke, sec. 76 (GP VII 409/L 709).

27. Leibniz assents to the "metaphysical necessity" of PSR at GP II 420 and GP II 170/L 516: "I admit that anything remains in its state until there is a reason for change; this is a principle of metaphysical necessity." (I have slightly altered Loemker's translation.)

28. The interpretation I am proposing accepts the possibility of a failure of PInt in worlds other than the actual one (thus allowing for the possibility of so-called "occult qualities," such as a primitive hardness), but nevertheless upholds the validity of the PSR ("nothing happens without a reason") within every possible world. Another way of reading Leibniz's claim about the mutual incompatibility of PSR and the hypothesis of material atoms would be to see it as bearing primarily on the rationality of God's will: were God to choose to realize any world other than our own, he would be opting for the less perfect over the more perfect; consequently, there would be a failure of sufficient reason as regards his action (cf. the Fifth Letter to Clarke, sec. 19; GP VII 393/L 698-99).

29. Fourth Letter to Clarke, sec. 18 (GP VII 374/L 688); Fifth Letter, secs. 19, 170 (GP VII 393, 407/L 698-99, 708); and the texts quoted in n. 16 above.

30. Cf. *Theodicy*, secs. 225-28 (GP VI 252-54/H 267-69).

31. This similarity notwithstanding, there remain crucial differences between the theodicies of Leibniz and Malebranche. I discuss these in the paper cited in n. 15 above.

32. An earlier version of this paper was presented at the 1989 APA Eastern Division Meeting in Atlanta, GA. The present version owes much to the insightful criticisms of my commentator David Blumenfeld. For their helpful comments, I would also like to thank Reinhard Finster, Daniel Fouke, Steven Nadler, and Neil Thomason.