Change in the Monad
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It is well known that in the Aristotelian-scholastic metaphysics, the nature of a

substance determines its powers and organizes them around the production of ends.

Every cause has a particular or specific end—a termination of acting which is its goal.

Causes can thus be assessed for success, frustration, completion, and imperfection.

Equally well known, in the early modern mechanist universe, excluding minds, nothing

changes but the motion of material particles and every change has a cause. Mechanists

do not think of these causes as having ends, or being subject to evaluation. No doubt

there are several reasons for this, but it seems especially important that mechanist causal

laws have universal scope. They refer to a small number of causally relevant

properties—determinates of extension, impenetrability, motion, and position. There is no

multiplicity of substances, but rather only material substance, its universal powers, and

their determinations. For scholastics, the nature distinctive of fire includes powers

constituted specifically for rising and producing fire. For mechanists, fire produces these

same effects in virtue of the determinate sizes, shapes, motions, and arrangement of

particles, as does every other sort of material thing. Robert Boyle, the unofficial

spokesman of mechanism, proposes that: 'Instead of nature in . . . the sense of [*an*

aggregate of the powers belonging to a body . . .], we may employ the *constitution,*

temperament, or the *mechanism*, and sometimes . . . the *structure*, or the *texture* of that

body.'[i]

Yet the mere collision of particles seems insufficient to explain the complex

organization exhibited by the bodies of living things, and many non-Cartesian mechanists

appeal to something else in the created world to explain the generation and functional operation of plants and animals—plastic natures, a world soul, or as Boyle has it, the initial God-given distribution, arrangement and motion of particles. To Leibniz's mind, there is a further, more pervasive stability which is inexplicable by matter and motion alone: physical forces whose local effects are so globally attuned that: ' . . . the foundation of the laws of nature should . . . be sought . . . in the fact that it is necessary that the same quantity of active power be preserved, indeed . . . that the same quantity of motive action also be conserved. . .' ('On Nature Itself', A&G 157) This cannot be explained by the essentially passive nature of matter and the laws of logic and mathematics.[ii] Leibniz purports to explain the preter-material order of corporeal things on the basis of a multiplicity of immaterial substances—called 'substantial forms', 'souls or soul-like entelechies', 'primary forces', or 'monads'. Monads, as I will call them, are constituents of all living things. Each monad is, first, an incorporeal paradigm of the operations carried on the body of a living thing and, second, a paradigm of the architectonic properties of the entire corporeal world. It is an enduring substance, essentially acting, but only within itself, always achieving internal balance and overall regularity—just as physical forces constantly produce change yet sustain functional unity in bodies of living things and equilibrium in the corporeal world as a whole. Monads are so many 'living mirrors' of the universe, as Leibniz often says. But the metaphysical dependence flows in the opposite way: the corporeal world reflects the operational diversity within the enduring unity which is exemplified by every monad. I say all this to motivate my topic: change in the monad.[iii]

In a simple substance, there is nothing but perception and appetition which are to be understood on the basis of what we are aware of within ourselves (To De Volder, L 537) The idea is expressed in numerous writings that predate and postdate this famous line to Burcher De Volder. Taking the doctrine at face value, monads, in general, engage in cognitive activity and have something akin to desires for the objects of cognition. Appetition is 'the principle of change' in a monad, a 'tendency to go from perception to perception' (PNG 2). One may be tempted to think change in a monad is explained by some version of belief-desire theoretical psychology sufficiently general to apply to monads whether or not they have conscious perceptions or even sense perceptions. Indeed, I want to suggest this is close to the truth; the terms 'perception' and 'appetition' are best understood in a literal, but highly theoretical, way. But some able scholars raise objections to this, contending either that monadic perceptions have no legitimate claim to cognitive character or that appetitions, in general, are not desire-like states directed to ends represented as good. Still, they maintain, this does not undermine Leibniz's basic account of the unity that enables a monad to model the universe. According to Jonathan Bennett: 'His fundamental theory says only that the individual monad runs through its history in accordance with laws given to it by God, laws that govern the efficient causality of its unfolding.'[iv] On the contrary, I want to suggest, a law sufficient to determine the successive states of a monad cannot be the source of its trans-temporal unity, but taking concrete, particular perceptions and appetitions to be literally cognitive and desiderative affords a neat account of the unity among all acts of the same monad.

That appetites are directed to ends is not in dispute. The texts are explicit: 'The laws of appetite [are] the laws of the final causes of good and evil.' (PNG 3). Moreover,

the causal order internal to monads is contrasted with the order of corporeal events:

'Souls act according to the laws of final causes, through appetition, ends and means.

Bodies act according to the laws of efficient causes, or of motions. And the two realms,

that of efficient causes and that of final causes, are in mutual harmony.' (Mon 79)

It is clear that efficient causes act on preceding states in ways that generate subsequent

states: '. . . whatever takes place in matter arises in accordance with laws of change from

the preceding condition of matter. And this is what those who say that everything

corporeal can be explained mechanically hold, or ought to hold.' [v]   It is equally clear that

final causes explain change on the basis of its end.

But there are at least two notions of final cause abroad in the 17th century? (1) A

final cause is a future event insofar as the agent has desire for it, a desire which causes

the agent to act (if means are at hand); the cause is efficient in its action, but unlike other

efficient causes, contains a desire. (2) A final cause is a future state which the agent has

the capacity to produce, for the sake of which the agent presently performs such-and-such

acts. This sort of final cause is not efficacious, nor does it essentially involve anything

like desire on the part of the agent. Even if the agent does have a desire which is efficient

cause of its acting, the desire may be for a result which is not its final cause; e.g. if a

person has thirst which is the efficient cause of her taking a sip of water, the final cause

of her action might be, say, health, for which she has no particular desire. Final causes of

the second sort explain facts about corporeal change, according to Leibniz: 'It must be

maintained in general that all existent facts can be explained in two ways—through a

kingdom of power or efficient causes and through a kingdom of wisdom or final causes. .

.' *Specimen Dynamicum*, L 442 [vi] Light travels along the shortest path not because it

desires to do so, but because God, the creator, desires that it should do so. But in just the same way, monadic acts have final causes—whatever monads do tends to realize ends desired by God. How, then, are the laws of final cause, which govern the realm of monads exclusively, different from the laws of efficient causality which govern corporeal change? Appetites, too, are efficient causes, or active tendencies (PNG 2).[vii]

The answer is ready at hand—monads are universally governed by efficacious desire-like final causes, while bodies are subsumed under efficient causal laws without reference to desires. This is reason to think that every event in monads is produced by desire-like appetites. We will shortly consider why some commentators argue that this cannot be correct. For the present, I want to argue that *if* appetitions *are essentially desire-like,* a case can be made that perceptions are essentially cognitive.

As you may know, Leibniz maintains that a monad (simple substance) perceives just in case its modifications express corporeal things outside of the monad. That is, each of its modifications has a complex structure in respect of which it is identical to the spatial-temporal compositional and causal dispositional structure of bodies and bodily events. The structural properties of modifications are basic; their representative properties derive from them.

Two main considerations put in question that the expressive modifications of monads generally qualify as even low grade cognitions. (1) The mere fact that states of a monad carry information about the world is not enough to make it cognizant. Familiar illustrations of this point include thermocouples, adding machines, and high powered computers. Despite having states that receive information, and even make truth preserving transformations on it, none of these things is cognitive, not by *our* lights. (2)

Leibniz himself stresses that material things are capable of expressing other things; e.g. maps express regions, complete effects express their causes, algebraic equations express geometrical figures, but none of them are cognizant of what they express. Why should expression in an immaterial substance, or true unity as Leibniz stresses, be so different? I am aware of no texts which offer to defend or even motivate this view. However, I will suggest, means for this can be found in Aristotelian scholastic sources familiar in Leibniz's time, but overlooked nowadays. In a similar vein, Leibniz often says that walking around in a mill shows plainly enough that perception cannot arise in it, or any other merely material machine. Readers are hard pressed to find an argument in this.

But there is an argument from the premise that appetitions are desire-like to the conclusion that perceptions are generally cognitive in nature, one that is commonplace nowadays. Computers, thermocouples, and the like have physical, structural properties as well as information bearing properties; the former determine the latter. But only their physical properties play a causal role in their operations. A computer executes its programs by sending electrical current through a large number of chips, a causal process explained without reference to what a certain pattern of electrical flow might represent. The semantic properties of machine states are relevant for explaining the functions the computer performs, but causally irrelevant to the production of its states. Recall Leibniz's remark that a person who buys a clock need only know it keeps time, but this is not enough for the person charged with maintaining it. This points to a crucial difference between a computer and a mind; as Colin McGinn puts it: 'Even if we set the computer up so that its symbols have meaning . . . it is still the case that the programme instructions have nothing to do with these meanings. . . . [T]he trouble is that the machine never does

anything because of what a symbol means—yet that seems to be precisely what minds

do.' (*The Character of Mind*, 112). Nowadays it is widely held that the semantic

properties of mental states are causally relevant; that is, the causal laws pertaining to

mental processes cannot be stated without reference to what mental states represent.[viii]

Now this is true of monads, on the assumption that appetitions are essentially

desire-like. For desires are directed to future ends and desires tend to produce effects

which realize these ends. Laws of final causality of the sort which pertain exclusively to

monads might be expressed in the following form: If M has perceptions which represent

impending goods $\{e1, e2, e3, \ldots\}$ and has appetitions for $\{e1, e2, e3, \ldots\}$, then M

changes to a state that realizes $\{e1, e2, e3 \ldots\}$ to the extent this is possible. To be sure,

a monad has modifications in virtue of which it represents the things it does. They are

analogs of the physical properties of a computer, so one might think they are the causally

relevant properties of the monad. But the doctrine that monads are governed by laws of

final cause apparently implies that this is not the case. Either there are no general laws

with regard to the effects produced by modifications or they are not regulatory laws, i.e.

they don't give the reason why appetitions produce the effects they do.

Further, one might argue that monads are not just mental in character but

explicitly cognizant. It is surely appropriate to ask how Leibniz explains the fact that a

monad's expression of an attainable good is attended with appetite for that good. This is

easy to explain, in a rough and ready way, if the monad has states that express things in

the world as if actual.   A monad's being presented with a world as if containing an

impending desirable event has an intelligible connection with its having something like

desire for it. Indeed, Aristotle's *De Anima* offers an explanation of appetition along

similar lines:

> While, however, intellect is always right, appetency and imagination may be right
> or wrong. Hence it is invariably the object of appetency which causes motion, but
> this object may be either the good or the apparent good. DA 433a26f; Hicks

The cause of appetite is the appearance of good, which is either right or wrong, but in any

case a form of cognition; and appetite causes animal motion. Moreover

> Sensing, then, is analogous to simple assertion or simple apprehension in thought
> and, when the sensible thing is pleasant or painful, the pursuit or avoidance of it
> by the soul is a sort of affirmation or negation. . . . It is in this that actual
> avoidance and actual appetition consist; nor is the appetitive faculty distinct . . .
> from the sensitive faculty; though logically they are different. Aristotle, *De
> anima,* A 431a8f; trans. Hicks

Appetition is a sort of affirmation of an appearance of good.

I suggest that in Leibniz's theory of the monad, there is a more abstract, but

similar, explanatory connection among perceiving, appetition, and acting. Many monads

lack intellect, imagination, and a sensory faculty, but I want to suggest, in general

appetitions respond to perceptions of impending events as if attainable things of value;

appetitions are *signs* of the monad's acceptance of what is presented to it. My suggestion

is that Leibniz subscribes to a version of Aristotelian psychological theory pushed back to

an abstract notion of cognition as mere presentation of things in the world as if factual;

cognition explains activation of appetite, and appetite explains why monads act.

Work of John Carreiro takes note of this sort of argument, but suggests it has no

grip in the historical context.[ix] It is undermined by the natural philosophy of Thomas

Aquinas, he urges. The problem is that all substances, including the Aristotelian

elements, have natures comprising powers organized around ends; *all* causes have ends, natural terminations or goals. Aquinas argues for this very general claim as follows:

> . . . for every agent the principle of its action is either its nature or its intellect.
> Now there is no question that intellectual agents act for the sake of an end,
> because they think ahead of time in their intellects of the things which they
> achieve through action; and their action stems from such perception . . . [S]o, too,
> does the likeness of a natural resultant pre-exist in the natural agents; and as a
> consequence of this, the action is determined to a definite result. . . . Therefore,
> every agent acts for an end. *Summa contra gentiles*, 3[x]

So fire, which naturally produces fire, has within it the likeness of fire; in the same way, it would seem, fire has an internal representation, or likeness, of its proper place in the universe, given that it naturally rises.

Moreover, Aquinas detaches the notion of appetite from its Aristotelian mooring in cognition. I will just sketch his line of reasoning.[xi] Inclination follows every form, he argues. Form is present in non-cognizant beings in an inferior way and present in cognizant beings in a superior way. In non-cognizant beings, form determines the nature of the thing and, thus, its natural inclinations, called 'natural appetites'. The rest of this passage, which Carriero does not quote, draws an instructive contrast with cognizant beings; I will turn to it shortly. Carriero's point is that in the Thomistic philosophy, non-cognizant substances have appetites for internally represented ends and act for the sake of attaining them. As he puts it, 'What is essential for [Aquinas] seems to be . . . that the end shape or determine the agent's activity.' (Carriero (2004), 114).

He suggests that goal-directed activity is the essential condition of substantial unity and agency, for Leibniz as well.[xii] As he sees it, Leibniz's notion of a substance, its powers, and acts is organized by an 'immanent end' in the manner of scholastic metaphysics. But as Aquinas' theory shows, this sort of functional structure requires no

cognitive capacity: 'Leibniz's allusions to scholastic substantial forms and entelechies make it reasonably clear that he's trying to rehabilitate a notion of a scholastic end-governed natural inclination, which was supposed to be a sort of end-responsiveness that could be found in non-cognitive beings as well.' (Carriero (2008), 129) So Leibniz retains the desire-like nature of monadic appetition and cuts the explanatory link between appetition and cognition with precedent in Aristotle.

One can wonder how much Leibniz credits Aquinas' account of the agency of elements such as fire. Descartes remarks that gravity could not impel a body toward the center of the universe unless the body had within it some knowledge of the center.[xiii] But however that issue is decided, it has little relevance to the theory of monads. Much more important, Aquinas's theory of cognition is linked to appetites of the *sort* that occur in monads, that is, appetites significantly more variable and diverse than the small number of appetites he ascribes to fire, earth, and the like.

Of particular interest to us, Aquinas proposes a general account of what it is to be a cognizant being which abstracts from psychological notions which plainly do not apply to monads in general—belief, memory, inference, and the like:[xiv]

> The cognizant are distinguished from the non-cognizant in this respect, that the non-cognizant have nothing but their own form alone, whereas a cognizant entity is suited to have the form of another thing as well. For the species of the thing being cognized is in the one cognizing. *Summa Theologica*, 1a 14.1c.; Pasnau (1997), 32

A species is the form of a thing existing *intentionally* in some other thing. A cognizant being knows other things in virtue of receiving species of those things. For instance, an animal perceives a stone when its soul receives intentionally the form of the stone. When a kettle receives the form of heat, it becomes hot but has no perception of heat; but when

the soul of a dog intentionally receives the form of heat, it perceives heat without growing warm. There is much more to say, but this suffices for our purpose.

The capacity to receive species does not suffice to distinguish between cognizant and non-cognizant beings, according to Aquinas. He allows that the forms of heat, etc. exist intentionally in the media by which they are conveyed to knowers, and he denies that air and water are cognizant of heat, and so on. Robert Pasnau accounts for this in the following way: '. . . I believe it is an implication of Aquinas' account that media, in receiving forms intentionally are (from a theoretical perspective) participating in the same sorts of operations as are the properly cognitive faculties of sense and intellect.' (Pasnau (1997), 50) Intentional reception of forms is, then, necessary but not sufficient for cognition.

To qualify as a knower, a being must have a nature suited to receive more complex forms than those present in air and water—not just scattered information to the effect that there is red here and heat there, but information structured enough to represent different bodies with their respective qualities and relations. Cognition is the capacity to receive intentional forms that reach or exceed a threshold; cognition begins at a certain point on the scale of representational complexity (Pasnau (1997), 52-4).

Without going into more detail, we can see important similarities with Leibniz's doctrine that perception is expression in a monad. The expressive modifications of a monad represent—indeed, are formally (structurally) similar to—things and events in the world; and what they express is extremely complex. As Leibniz explains, '. . . every substance . . . expresses, however confusedly, everything that happens in the universe, whether past, present, or future—this has some resemblance to an infinite perception or

knowledge.' (DM 9)   Monadic expression surely counts as cognition, by Aquinas'

measure. This is not to say that Leibniz and his predecessor agree about the criteria that

distinguishes things which engage in cognition from those that don't. Pasnau suggests

computers might count as cognitive for Aquinas, and bees might not; the scholastic

explicitly denies cognition to plants. By contrast, Leibniz denies it for computers and

ascribes perception to all living things. Still what we have said about Aquinas' account

of cognition serves to distinguish what goes on in a monad from the apparatus of goal-

directed activity he ascribes to non-cognitive substances, such as fire.

The divide deepens when Aquinas addresses the connection between appetite and

cognition. We looked at the argument from form to inclination as it applies to non-

cognizant beings. The natural inclinations, or appetites, which form determines in non-

cognizant being contrast with the appetites that follow form as it is present in cognitive

beings:

> Therefore as forms exist in those things that have knowledge in a higher manner
> and above the manner of natural forms, so must there be in them an inclination
> surpassing the natural inclination, which is called natural appetite. And this
> superior inclination belongs to the appetitive power of the soul, through which the
> animal is able to desire what it apprehends, and not only that to which it is
> inclined by its natural form.   *Summa Theologica*, 1, q 80, art 1[xv]

The appetitive power distinctive of cognizant beings is 'multi-form appetite', which can

be directed at any one of the many things such a being apprehends.

Monads can surely be credited with multi-form appetition, because they exercise

their power of acting on everything they perceive, albeit confusedly: '. . . with confused

perception and a corresponding appetite (which, with some, you might term instinct) [the

soul] imitates divine infinity, in such a way that nothing happens in the body that the soul

does not in fact perceive, nothing concerning which [the soul] does not exercise [its] appetite . . . even if we are unaware.'[xvi] Again: '. . . there are no perceptions which are matters of complete indifference to us; . . . ' (NE 162) So although Carriero is right that a unity constituted by goal-oriented activity need not be cognitive in the Thomistic metaphysics, the end-directed activity of a monad involves complex representations and multi-directed appetition of the sort distinctive of cognizant beings, according to Aquinas. Most important, for Aquinas, cognitions of and appetites for particular ends cause the actions of animals; in this way, animal agency is conceptually linked with cognition and multi-directed appetite.[xvii] With a few key adjustments, Aquinas' theory might be adapted to explain the connection between perception, appetition, and acting in a monad.

Inspite of the attraction of this way of explaining monadic acts, some commentators argue that Leibniz cannot consistently maintain a key principle of this scheme—that appetites, in general, are akin to desires. The problem is illustrated by Bayle's dog; the animal is eating a bone when a man sneaks up behind and gives it a blow on the back with a stick. Leibniz is committed to saying that the soul of the dog goes from feeling pleasure to pain and the cause of the transition comes from within the soul. But the only causes of change in the soul are its appetites and the dog surely has no appetite for pain. How can Leibniz explain what happens in the soul of the poor dog?

To solve the problem, some commentators urge, he must distinguish between two sorts of appetites: (1) those directed to a represented future good, for which the soul has something akin to desire and (2) appetites directed to ends which are good, but not represented as good and not desired by the soul. This marks a distinction we noted

earlier between two sorts of final cause—those with ends desired by the agent and those with ends not necessarily so desired. Just prior to being struck, the dog's soul has a desire-like appetite for future perceptions of its jaws clamping repeatedly on the bone; at the same time, it has appetites for perceiving future events such as motion of bodies in conformity with universal laws of nature, and future states of the world which are maximally good given its present state. The dog has nothing akin to desire for these future events—its perceptions either do not represent them at all or do not represent them as good. The dog's desire for future bone gnawing and its non-desiderative appetites engage in a contest of strength which determines the transition the soul undergoes; in the event, the non-desiderative appetites prevail. Donald Rutherford works out an elegant account of the difference between a monad's actions and passions along these lines, and Robert Adams briefly endorses this sort of approach to the problem of the dog.[xviii]

Yet it has disadvantages. If some acts of a monad realize ends desired by the monad and others don't, then the acts explained by desire-like final cases are a proper subset of monadic acts. There is, then, no univocal sense of 'final cause' in which it is true that the realm of monads is governed by laws of final cause and the realm of bodies is not. Moreover, adhering to the solution implies that the explanatory scheme we have on the table, which has precedent in Aristotle and Aquinas, does not apply to the operations of monads. This is the theory that cognition on the part of an agent explains activation of its appetites for various things and its current appetites explain what the agent subsequently does. The proposed account of what happens in the soul of the dog goes very differently: the soul contains appetites for ends whose connection with perceptions is so far not explained, but instead taken as a primitive fact about the nature

of the soul;[xix] and the soul's transition to pain is the result of a struggle between its desiderative and non-desiderative appetites.

But the problem of Bayle's dog is solved without invoking non-desiderative appetitions, or so I suggest. The crucial point is that a monad achieves an end only if it has the means: souls act 'through appetition, ends and means'. The soul's means of realizing a given appetite are the other more confused appetites it has at the same time. Plainly enough, the dog's present desire for future perception of its jaws sinking once again into the bone will be realized only if a great many bodies move in appropriate ways—the parts of its jaws, the communicating parts of its body, their parts, and so on. The soul's means for attaining perceptions of the requisite motions of each of these bodies consist of its appetites for doing so; that is, if it has a relatively distinct appetite for perceiving a certain change in a certain body, it also has confused appetites for perceiving changes in the parts of that body, and so on. Leibniz explains what is required for an appetite of the soul to be executed by the body: '[I]t is necessary that the appetites and consequently the perceptions from which they arise attain in perfect detail everything which brings this about in the organs.' For this reason,

> . . . will is not always sufficient to make the body act according to its desire, when the exact perception of the means is not conjoined with it. . . . Thus it is necessary that end and means should always be joined together in the soul, as causes and effects are in the body, in order that the desired effect should be executed. (To Hartsoeker, G 3.509-10)

Or, as Leibniz puts it, only if a distinct appetite of the soul is seconded by its confused appetites, is the body obliged to do what the distinct appetite demands. Otherwise the confused appetites will have some success and the means for success of the distinct appetite will not be fully realized. In any case, every appetite attains as much as it can

given the others: '[I]t is true that the appetite cannot always completely reach the whole perception toward which it tends, but it always obtains something of it, . . . ' (Mon 15). More might be said. But the apparatus we have in view is adequate to explain why the soul of the dog contains the cause of its transition from pleasure to pain. Monads often do things for which they have nothing akin to desire, but what they do is always the result of the many desire-like urges they have.[xx] It is also important that regular change is more harmonious than irregular change, and the perception of harmony is pleasing, according to Leibniz. A monad does not perceive the harmony in the universe as a whole, or the conformity of the universe to universal laws of motion, but it tracks the motions of endlessly many particular bodies.[xxi] In view of this, it is not implausible that the dog has some attraction to perceiving future changes in the motion of the parts of its body and surrounding bodies which are regular with respect to the previous changes in those parts; doing so would give the soul of the dog a modicum of satisfaction. My point is that Bayle's dog does not force us to abandon the explanatory theory that connects cognition, appetition, and the acts of an agent.

This brings us to the trans-temporal unity of a monad and the unity among its many acts. An explanatory theory of the Aristotelian-Thomistic variety points to an account of the sort suggested by Carriero. That is, all powers, tendencies, and acts of the same monad contribute to a goal-directed activity, a multiplicity of acts directed toward diverse particular ends, all tending to implement a general goal, and doing so more or less well.

Bennett notes that corresponding to each monad there is fundamentally only a law that specifies the order of its states—nothing said about values or ends. Indeed Leibniz

says: '[T]hat which persists, insofar as it involves all cases, contains primitive forces, so that primitive force is the law of the series, as it were, while derivative force is the determinate value which distinguishes some term in the series.' (To De Volder, L 533)[xxii] Yet it is evident that the more is needed. The law must be suitable to subsume all and only acts of the same monad and capable of explaining the ground of their ascription to the same monad. Moreover, no law suffices to determine the actual states of a monad. This is because of the thoroughgoing heterogeneity of actual change, according to Leibniz. 'Things which are uniform, containing no variety, are always mere abstractions; for instance, time, space, and the other entities of pure mathematics.' (NE 109) Homogeneous things also include 'completely uniform parts of time' and the 'uniform motions and other regular effects' considered by mathematicians (NE 57). Because a law inevitably specifies a uniform way of changing, a law plus the initial state of a monad does not determine the transitions among actual states of the monad; for no two such transitions are exactly alike.

As a result, the particular concrete states of a monad must have individual properties and an order from which we can infer the general law that subsumes each transition and justifies the ascription of every state to the same monad. If the states were of no particular kind, we could infer no particular law. But in fact, they are perceptions and the transition from one to another is caused by appetite. If the former are literally cognitive and the latter essentially desiderative, then the series can be subsumed under the abstract Aristotelian-Thomistic explanatory theory. This provides an intelligible reason for assigning them all to the same monad, because it is, after all, a theory of agency—goal-directed agency. I would not want to say that an interpretation which

backs away from a literal notion of perception or a univocal notion of appetition cannot support a law with these properties—although it is not clear that such a law could be as simple and explanatory as a law of the sort just mentioned. The issue cannot be resolved in this paper. I hope to have shown that a literal reading is tenable and theoretically powerful.

More important for this conference, it offers a picture of the order internal to a monad in which every change is explained by the monad's confrontation with the changing world. Every change in a monad is responsive to the future perfection of things in the world, confusedly perceived from its unique point of view. A monad is always striving to attain the impending good insofar as it is able to perceive it, and it always attains some measure of satisfaction despite its frustrations. A monad might then be said to exemplify, within the constraints of its perspective, the order of the universe as it unfolds, according to Leibniz's principle of the best.

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[i] Boyle, 'A Free Inquiry into the Vulgarly Received Notion of Nature' (1686), Stewart, ed. 180

[ii] *Specimen Dynamicum*, GM 6.241; AG 125.

[iii] 'Each monad is a living mirror, or mirror endowed with internal action, which represents the universe from its point of view and is as ordered as the universe.' PNG 3 'One could know the beauty of the universe in each soul, if one could unfold all its folds, which only open perceptibly with time.' PNG 13

[iv] Jonathan Bennett, 'Leibniz's Two Realms' in *Leibniz: Nature and Freedom*, eds. Donald Rutherford and Jan Cover, p. 139.

[v] 'Objections to Stahl', trans. L. J. Rather and J. B. Frerichs, 'The Leibniz-Stahl Controversy, etc.', *Clio Medica* 3 (1968), 24.

[vi] Also 'There are, so to speak, two kingdoms even in corporeal of nature, which interpenetrate without confusing or interfering with each other—the realm of power, according to which everything can be explained mechanically by efficient causes, when we have sufficiently penetrated into its nature, and the realm of wisdom, according to which everything can be explained architectonically, so to speak, or by final causes when we understand its ways sufficiently.' *Tentamen anagogicum*, L 479

[vii] '. . . the present state of the body arises [*nascitur*] from its preceding state through laws of efficient causality and the present state of the soul form its preceding state through laws of final causation. . . . There a series of movement, here a series of appetites occurs, there a movement from cause to effect, here from end to means. And it can truly be said that in the soul the representation of the end is the efficient cause of the representation of the means.' "Objections to Stahl', trans. L. J. Rather and J. B. Frerichs, 'The Leibniz-Stahl Controversy, etc.', *Clio Medica* 3, 27. 'In the soul, the representation of causes are the causes of the representation of effects.' G 4.533; context indicates that efficient causes of monadic change are in question.

[viii] There is considerable debate about this. I do not think the issues affect Leibniz's position, since he is certainly not a materialist and apparently has an internalist theory of perceptual content.

[ix] 'Well, one might suppose that activity is impossible to understand without intentional agency, and this in turn requires, if not a conscious being, at least a cognitive being. And so, both the consideration about unity and the consideration about force or activity can be understood to point to the conclusion that the only things that are ultimately real . . . [in Leibniz's metaphysics] . . . are cognitive beings . . . ' Carriero (2005), 116.

[x] Trans. Bourke; quoted in John Carriero, 'Spinoza on Final Causality', in *Oxford Studies in Early Modern Philosophy*, 2 (2005), 112.

[xi] '[W]e must observe that some inclination follows every form: for example, fire, by its form, is inclined to rise, and to generate its like. Now, the form is found to have a more perfect existence in those things which participate [in] knowledge than in those which lack knowledge. For in those which lack knowledge, the form is found to determine each thing only to its being—that is, to its nature. Therefore this natural form is natural inclination, which is called natural appetite. (ST, Pt 1. Q 80, art 1; quoted Carreiro (2008), 131)

[xii] John Carriero, 'Substance and Ends in Leibniz', in *Contemporary Perspectives on Early Modern Philosophy* (2008), ed. Yaffe, Owens, and Hoffman, 120.

[xiii] 'But what makes it especially clear that my idea of gravity was taken largely from the idea I had of the mind is the fact that I thought that gravity carried bodies toward the centre of the earth as if it had some knowledge of the centre within itself. For this surely could not happen without knowledge, and there can be no knowledge except in a mind.' Descartes, 'Sixth Replies', CSM 2.298.

[xiv] The account of Aquinas' theory offered here relies on Robert Pasnau, *Theories of Cognition in the Later Middle Ages* (Cambridge: CUP, 1997).

[xv] *Great Books of the Western World*, ed. in chief, Robert Maynard Hutchins, v. 19, *Summa Theologica of Saint Thomas Aquinas* (Chicago: Encyclopedia Britannica, 1952), trans. by Fathers of the English Dominican Province, rev. Daniel J. Sullivan), p. 427.

[xvi] 'Objections to Stahl', R&F,

[xvii] The connection between cognition and animal agency (via multi-form appetite) plus the doctrine that nothing is capable of acting but a true unity may explain why he differs with Aquinas over the division of things into cognitive and non-cognitive. The former have to be capable of agency, and no merely material thing has this capacity: 'But if we superadd actual diversity, or a principle itself of motion, something is added beyond bare matter. In the same way, it is plain that perception cannot be deduced from bare matter, since it consists in a certain action.' G 7.328; trans Rutherford.

[xviii] Donald Rutherford, 'Leibniz on Spontaneity', in *Leibniz: Nature and Freedom*, ed. Rutherford and Cover; Robert M. Adams, *Leibniz: Determinist, Theist, Idealist*, 318.

[xix] An advocate of this view might say that because a monad perceives the entire universe, its perceptions encode information about the impending bodily changes which conform to universal laws and changes which are part of the best possible future state of the universe given its present state. And it is the nature of the monad to have non-desiderative appetites for perceiving these changes. This is tantamount to saying that there is no intelligible connection between perceptions and the appetites that attend them; the connection is just a primitive fact about the nature of a monad.

[xx] '. . .let us say that everything in bodies happens mechanically, or in accordance with laws of motion, and that everything in the soul happens morally, or in accordance with appearances of good or evil, in such a way that even in our instinctive and involuntary actions, . . . there is in the soul an appetite for good or an aversion to evil which drives it, even though our reflection is not able to pick it out in the confusion.' (To Sophie Charlotte; WF 224)

[xxi] 'Fundamentally pleasure is a sense of perfection, and pain a sense of imperfection, each being notable enough for one to become aware of it.' (NE 194) 'What is it to be delighted? To perceive harmony.' (A 6.3.127) 'Distinct cogitability gives order to a thing and beauty to a thinker. For order is simply a distinctive relation of several things; confusion is when several things are present, but there is no way of distinguishing them from one another.' (*Résumé of Metaphysics,* MP, 146).

[xxii] Leibniz sometimes appeals to a law of this sort in response to the problem of Bayle's dog: '[T]his law of order, which constitutes the individuality of each particular substance, exactly corresponds to what happens in every other substance, and in the universe as a whole. . . so in this way the law of the changes in the substance of an animal takes it from pleasure to pain just when there is a break in the continuity of its body, because the law of this animal's indivisible substance is to represent what happen in its body, just as we

know from our own cases, and indeed to represent in some fashion, through its relation to the body, everything that happens in the world.' 'Letter from M. Leibniz to the Editor, etc.', WF 80.