Leibniz on Monadic
Agency and Optimal Form

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Leibniz on Monadic Agency and Optimal Form[1]

by

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"... the principle of perfection is not limited to the general but descends also to the particulars of things and of phenomena ... in this respect it closely resembles the method of optimal forms ... For in these forms or figures the optimum is found not only in the whole but also in each part, and it would not even suffice in the whole without this. ... It is in this way that the smallest parts of the universe are ruled in accordance with the order of greatest perfection; otherwise the whole world would not be so ruled."[2]

Introduction

It is tempting to suppose of Leibniz's account of monadic agency what many have supposed of his philosophy in general, namely, that in spite of being full of intriguing insights, positions, and arguments, its elements ultimately fail to form a coherent, unified system. And, indeed, it should be conceded that grounds for doubting the systematicity of Leibniz's thought are especially strong in the case of monadic agency. As we will see in greater detail below, he appears to endorse contradictory views on the nature of monadic teleology; his account of creaturely appetition has seemed to many manifestly untenable; and it remains far from clear how even the most basic threads of his psychology might be consistently woven together. Someone who had encountered only Leibniz's writings on the agency of finite minds might understandably take him to be a sporadically insightful, but not very coherent thinker.

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[2] "... la perfection au lieu de se borner seulement au general, descend aussi dans le particulier des choses et des phenomenes, et qu'il en est à peu pres comme dans la Methode de Formis Optimis ... Car ee meilleur de ces formes ou figures ne s'y trouve pas seulement dans le tout, mais encor dans chaque partie, et même il ne seroit pas d'assez dans le tout sans cela. ... C'est ainsi que les moindres parties de l'univers sont reglées suivant l'ordre de la plus grande perfection; autrement le tout ne le seroit pas." *Tentamen Anagogicum, Essay Anagogique dans la recherche des causes*, GP VII, 272-273; translated by L. Loemker in *Philosophical Papers and Letters, Second Edition*, Dordrecht, 1969, p. 478.

The present essay aims to counter this impression of disarray in Leibniz's thinking about monadic agency by drawing on a seemingly distant notion developed primarily in his mathematical and scientific studies, namely, his notion of an optimal form. Towards that end, the first section introduces Leibniz's understanding of an optimal form through his work on the technical problem of determining the shape of catenaries, that is, the shape of freely hanging cords suspended at both ends. The second section argues that Leibniz's notion of an optimal form provides him with a surprisingly elegant model for reconciling two forms of teleology he ascribes to monads. The third section teases out three ways in which monads may nonetheless pursue courses of action that are in various senses sub-optimal and defends Leibniz against a famous objection made by Pierre Bayle. Finally, the fourth section argues that Leibniz's notion of an optimal form even provides him with a rather ingenious picture of how reason might play a role in the goal-directed unfolding of finite minds. The essay concludes by briefly returning to the recently much-debated question of whether Leibniz was or was not a systematic philosopher.

1. Optimal Form and the Catenary

Throughout his career, Leibniz was acutely interested in natural phenomena that could be treated as instances of "optimal form." In the most straightforward cases, an optimal form is a shape, configuration, or process that maximizes or minimizes some relevant quantity in nature. Thus to take three examples considered by Leibniz, a drop of liquid immersed in another liquid will, under appropriate conditions, take on an optimal form – a spherical shape – that maximizes its volume with respect to its surface area.[3] Similarly, a ray of light reflected off a mirror will travel along an optimal path – typically a bent line minimizing time and distance – from its light source to its sink (e.g. from a candle to an eye).[4] Finally, a stiff beam loaded with a heavy weight will generally distort until it assumes an optimal form that minimizes its overall "stress" energy.[5] Through investigation of such phenomena, Leibniz, together with a handful of leading philosophers and scientists of the seventeenth century, helped to pioneer a way of approaching nature that led, in the hands of those such as Euler, LaGrange and Jacobi, to the rational mechanics of the eighteenth century, and the founding of the calculus of variations proper, a powerful way of approaching natural phenomena still widely used today throughout the natural sciences.[6]

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[3] *De rerum originatione radicali*, GP VII, 303-304; see also GP VII, 290, § 10.

[4] *Tentamen Anagogicum*, GP VII 270-279; see also *Unicum Opticae, Catoptricae & Dioptricae Principium*, Dutens pp. 145-150.

[5] *Demonstrationes Novae de Resistentia Solidorum*, GM VI, 106-112.

[6] For an overview of the history of eighteenth century rational mechanics and the development of the variational calculus, see H. Goldstine, *A History of the Calculus of Variations from the 17th through the 19th Century*, Berlin 1980; D. Lemons, *Perfect Form: Variational Principles, Methods, and Applications in Elementary Physics,* Princeton 1997; E. Mach, *The Science of Mechanics*, T. McCormack (trans.), La Salle, Illinois 1989; C. Truesdell, *The Rational Mechanics of Flexible or Elastic Bodies 1638-1788*, Birkhäuser 1980; R. Woodhouse, *A History of the Calculus of Variations in the Eighteenth Century*, New York 1810; W. Yourgrau

In 1690, Leibniz's attention was drawn to a particularly interesting instance of optimal form. In the May edition of the *Acta eruditorum* of that year, James Bernoulli, having replied to a challenge issued in the previous year, proposed in turn a new challenge: "find the curve assumed by a loose string hung freely from two fixed points … [assuming] the string is a line which is easily flexible in all parts."[7] Leibniz replied almost immediately to Bernoulli's test, announcing in the following June edition that he had successfully used his differential calculus as a "key" to unlock the mystery. In order "to give time also to others for exercising their skill," he nonetheless withheld his solution promising that "if no one indicates *before the end of the year* that he has found a solution, I will give mine, God willing."[8] In the event, two other solutions were purposed in addition to Leibniz's, one by Christiaan Huygens and one by Johann Bernoulli, James's younger brother. Collectively, the solutions served to highlight two central features of catenaries (as they were first called by Huygens) that will be especially relevant for the discussion that follows.

First, under the simplified conditions assumed in Bernoulli's challenge, the shape of a catenary as a whole may be treated as an optimal form in the sense that freely hanging cords suspended at both ends will assume a shape that maximizes the overall descent of the cord as a whole. Put in more modern terms, and conversely as it were, the shape of a catenary is the shape that minimizes the total potential energy of a freely hanging cord in a state of constrained equilibrium as in Figure 1.
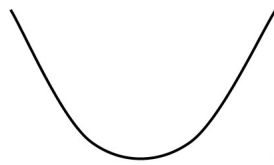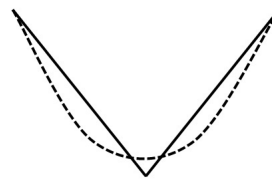

Figure 1	Figure 2

and S. Mandelstam, *Variational Principles in Dynamics and Quantum Theory*, *Third Edition*, London 1968. For a highly accessible introduction to applications of optimal form in nature, see S. Hildebrandt and A. Tromba, *Mathematics and Optimal Form*, New York 1985.

[7] "Problema vicissim proponendum hoc esto: Invenire, quam curvam referat funis laxus et inter duo puncta fixa libere suspensus. Sumo autem, funem esse lineam in omnibus suis partibus facillime flexilem." J.B. Bernoulli, "*J. B. Analysis problematic antehac propositi, de inventione lineae descensus a corpore gravi percurrendae uniformiter, sic ut temporibus aequalibus aequales altitudines emitiantur: et alterius cuiusdam Problematis Propositio*," in: *Acta Eruditorum* (1690), p. 219; cited in C. Truesdell, *The Rational Mechanics of Flexible or Elastic Bodies 1638-1788*, Zurich, p. 64.

[8] "… si ante anni exitum nemo solutionem a se repertam esse significabit, ego meam Deo volente dabo." G.W. Leibniz, "*G. G. L. ad ea, quae vir clarissimus J. B. mense Majo nupero in his Actis publicavit, Responsio*," in: *Acta eruditorum* (1690), p. 360; cited in C. Truesdell, *The Rational Mechanics of Flexible or Elastic Bodies 1638-1788*, Zurich, p. 64.

It is important to note that a catenary does not typically maximize the descent of every individual segment. One might, for example, further decrease the potential energy of the middle segment of the cord depicted in Figure 1 by pulling on the middle of the cord as in Figure 2. Doing so, however, will cause other segments of the cord to ascend, and indeed to ascend in a way that will more than compensate for the decline of the middle segment. It is for this reason that a cord that is disturbed from a state of equilibrium will oscillate in such a way as to regain its former shape, the shape in which its potential energy is minimized (that is, of course, under an intuitive range of parameters, the cord can't be so disturbed that it breaks or kinks for example).

Second, it is a demonstrable feature of catenaries that every segment of a catenary is itself a catenary. If, for example, we allow Figure 3 to represent a catenary ACDB, then the cord CD in Figure 4, resulting from releasing the cord from points A and B, will also represent a catenary.[9]
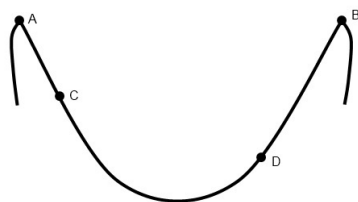

Figure 3   Figure 4

It is perhaps easiest to see why this should be so by *reductio*: if every segment of a catenary did not itself minimize its potential energy under the given constraints, then it would be possible to alter or replace that segment so that the potential energy of the catenary would be less even assuming the same conditions. On pain of allowing that a cord might realize a potential energy less than its minimum value, every segment of a catenary must therefore itself be a catenary.

In examples like the catenary, Leibniz saw the possibility of an intriguing and powerful model of teleology at work within the natural world. From the vantage provided by the notion of an optimal form, it is possible to explain the resting shape of a hanging cord in terms of a consequence of that shape, and the behavior of a disturbed chain in terms of the outcome of its behavior, thus making possible putatively teleological explanations of the resting shape and restoring movements of hanging cords. Such *prima facie* teleological explanations were especially enticing to Leibniz because they promised to put explanations in terms of final "causes" or reasons on a mathematical, predictive, and even lawful par with efficient, mechanical explanations: appealing to the notion of an optimal form, Leibniz could predict, for examples, the shape of a freely hanging cord, or the trajectory of a ray of light, and in principle the shape

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[9] In a strictly parallel case, Leibniz himself notes that every sub-path of a path of quickest descent must itself be a path of quickest descent. See *Tentamen Anagogicum*, GP VII, 272-3.

of a bent beam, with the same precision as any mechanist could hope to predict the outcome of the collision of a pair of perfectly elastic spheres.

Leibniz's work on optimal form naturally raises deep and difficult questions within what we might think of as his philosophy of science. How are examples of optimal form related to more traditional as well as current views on teleology? How are we to understand the relationship between explanations in terms of optimal form and explanations in terms of efficient causes? How widely can the sorts of explanations that Leibniz offers for catenaries, rays of light and bending beams be applied within the natural sciences? While these are all, I think, good and worthy questions, in the next three sections I would like to set them aside in order to consider the influence of Leibniz's pioneering work on optimal forms on his thinking about the goal-directed agency of finite creatures.[10] More specifically, I would like to suggest that key structural features of Leibniz's notion of an optimal form are echoed in his understanding of the agency of finite creatures and lend his views on creaturely agency an otherwise elusive coherence.

2. An Unlikely Model of the Will

On a standard, and I think permissible, interpretation of Leibniz's considered metaphysics, the world is exhaustively constituted by immaterial, mind-like simples – the "monads" familiar from his *Principles of Nature and Grace* and the so-called *Monadology*.[11] Although monads are metaphysical atoms of a

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[10] I have taken up these issues in J. McDonough, "Leibniz on Natural Teleology and the Laws of Optics," *Philosophy and Phenomenological Research* 78:3 (2009), pp. 505-544; J. McDonough, "Leibniz's Two Realms Revisited," *Nôus* 42:4 (2008), pp. 673-696; and J. McDonough "Leibniz's Optics and Contingency in Nature," *Perspectives on Science* 18:4 (2010), pp. 432-455. For related discussion see also J. Bennett, "Leibniz's Two Realms," in: D. Rutherford and J. Cover (eds.), *Leibniz: Nature and Freedom*, Oxford 2005, pp. 135-155; H. Hecht, "Dynamik und Optik bei Leibniz," *NTM International Journal of History and Ethics of Natural Sciences, Technology and Medicine* 4 (1996), pp. 83-102; M. Roinila, *Leibniz on Rational Decision-Making*, Helsinki 2007; M. Stöltzner, "Action Principles and Teleology" in: H. Atmanspracher and Gerhard Dalenoort (eds.), *Inside Versus Outside*, Berlin 1994, pp. 33-62; M. Stöltzner, "To What Extent Does Formal Teleology Still Make Sense," in: M. Féhér, L. Ropolyi, and O. Kiss (eds.), *Hermeneutics and Science*, Dordrecht 1999, pp. 227-246; M. Stöltzner, "Le Principe de Moindre Action et les Trois Ordres de la Téléologie Formelle dans la Physique" *Archives de Philosophie* 63 (2000), pp. 621-655.

[11] Although a great deal of controversy currently surrounds Leibniz's views on substance and fundamental ontology, I take the discussion here to be consistent in essentials with all the now major interpretations. For entry into the debate over Leibniz's views on substance, see R. Adams, *Leibniz: Determinist, Theist, Idealist*, Oxford 1994; D. Garber, "Leibniz and the Foundations of Physics: The Middle Years," in: Kathleen Okruhlik and James Brown (eds.), *The Natural Philosophy of Leibniz*, Dordrecht 1985, pp. 27-130; D. Garber, *Enchanting the World: Leibniz on Body, Substance and Monad*, Oxford 2009; D. Rutherford, "Leibniz as Idealist," *Oxford Studies in Early Modern Philosophy* 4 (2008), pp. 141-

sort, Leibniz maintains that each monad is unique in virtue of "its internal qualities and actions, which can be nothing but its *perceptions* (that is, the representation of the composite, or what is external, in the simple) and its *appetitions* (that is, its tendencies to go from one perception to another) which are the principles of change."[12] Since the notions of perception and appetite figure centrally in Leibniz's account of human agency, it should be helpful to begin by highlighting a few of Leibniz's distinctive views concerning them.

Leibniz attributes to monads far ranging but not unlimited perceptual capacities. He holds that each immaterial substance has "relations that express all" immaterial substances, so that, in a generic sense, each monad may be said to perceive every other monad in the created world.[13] Furthermore, he suggests that in virtue of their intrinsic "marks and traces," each monad additionally represents not only everything in the universe, but also everything in the universe that has occurred in the past or will occur in the future.[14] Nonetheless, Leibniz recognizes three important limitations on the representational capacities of monads. First, he insists that each monad must represent its entire world from a particular point of view, representing first and foremost a particular body which it dominates, and the rest of the world as acting more or less remotely on that body in a universe connected by time, space, and causation.[15] Second, Leibniz maintains that monadic perceptions come in varying degrees of clarity and confusion so that while each monad must in some sense have a representation of everything in the world, nonetheless "it is true that this representation is only confused as to the detail of the whole universe, and can only be distinct for a small portion of things, that is, either those that are closest, or for those that are greatest with respect to each monad."[16] Finally, third, Leibniz even grants that most monadic representations do not rise to the level of conscious awareness.[17] Thus while he is committed to my having, say, some representation of the burglar breaking into the bank next door, he is not

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190; C. Wilson, *Leibniz's Metaphysics: A Historical and Comparative Study*, Princeton 1989.

[12] "... ne sauroit être discernée d'une autre chose que ses perceptions (c'est à dire, les representations du composé, ou de ce qui est dehors, dans le simple) et ses *appetitions* (c'est à dire, ses tendences d'une perception à l'autre) qui sont les principes du changement." *Principes de la Nature et de la Grace, fondés en raison* § 2 (PNG); GP VI, 598; translated by R. Ariew and D. Garber, *G. W. Leibniz: Philosophical Essays*, Indianapolis, Indiana, 1989, 207; see also, "*Monadologie*," §§ 14-15; GP VI, 608-609; GP IV, 51; GM III, 552-553; A.VI.iv.556-7.

[13] "...rapports qui expriment toutes ..."*Monadologie* §§ 56-57; GP VI, 607; see also PNG § 3; GP VI, 598-559; GP IV, 564.

[14] See *Monadologie* § 61; GP VI, 617; PNG §13; GP VI, 604.

[15] See *Monadologie* § 57, §§ 62-63; GP VI, 616, 617-618; PNG § 3; GP VI, 598-599; GP II, 253; GP IV, 532; GP IV, 530, 532.

[16] "... quoyqu'il soit vray, que cette representation n'est que confuse dans le detail de tout l'univers et ne peut être distincte que dans une petite partie des choses, c'est à dire dans celles, qui sont ou les plus prochaines ou les plus grandes par rapport à chacune des Monades..." *Monadologie* § 60; G VI, 617; Ariew and Garber, p. 220. See also PNG § 13; GP VI, 604; G IV, 521.

[17] See *Monadologie* § 14; G VI, 608-609; G IV, 546-547; G IV, 550.

committed to my being consciously aware, even in a confused way, of the burglar's presence.

   If our perceptions allow us to represent the world around us, our appetites are, for Leibniz, what drive our mental lives forward; they constitute, in his words, "The action of the internal principle which brings about change or passage from one perception to another."[18] Leibniz's account of appetites essentially mirrors his account of perceptions.[19] Just as our perceptions taken as a whole encode information about the entire universe from a given point of view, so our appetitions taken as a whole lead us from one universal representation to our next universal representation. Likewise, just as petite perceptions vary among themselves with respect to their distinctness and confusion, so, Leibniz maintains, our tiny inclinations and appetites vary among themselves with respect to their strength, that is, they vary in their ability to effect transitions from one perceptional state to another.[20] Finally, just as we are differentially aware of our various perceptions, so, for Leibniz, we are also differentially aware of our individual appetites. I may be acutely aware, for example, of my desire to remove my hand from the hot stove, but only faintly aware of my desire to scratch the itch on the back of my neck. Indeed, Leibniz even suggests that just as there are perceptions falling below the threshold of consciousness, there may also be "minute sufferings of which we cannot be aware."[21]

   In speaking of monads as being driven by appetites, Leibniz clearly means to imply that monads unfold teleologically, a commitment that comes out

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[18] "L'action du principe interne, qui fait le changement ou le passage d'une perception à une autre …" *Monadologie* § 15; G VI, 609; Ariew and Garber, p. 215. Leibniz's thinking about appetition has only recently begun to receive the sort widespread attention it deserves. For important recent studies on the topic, see J. Bennett, "Leibniz's Two Realms," in: D. Rutherford and J. Cover (eds.), *Leibniz: Nature and Freedom*, Oxford 2005, pp. 135-155; M. Bobro and K. Clatterbaugh, "Unpacking the Monad: Leibniz's Theory of Causality," *Monist* 79 (1996), pp. 408-425; L. Carlin, "Leibniz on Final Causes," *Journal of the History of Philosophy* 44 (2006), pp. 217-233; J. Carriero, "Substance and Ends in Leibniz," in: P. Hoffman, D. Owen, and G. Yaffe, *Contemporary Perspectives on Early Modern Philosophy, Essays in Honor of Vere Chappell*, Buffalo, New York 2008, pp. 115-140; L. Jorgenson, "Leibniz's Appetite," unpublished manuscript 2011; M. Kulstad, "Appetition in the Philosophy of Leibniz," in: A. Heinekamp, W. Lenzen, and M. Schneider (eds.), *Mathisesis rationis: Festschrift für Heinrich Schepers*, Münster 1990, pp. 133-151; M. Lin, "What's Teleological about Monadic Causation?" unpublished manuscript 2009; S. Lee, "Leibnizian Appetites," unpublished manuscript 2009; M. Rozemond, "Leibniz on Final Causation" in: S. Newlands and L. Jorgensen (eds.), *Metaphysics and the Good: Themes from the Philosophy of Robert Merrihew Adams*, Oxford 2009, pp. 272-294; D. Rutherford, "Leibniz on Spontaneity," in: D. Rutherford and J. Cover (eds.), *Leibniz: Nature and Freedom*, Oxford 2005, pp. 156-180.

[19] *Monadologie* § 36; GP VI, 612-613; *Monadologie* § 49; GP VI, 615.

[20] *Monadologie* § 15; GP VI, 609; see also GP IV, 546.

[21] "… des petites douleurs inapperceptibles …" A VI.vi, 165; translated by P. Remnant and J. Bennett, *G. W. Leibniz: New Essays on Human Understanding*, Cambridge 1993, p. 165. See also, GP IV, 547; GP IV, 550.

explicitly in his repeated claims that "perceptions in the monad arise from one another by the laws of appetites, or the laws of the *final causes of good and evil*."[22] As Donald Rutherford has insightfully pointed out, however, Leibniz's account of monadic teleology is complicated by the fact that monads would seem to be subject to at least two distinguishable teleological laws.[23] On the one hand, each monad seems to unfold in such a manner as to contribute in its own specific way to the objective optimization of the created world. Call this "the law of *objective* teleology." It is teleology in this regard that seems to be required by Leibniz's commitment to this being the best of all possible worlds. On the other hand, each monad also seems to unfold in such a way as to optimize what it perceives to be the best. Call this "the law of *subjective* teleology."[24] It is teleology in this regard that seems to be required by Leibniz's commitment to the ancient doctrine that agents always act under the "guise of the good" – that is, according to which we always will what *seems* to be best to us at the time.[25] Although it has been suggested that these two commitments must lead to various tensions and inconsistencies in Leibniz's thought, I'd like to suggest that his seemingly distant notion of an optimal form both provides insight into his thinking about the laws of objective and subjective teleology, and shows how he could reasonably suppose that both laws might be universally true.

Although easily overlooked, the actual world is, for Leibniz, an optimal form system much like a catenary and thus exhibits the two features of optimal form systems highlighted above.[26] First, just as a catenary may be viewed as a system that optimizes overall descent under the constraints imposed by its mounts, its tensile strength, etc., the world as a whole, for Leibniz, may be viewed as a system that optimizes objective goodness under the constraints of what God can consistently create – that is, to borrow Leibniz's own term, under the constraints of compossibility.[27] Without the constraints of compossibility the

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[22] PNG §3; GP VI, 598-599; see also *Monadologie* § 36; GP VI, 612-613; *Monadologie* § 79; GP VI, 620; G VI, 421-423; C 14.

[23] D. Rutherford, "Leibniz on Spontaneity," p. 167.

[24] Rutherford calls these the "law of natural teleology" (=objective teleology) and "law of desire teleology" (=subjective teleleology), "Leibniz on Spontaneity," p. 167.

[25] For earlier indications of the doctrine of the guise of the good, see Plato's *Meno* 77a-87c in: *The Collected Dialogues*, E. Hamilton and H. Cairns (eds.), Princeton, 1989, pp. 360-372; Aristotle's *Nicomachean Ethics*, Book III, 1113a-1113b in: *The Complete Works of Aristotle*, Jonathan Barnes (ed.), Princeton 1984, pp. 1757-1758; Aquinas's Summ Theologica, Ia2ae, question 8 in: *Summa Theologica*, Fathers of the English Dominican Province (trans.), Notre Dame, Indiana 1981, pp. 626-628. For an entry into current discussions of both the doctrine's historical and contemporary significance, see S. Tenenbaum, *Desire, Good, and Practical Reason*, Oxford 2010.

[26] *De rerum originatione radicali*, GP VII, 303.

[27] Brown, "Compossibility, Harmony, and Perfection in Leibniz," *Philosophical Review* 96 (1987), pp. 172-203; J. Cover and J. O'Leary-Hawthorne, *Substance and Individuation in Leibniz*, Cambridge 1999; I. Hacking, "A Leibnizian Theory of Truth," in: M. Hooker (ed.), *Leibniz: Critical and Interpretative Essays*, Minneapolis 1982, pp. 185-95; J. Hintikka, "Leibniz on Plentitude, Relations, and

optimization of the world would be trivial, just as the optimization of an unconstrained chain is trivial. Second, just as each segment of a catenary can itself be viewed as a system that maximizes its overall descent under given conditions, so too each monad constituting the actual world can be understood as a subsystem that maximizes its objective goodness under the constraints of compossibility. That this must be so can be seen in this case as well by *reductio*: If, for example, Judas could have been replaced with a better counterpart under the constrains of compossibility, without generating worse repercussions, then there would be a possible world better than the best of all possible worlds. In virtue of realizing these two features of optimal form systems, both the actual world as a whole and each monad in it may be viewed as teleological systems that maximize objective goodness in much the same way as catenaries, bending beams and stretched springs may be viewed as teleological systems that minimize potential energy.

Significantly, however, each monad constituting the actual world may also be viewed as an optimal form system that maximizes subjective goodness in a manner structurally analogous to the way in which the world as a whole maximizes objective goodness. Thus to make the parallels explicit: first, just as the world as a whole maximizes objective goodness under the constraints of compossibility, so each monad maximizes subjective goodness under the constraint that it represents its entire world from a distinct point of view and as being related to the body it dominates by relations of time, space, and causation. (For ease of expression, henceforth I'll generally refer to this constraint simply as the "point of view" constraint.)[28] Without this constraint, the optimization of a

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the 'Reign of Law," in: Harry G. Frankfurt (ed.), *Leibniz: A Collection of Critical Essays*, Garden City, New York 1972, pp. 155-190; O. Koistinen and A. Repo, "Compossibility and Being in the Same World in Leibniz's Metaphysics," *Studia Leibnitiana* 33 (1999), pp. 196-214; B. Mates, *The Philosophy of Leibniz: Metaphysics and Philosophy of Language*, Oxford 1986, pp. 76-78; J. McDonough, "Leibniz and the Puzzle of Incompossibility," The Philosophical Review 119:2 (2010), pp. 135-163; J. Messina and D. Rutherford, "Leibniz on Compossibility," *Philosophy Compass* 4 (2009), pp. 1–16; N. Rescher, *Leibniz: An Introduction to His Philosophy*, Lanham, Maryland, 1979; B. Russell, *A Critical Exposition of the Philosophy of Leibniz, 2nd edition*, London 1937; D. Rutherford, *Leibniz and the Rational Order of Nature*, Cambridge 1995, pp. 181-188; M. Wilson, "Compossibility and Law," in: Steven Nadler (ed.), *Causation in Early Modern Philosophy*, University Park, Pennsylvania 1993, pp. 119-33; C. Wilson, "Plentitude and Compossibility in Leibniz," *Leibniz Review* 10 (2000), pp. 1-20.
[28] The application of the law of subjective teleology is, of course, less intuitive in the case of lower monads. How could, for example, a wholly unconscious "mind" always act under the guise of the good? Leibniz, however, I think intentionally means to treat the unfolding of even the dullest of monads, as well as the smartest of monads in their dullest respects, on analogy to the teleological unfolding of our own, conscious mental lives. Thus, for example, in a letter to Sophie Charlotte of 8 May 1704, Leibniz writes explicitly:

> Quand nous voyons … l'ame suivre les loix morales du bien et du mal apparent dans quelque deliberation: disons des autres cas que nous ne voyons pas ou que nous ne demêlons pas si bien, qu'il en est de même, et

monad's subjective goodness would be trivial – an agent's potential pleasures and pains would in no way be limited by present circumstances or past actions. Second, just as each monad constituting the actual world can itself be viewed as a sub-system that maximizes objective perfection under the constraints of compossibility, so each appetite of a monad can be viewed as a subsystem that maximizes subjective perfection under the constrains imposed by the agent's point of view. That this must be so can once again be seen by *reductio*: if an appetition did not optimize subjective goodness under the constraints imposed by the agent's point of view, then it would be possible for an agent to more than maximize its overall subjective goodness – to realize more subjective goodness than is possible under the constraints imposed by its point of view. In virtue of realizing these two features of optimal form systems, each monad as whole, and each appetite within it, may be viewed as a teleological system that maximizes subjective goodness in much the same way that, for Leibniz, various physical systems and the world as a whole may be viewed as teleological systems.

   Finally, since the world as a whole may be viewed as an optimal form system with monads as optimized subsystems, and monads themselves may be viewed as optimal form systems with appetites as subsystems, Leibniz's notion of an optimal form furnishes him with an extremely elegant picture of how the laws of objective and subjective teleology may be reconciled. Viewed from the top down, as it were, monads may be viewed as subsystems presupposed by the optimization of the objective perfection of the world as a whole, and subject to the law of *objective* teleology insofar as they unfold in such a way as to collectively optimize the objective goodness of the created world as a whole under the constraints of compossibility. Viewed from the bottom up, however, monads may also be viewed as uniquely determined systems resulting from the optimization of their subjective inclinations, and subject to the law of *subjective* teleology insofar as they unfold in such a way as to individually optimize their competing subjective inclinations under the constraints imposed by their unique points of view. The two laws are reconciled in a way that is familiar from optimal form systems generally, namely, via the fact that a single system may be viewed both as a consequence of the optimization of its elements and as prerequisite of the optimization of a more comprehensive system: Just as a catenary may be viewed both as resulting from the optimization of its elements,

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  que c'est tout comme icy. C'est à dire, expliquons les choses dont nous n'avons qu'une connoissance confuse, par celles dont nous en avons une distincte, et disons que …. tout se fait moralement dans l'ame, ou suivant les apparences du bien et du mal, tellement que même dans nos instincts ou dans les actions involontaires où le seul corps paroist avoir part, il y a dans l'ame un appetit du bien ou une fuite du mal qui la pousse, quoyque nostre reflexion ne puisse point en demêler la confusion. (G III, 346-347; see also, GP IV, 510; *Principes de la Nature et de la Grace* §§ 4-5; GP VI, 599-601)

It is not essential to the present account, however, to insist that subjective teleology be ascribed to lower as well as to higher monads. Those who – not implausibly – think that lower monads do not act under the guise of the good are invited to take the present account as an account of how Leibniz may reconcile the two forms of teleology he ascribes to higher monads alone.

and as an element necessary for the optimization of a larger cord, so, for Leibniz, each monad may be viewed both as resulting from the optimization of its appetites, and as an element necessary for the optimization of the world as a whole.

Although the structural analogy just sketched may seem a bit abstract, the picture it suggests of how monads might be subject to both the laws of objective and subjective teleology is actually quite straightforward. In creating the actual world, Leibniz's god creates an infinity of monads, each of which must represent its entire world from its own distinct point of view. Each monad then unfolds "spontaneously" in accordance with what appears to it to be best given the constraints imposed by its own unique perspective. In doing so each monad follows the law of subjective teleology. In spontaneously pursuing what appears to it to be best from its own point of view, however, each monad also makes exactly the contribution it needs to make in order to play its specific role in realizing the best of all possible worlds. That is to say, the monads of the actual world follow the law of objective teleology precisely by following the law of subjective teleology.[29] It might, of course, seem like a fantastic coincidence that each monad's pursuing what seems subjectively best to it should in fact bring about the objectively best of all possible. And, indeed, I think that Leibniz would gladly concede that it would be a fantastic coincidence, but for the fact that an omniscient, benevolent God chose to create the monads that he did create precisely *because* he knew that their spontaneous unfolding would in fact bring about the best of all possible worlds.

3. Non-optimal Agency and Bayle's dog

It has been argued thus far that Leibniz's notion of an optimal form helps to shed light on his thinking about how monads may strive to optimize their own subjective perfection while simultaneously contributing to the objective perfection of the world as a whole. It should be emphasized, however, that the various ways in which Leibniz believes that monads must always strive for perfection are consistent with their actions nonetheless being imperfect in various senses. More specifically, Leibniz's commitment to monads always being governed by the laws of subjective and objective teleology can be shown to be consistent with their failing to act optimally in at least three important ways.

First, Leibniz can allow that some actions of finite creatures may be non-optimal in the sense that they are performed under conditions that are themselves non-optimal, at least from the perspective of the agent. As noted above, Leibniz maintains that every finite creature wills under the constraint that it represent its entire universe from its own distinct point of view. That implies, however, that I might confront an array of options that simply does not

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[29] It is, of course, important not to confuse the law of objective teleology as defined above with a law according to which each monad must realize what is objectively best for it *per se*. Unless taken to hold trivially – for example in virtue of super essentialism – Leibniz clearly does not accept any such law. In whatever sense we may say, for example, that Judas might not have sinned, we may also say that it would have been better for Judas *per se* had he not sinned.

include the option that I would most prefer. I might really want a scoop of strawberry ice cream, but have to choose between chocolate and vanilla because those are the only options presented. In maintaining that finite agents always will what they perceive to be the best, Leibniz should be understood as maintaining that they always will what they perceive to be the best among the options available to them, and he is quite explicit, for example, in emphasizing that "The soul is not able always to give itself pleasant feelings, since the feelings it has are dependent on those it has had."[30]

Second, Leibniz can allow that in optimizing their overall inclinations creatures may neglect what is their strongest inclination considered individually. At the ice cream store, my single strongest inclination might be to order two scoops of chocolate, but I might also desire a cup of coffee, be worried about my diet, and want enough change for the parking meter. Optimizing these inclinations may well result in my compromising my strongest inclination – I may order one scoop instead of two, get the coffee, and pay the meter my leftover change.[31] As Leibniz himself points out, in such cases my inclinations considered in isolation may be likened to God's antecedent will which "considers each good separately in the capacity of a good" while my optimized will may be likened to God's consequent will which "results from the conflict of all the antecedent wills" and to which alone "Success entire and infallible belongs."[32]

Third, Leibniz can allow that creatures may fail to optimize their own subjective good due to their imperfect knowledge of the world. Thus, for example, I might act under the guise of the good in taking a big bite of my ice cream sundae – I may perceive that state of affairs as the best overall state of affairs available to me. But I might be wrong. In that bite of sundae there might be a hard rock that I fail to perceive with sufficient clarity, or the perception of which does not rise to the level of my consciousness before I break my tooth on it. Indeed, I may well not recognize my mistake until only after it is too late to fully avoid the pain the rock will cause me so that the most I can do is attempt to minimize my suffering, perhaps by stopping my bite halfway through, or by holding my jaw with my hand, or even by going to the dentist immediately after the fact. A creature may thus optimize what appears to be best to it, and still

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[30] "… l'ame de se donner tousjours les sentimens qui luy plaisent, puisque les sentimens qu'elle aura, ont une dependance de ceux qu'elle a eus." GP IV, 519; translated by R. Woolhouse and R. Franks, in: *Leibniz's "New System" and Associated Texts*, Oxford 2006, p. 81.

[31] Incidentally, this concession provides Leibniz with good resources to respond to a familiar objection to the guise of the good, namely, that where weakness of the will occurs an agent may recognize something as optimal but nonetheless fail to will it fully. Because the Leibnizian will is always a rich sea of competing inclinations to begin with, Leibniz can plausibly reply that purported cases of weakness of will should always be understood as cases where one appetite is simply swamped by countless other appetites.

[32] "…regarde chaque bien à part en tant que bien… succès entier et infaillible n'appartient qu'à la volonté consequente … cette volonté consequente, finale et decisive, resulte du conflit de toutes les volontés antecedentes …" GP VI 116; translated by E. Huggard in: *G.W. Leibniz, Theodicy*, LaSalle, Illinois 1985, pp. 136-137.

choose a state of affairs that is non-optimal in the sense that it would not have chosen that course of action had it known better.

This last example suggests a natural way of understanding Leibniz's response to a famous objection raised by Pierre Bayle in his *Historical and Critical Dictionary*. Bayle imagines a man sneaking up behind a hungry dog enjoying its dinner, and striking the dog with a stick so that the dog transitions abruptly from feelings of pleasure to feelings of pain. Bayle saw in this scenario a devastating critique of Leibniz's doctrine of pre-established harmony since he could not see how the dog's "soul should be constructed in such a way that it would have felt pain at the moment it was hit," and, more generally, found the "spontaneity of this soul wholly incompatible with its feelings of pain, and in general with all feelings it finds unpleasant."[33] While Leibniz responded in detail to Bayle's concerns, he never seems to have been much moved by Bayle's now famous example. And, I think, reasonably so. As described by Bayle, the dog is at best dimly aware of the threat coming from behind him, and so could presumably perceive, incorrectly, but understandably, his continuing to eat his supper as the subjectively best course of action available to him. Thus, in replying to Bayle, Leibniz is able to point out that while "we have no spontaneous inclination towards what we find unpleasant … when we know something will displease us … in this case the dog [simply] does not know."[34] At a first pass, Bayle's dog example, at least as presented by Bayle, turns out to be not so different from the case of the stone-laden ice cream sundae: although the dog might have avoided the pain of the blow had it known better, there is no reason to suppose that it did know better, and thus no reason to be puzzled by its coming to experience pain in its pursuit of what appears to it to be most pleasurable.

In an important recent development, however, Donald Rutherford has suggested that this first-pass response fails to get to the deep root of the problem raised by Bayle. For our purposes, Rutherford's worry might be set out as a dilemma consisting of a framing assumption and two principal horns.[35] The framing assumption is that Leibniz's doctrine of monadic spontaneity commits him to there being a specific appetite sufficient for bringing about each specific state, including each sensation, that a monad experiences. But what specific appetite could Bayle's dog possibly have for the sensation of pain it undergoes? The first horn argues that we have no reason to suppose that the dog might have a subjective appetite for the sensation of pain *per se* since it is implausible to suppose that the dog might perceive or even misperceive the very pain of the blow as something desirable. The second horn argues that it is likewise implausible to suppose that the dog might have a subjective appetite for an

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[33] "… que son âme soit construite de telle sorte, qu'au moment qu'il est frappé" … "fort incompatible la spontanéité de cette âme avec les sentimens de douleur, et en général avec toutes les perceptions qui lui déplaisent," P. Bayle, *Dictionnaire historique et critique*, Nouvelle Édition, Paris 1820, p. 610; Woolhouse and Franks, pp. 73-74.

[34] "… que'on ne tend pas avec spontanéité à ce qui nous deplaisent … quand nous savons que cela nous doit deplaire … Mais icy le chien ne le sait pas …" GP IV, 532; Woolhouse and Franks, p. 78

[35] "Leibniz on Spontaneity," pp. 170-174

irresolvably complex state of affairs that includes the painful sensation of the blow of the stick – that is to say, the dog couldn't have a subjective appetite for a state of affairs that includes both pleasure and pain in an inextricable mix. In light of this dilemma, Rutherford concludes that since the dog must have some sufficient appetite for its painful sensation (by the framing assumption), and since that appetite cannot plausibly be a subjective appetite (by the two horns), the dog must have an objective appetite alone for its state of pain, and so it must be the case that in order to follow the law of objective teleology the dog must sometimes abandon the law of subjective teleology.[36]

Postulating objective appetites that are not at the same time subjective appetites would admittedly provide Leibniz with an especially straightforward response to Bayle's objection. In replying to Bayle, Leibniz could have said that although the dog does not have a subjective appetite for the pain of the blow of the stick, it nonetheless does have an objective appetite for the pain, and that it is that objective appetite for the pain that explains the dog's coming to have the unfortunate experience that it does. But if Leibniz meant to postulate objective-but-not-subjective appetites, his actual response to Bayle is quite misleading. The fact that "we have no spontaneous inclination towards what we find unpleasant … when we know something will displease us," would have pointed Bayle in exactly the wrong direction since it suggests that monads don't have objective appetites for states that they think will be displeasing, that is, that they don't have objective appetites that are not also subjective appetites. Nor might this be dismissed as just a slip. In replying to inquiries from Lady Masham, Leibniz takes up the topic of involuntary and instinctive actions. Here again if he had meant to countenance objective-but-not-subjective appetites, he could have simply said that in many cases of involuntary and instinctive actions monads are driven along primarily by their objective-but-not-subjective appetites, and in those cases act not only spontaneously but also in opposition to what they perceive to be the best at the time overall. But he doesn't. Instead, once again he appeals to confusion, telling Masham that in those cases, "where it seems only the body plays a part, there is in the soul a desire for good or an aversion to evil which directs it, even though our reflection is not able to pick it out in the confusion," a point he underscores later in the same paragraph, again notably not invoking objective-but-not-subjective appetites, in writing, "desire moves the soul from image to image … it is made subject to the body beforehand, in so far as it tends towards confused perceptions" (G III, 347; WF p.224). Although the postulation of objective-but-not-subjective appetites would have provided Leibniz with an obvious reply to Bayle's objection, his actual response to Bayle, as well as his response to similar worries raised by Masham, suggests that he

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[36] Rutherford puts the point himself this way:

> The lesson of Bayle's dog, as I read it, is that if appetition is the internal force, or endeavor, that explains the transition of the dog's soul from a state of pleasure to a state of pain, then that endeavor cannot operate in the same way as volitional states such as desire. Appetition cannot be understood as functioning according to the law of desire teleology [=subjective teleology], for there is no conceivable scenario under which the dog would have represented its subsequent state of pain as a good relative to its present state of pleasure." "Leibniz on Spontaneity," p. 170.

didn't think he needed them. Although this is not the place for a full treatment of Leibniz's textually and philosophically complex views on appetition, we might – since the issue ultimately ties back into Leibniz's views on optimal form – take up the more limited task of showing how Leibniz might hope to resist both horns as well as the framing assumption of Rutherford's dilemma without abandoning the thesis that monad's always follow the law of subjective teleology.

With respect to the first horn of Rutherford's dilemma, it should be conceded that from a contemporary perspective it is indeed highly implausible to suppose that – pathological cases aside – we have subjective appetites for painful or unpleasant sensations *per se*.[37] This intuition can be seen as reflecting a general tendency to see our sensations as falling on a preference scale running from pleasant sensations to the absence of sensation to painful sensations, with our being attracted to pleasant sensations, indifferent to the absence of sensation, and averse to painful sensations. Leibniz, however, belongs to a long-standing apologist tradition that generally sees things quite differently. Christian Neo-Platonists typically embrace the view that every sensation, insofar as it is an existing thing or affection, is good and desirable. They are thus inclined to insist that our sensations are best ordered on a scale running from pleasant sensations to painful sensations to the absence of sensation, with painful sensations being relatively less attractive than pleasant ones, but still always preferable to the absence of sensation altogether.[38] Thus Augustine, for example, notoriously insists that one would have to prefer, since it is at least some mode of existence, even the eternal suffering of hell to the ultimate evil of non-existence.[39] In light of his sympathy with Augustine's views on the nature of sin and evil, Leibniz could maintain that finite agents have subjective appetites for all their specific sensations, even relatively unpleasant ones, as well as an aggregated subjective appetite for what they perceive to be the best overall, just as he takes God to have an antecedent will for every specific creatures, even relatively sinful ones, and a consequent will for the best world as a whole.[40] In doing so, he could reject the first horn of Rutherford's dilemma and maintain that Bayle's dog might, strictly speaking, perceive even the very pain of the blow of the stick as something desirable *per se* while still insisting that it is nonetheless much less desirable than other sensations that the dog might hope to experience.

Leibniz could also reject the second horn of Rutherford's dilemma. In general, Leibniz seems to hold that that our everyday sensations are typically complex states of affairs, mixtures of what we find both pleasant and unpleasant. He also seems to think that those complex states are generally analyzable into constituent sensations – that on closer inspection our everyday sensations reveal

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[37] See, Rutherford, "Leibniz on Spontaneity," pp. 171; 179, fn 30

[38] Some evidence that this approach is not *entirely* foreign to contemporary ways of thinking is provided by anecdotal reports of depressives, who are reported to sometimes forego their medications on the grounds that they would rather feel miserable than numb, rather suffer than feel nothing at all.

[39] St. Augustine, *De Libero Arbitrio*, in *Corpus Christianorum: Series Latina*, volume 29, W. M. Green (ed.), Brepols, 1970, p. 286f. Available in English translation in Thomas Williams (ed. and trans.), On *Free Choice of Will*, Indianapolis, Indiana 1993, p. 83f.

[40] GP VI, 127

themselves to be confusions of lesser sensations. It is, of course, tempting to suppose, as Rutherford's second horn suggests, that such an analysis must in principle come to an end somewhere, terminating in a final level of analysis in which our sensations would be fully sorted out into pure pleasures and unadulterated pains. Leibniz's analysis of structurally analogous phenomena, however, generally supports a rather different picture, one according to which at every level of analysis we find not only greater resolution, but also further complexity. Thus, for example, Leibniz suggests that a full analysis of the organic world would show that larger creatures contain smaller creatures that contain smaller creatures all the way down so that there is no final level of analysis at which there are creatures that cannot themselves be resolved further into still smaller creatures.[41] Nothing prevents Leibniz from saying something quite similar about our appetites. Our manifest, everyday experiences might be thought of as being constituted by mixtures of pleasurable and painful sensations; those constituting sensations might in turn be thought of as being constituted as well by mixtures of pleasurable and unpleasurable sensations, and so on all the way down. In that case, Leibniz could maintain that even our everyday sensations may involve an inextricable mix of pleasurable and unpleasurable sensations in the sense that there is simply no level of analysis at which particular sensations must be resolved into pure pleasures and pure pains. Leibniz, it would seem, could thus not only reject the first horn of Rutherford's dilemma but the second horn as well.

Finally, and most significantly, I think Leibniz in fact implicitly rejects the assumption that frames Rutherford's dilemma. The intuition that there must be a specific "local" appetite sufficient for bringing about each specific "local" perception, including each of a monad's sensations, might be encouraged by the assumption that Leibniz means to offer an essentially atomistic or reductionist explanation of monadic agency. On such a view, it might be thought that if a monad produces two (possibly complex, but not global) states S_1 and S_2, then there must be two distinct (possibly complex, but not global) appetitive states A_1 and A_2 such that A_1 exhaustively explains the occurrence of S_1 and A_2 exhaustively explains the occurrence of S_2. So, for example, it might be thought that if a monad comes to have a perception an ice cream cone and a perception of a cup of coffee, it must have had an appetite for an ice cream cone that by itself explains the monad's coming to have to have a perception of an ice cream cone and an appetite for a cup of coffee that by itself explains the monad's coming to have a perception of a cup of coffee. If that were the case, Leibniz would indeed be committed to holding that there must be a specific "local" appetite sufficient for bringing about each specific "local" perception, and we might well suppose that where S_1 is a painful sensation that he will be hard pressed to maintain that its corresponding appetite A_1 is a subjective appetite (even in spite of the subtleties of the last two paragraphs).

Leibniz's explanations in terms of optimality, however, militate against any such atomistic or reductionist explanatory approach. Indeed, their power lies precisely in their ability to draw together into a single explanation both local and global, atomistic and holistic considerations. Leibniz's treatment of the catenary, for example, shows how the states of each link of a hanging chain may

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[41] GP III, 356; GP VI, 539-46; A VI.iv.1399

be explained by taking into consideration not only the contributions of each link but also the constraints of the chain as a whole. An atomistic focus on any one individual link would leave unexplained, for example, why that link does not assume a lower energy state. Leibniz's treatment of divine agency similarly suggests that God's decision to create, say, Judas can only be explained by taking into consideration not only the worth of Judas but also the worth of every other possible substance and the constraints governing creation. An atomistic focus on Judas alone would leave unexplained, for example, why God does not create a less egregious sinner (whether that less egregious sinner is a modified Judas or a Judas counterpart). The same lesson, I think, applies in the case of monadic agency. A monad's coming to have any particular "local" state S_1 can only be fully explained by taking into consideration not only some particular "local" appetite A_1 but also all its other specific local appetites as well as the constraints imposed by its point of view.[42] A narrow focus on, say, a monad's appetite for two scoops of chocolate ice cream would leave unexplained why it in fact comes to have an experience of one scoop of ice cream, a cup of coffee and some leftover change. Reflection on how Leibniz's optimality explanations work thus suggests that he implicitly rejects Rutherford's framing assumption, that is, that he would deny that specific "local" states of a monad can always be explained atomistically by appeal to specific "local" appetites.

It's worth noting that Leibniz's explanatory approach to monadic agency has perhaps unexpected implications for how we should understand the efficient causal structure of monads. An atomistic explanatory approach encourages the view that the true causal relata of monadic agency must be specific "local" states, particular appetites and particular perceptions. A monad's transitioning from one global state to another global state would on this picture be a derivative consequence of its local appetites bringing about local perceptions. A monad would come to have a global state in virtue of its coming to have all the local states that constitute that global state. While Leibniz's willingness to talk of particular perceptions and particular appetites might invite such a picture, a reductionist model of monadic causation turns out to be difficult to square with his more holistic explanatory approach to monadic agency. For if the true causal relata of monadic agency are local appetites and local perceptions, we should want an account of how exactly we are to understand the causal influences that would have to hold between rival appetites and their corresponding perceptions. If, for example, A_1 not only helps to explain a monad's coming to have a state S_1 but also a state S_2, how are we supposed to understand the causal influence of A_1

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[42] The point of view constraint itself is, I think, best thought of as a contingent constraint ultimately grounded in God's decision to create the best of all possible worlds. For Leibniz, it is logically possible for a monad to, say, represent itself as discontinuously jumping from one location to another. Such a possibility, however, is ruled out by God's decision to create the best of all possible worlds in which laws of continuity and harmony obtain. The status of the point of view constraint is thus strictly analogous to the status of other laws of nature. So, for example, for Leibniz, it is similarly possible that, say, the movement of one link of a chain not be constrained in the least by other links to which it is joined. Such a possibility, however, is ruled out by God's decision to create the best of all possible world in which the laws of physics as we know them obtain.

on S_2? It is not easy to see how A_1 could be a direct cause of S_2 since it is by stipulation a local appetite for S_1 and not S_2, and it is unclear what sort of causal bond there could be between S_1 and S_2 such that A_1's causally influencing S_1 might, via that bond, causally influence S_2. Leibniz's non-atomistic explanatory approach to monadic agency thus suggests a rather different picture of the causal structure of monads, one according to which the true causal relata involved in monadic agency are not "local" or partial representational and appetitive states but rather global or holistic representational and appetitive states. On such a picture, each monad would, as it were, start with a global representation of its entire world, and then transition to its next global representation under the causal influence of a global appetitive state. Particular appetites, such a A_1 and A_2 would then be understood as decompositions of the monad's global appetites in much the same way that Leibniz often treats, say, the orthogonal motions of diagonally moving bodies as decompositions of their true motions. Just as the conceptual decomposition of a motion into orthogonal vectors may prove useful for understanding a body's response to a collision, so the conceptual decomposition of global appetites into local appetites may be useful for understanding the agency of a monad. But it would be a mistake in both cases, I think, to take such decompositions too literally, to infer from Leibniz's explanatorily useful distinctions that the real tendencies of the diagonally moving body are its orthogonal tendencies and that the true causal relata of an unfolding monad are its local appetites and perceptions. In the case of monads, doing so not only threatens to obscure the sophisticated nature of Leibniz's explanatory approach to monadic agency, but also encourages a misleading picture of the causal structure of monads themselves.[43]

Optimal Form and a Role for Reason

Leibniz's understanding of monadic teleology provides him with a framework for explaining, at least in principle, how complex and sophisticated developments or behaviors might be constructed from relatively simple inclinations. A creature with nothing more than petite appetitions for light might enjoy only very simple developments – appetites giving rise to, say, the behavior of tacking towards sunshine and away from darkness. A creature with a handful of different kinds of inclinations, however, might enjoy exponentially more complicated states, states corresponding to, say, the behavior of an animal that seeks sunshine, unless it is a little too thirsty or very hot. Indeed, given infinitely many appetites, and an omniscient God to combine them, there would seem to be almost no limit to the behavioral sophistication of a Leibnizian agent. Working with infinitely many inclinations, Leibniz's God, it would seem, could create

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[43] The same lesson, I think, applies in the case of divine agency. It should not be supposed that God's consequent will is literally a derivative consequence of his cumulative antecedent wills. The thought that God could have genuinely efficacious, yet inconsistent wills, most of which are ultimately frustrated is at best semi-coherent. Better to suppose that God's antecedent wills are merely explanatorily useful decompositions of his consequent will; they are not causally efficacious per se, but rather afford us a way of understanding God's consequent will, which is efficacious per se.

creatures that could be appropriately described as finding and burying acorns for the winter, damming rivers to improve their environment, and even returning library books in order to avoid late fees.[44]

In spite of the already rich resources of his theory, however, Leibniz nonetheless clearly wishes to carve out a special role for reason in the teleological unfolding of monads. But what role exactly? An important clue to Leibniz's thinking on this point is provided by a well known, but I think not fully understood, passage from the *New Essays*. It begins with Leibniz suggesting that appetites are "the first steps that nature makes us take; not so much towards happiness as towards joy, since in them one looks only to the present" and his noting that "experience and reason" can nonetheless "teach us to govern and moderate them so that they can lead us to happiness."[45] The passage continues with the following striking analogy:

> "Appetitions are like a stone's endeavor to follow the shortest but not always the best route to the center of the earth; it cannot foresee that it will collide with rocks on which it will shatter, whereas it would have got closer to its goal if it had had the wit and the means to swerve aside. In the same way, by rushing straight at a present pleasure we sometimes fall into the abyss of misery. That is why reason opposes appetition with images of greater goods or evils to come, and with a firm policy and practice of thinking before acting and then standing by whatever is found to be the best ..."[46]

The surface implication of the analogy is, I think, clear enough: non-rational creatures, and indeed rational creatures insofar as they don't use their reason (that is, most of us, most of the time)[47] are destined to be driven by their short-range desires, often suffering greater miseries as a result. The mouse grabs the cheese and is caught in a trap; I impetuously eat too much dessert and regret doing so later.[48] There is, however, also a deeper, more easily overlooked

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[44] *cf*. P. Bayle, "*Dictionnaire historique et critique* ," pp. 617-618; GP IV, 555-559.

[45] On the relationship between joy and happiness in Leibniz see his letter to C. Wolff 18 May 1715 in *Briefwechsel zwischen Leibniz und Christian Wolff*, C. I. Gerhardt (ed.), Halle, 1860; reprinted, Hildesheim 1963, pp. 171-172; Ariew and Garber, pp. 232-234.

[46] Les appetitions sont comme la tendence de la Pierre qui va les plus droit mais non pas tousjours le meilleur chemin vers le centre de la terre, ne pouvant pas prevoir qu'elle rencontrera des rochers où elle se brisera; au lieu qu'elle se seroit approchée d'avantage de son but, si elle avoit eu l'esprit et le moyen de se detourner. C'est ainsi qu'allant droit vers le present plaisir nous tombons quelques fois dans le precipice de la misere. C'est pourquoy la raison y oppose les images des plus grands biens ou maux à venir et une ferme resolution et habitude de penser avant que de faire, et puis de suivre ce qui aura esté reconnu le meilleur ..." A.VI.189; Remnant and Bennett, p. 189; see also A.VI.vi.194).

[47] *Principes de la Nature et de la Grace* §5; GP VI, 600; see also A VI.vi. 50-51, 475.

[48] In an amusing aside, Leibniz notes;

> J'ay connu un homme considerable dans l'Eglise et dans l'estat que ses infirmités avoient fait se resoudre à la diete, mais il avoua qu'il n'avoit pû resister à l'odeur des viandes qu'on portoit aux autres en passant devant

implication that is intimately related to Leibniz's thinking about optimal form, and in particular to a technical wrinkle passed over in the discussion above.

Earlier it was noted that every segment of a catenary must itself be a catenary – a result that, as we have seen, Leibniz exploits quite effectively in relating the optimization of the world to the optimization of monads, and the optimization of monads to the optimization of appetites. Significantly, however, the inverse of that relation does not hold: even if every segment of a suspended cord is a catenary, it does not follow that the cord itself must be a catenary, as the following diagram illustrates in an intuitive way:

Figure 5

In the diagram, the segments AB, BC, and CD are themselves catenaries, but the chain AD is nonetheless not a catenary. In such a case, we might say that the chain is "locally" a catenary, and yet not "globally" a catenary. This asymmetry – that global optimization implies local optimization, but that local optimization does not imply global optimization – arises in other applications of optimal form as well. Thus, to take an example that Leibniz himself considers, a ray of light reflecting off of a concave mirror may take a path that is everywhere locally optimal, and yet still not globally optimal as the following diagram helps to illustrate.[49]
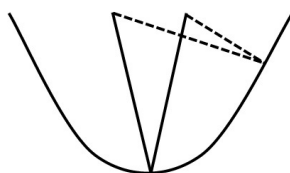
Figure 6

Intuitively, the actual path of the ray of light – indicated in Figure 6 by the solid line – is locally optimal in the sense that the overall path could not be improved by replacing any sufficiently small piece with a "better" small piece. Nonetheless, the path is not globally optimal in the sense that there is another path from the light source to the observer – indicated by the dashed line – that would be better overall. In slightly different terms, the path of the ray of light in the case depicted in the diagram is locally optimal in the sense that it follows a path that

son appartement. C'est sans doute une honteuse foiblesse, mais voilà comme les hommes sont faits. A VI.vi.187

[49] GP VII, 275-277; see also *Unicum Opticae, Catoptricae & Dioptricae Principium*, Dutens pp. 145-150.

is shorter than any possible *nearby* path, but globally non-optimal in the sense that there is at least one (non-nearby) path that is shorter overall.[50]

With this local/global asymmetry in mind, we can see more clearly that Leibniz's falling stone analogy suggests a surprisingly precise demarcation between the capacities afforded to non-rational and rational creatures. Non-rational creatures are, for Leibniz, destined to always follow courses of action that are locally, but not necessarily globally, optimal. They are somewhat like a dog lost in a wood that follows the strategy of taking whatever path is immediately less strenuous. If all goes well, the dog may in fact follow a path that is indeed the best path overall – perhaps it starts at one end of a long valley and runs to the other end. But it may just as well find itself following a path that is, on the whole, much more arduous than if it had selected a few uphill paths along the way. By rushing at present pleasure, it may, to borrow Leibniz's words, fall into an "abyss of misery." To rational creatures, however, Leibniz attributes additional capacities enabling them, in principle, to avoid merely locally optimal courses of action in favor of globally optimal courses of action. Reason allows us, according to Leibniz, to be more like hikers with maps, who may reliably chart courses that are easiest overall, not simply easiest at each juncture. They have, in Leibniz's words, the "the wit and means to swerve aside," to avoid pitfalls and dead ends, and thereby to come closer to achieving their overarching goals. If the teleological agency of finite creatures maps neatly onto Leibniz's understanding of optimal forms, his distinction between non-rational and rational creatures corresponds equally well to the asymmetry of the relationship between local and global optimization.

Leibniz's falling stone analogy, and the asymmetry it suggests, however, might invite anew the suspicion that at least some monads are not always subject to the law of subjective teleology. For one way in which reason might provide rational creatures with the ability to follow globally optimal courses of action is by providing them with the ability to act contrary to the law of subjective teleology. On such a picture, reason would be like a miraculous power allowing creatures like us to will a state of affairs other than that which, in our present state, appears to us to be best overall. And, indeed, one might see Leibniz himself as advocating for such a view in suggesting that reason's role is "all a matter of 'Think carefully' and 'Remember' – by the first to make laws, and by the second to follow them even when we do not remember the reasons from which they sprang."[51] For one might understandably see in this remark the suggestion that reason might allow us, as rational creatures, to formulate rules that we might then steadfastly abide by even when those rules seem to run contrary to our overall inclinations. On this picture, I might, for example, use reason to formulate a rule to never lie to anyone at anytime, and then abide by

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[50] For a technical, but relatively accessible, treatment of the sense in which optimal forms are typically "stationary" forms – i.e. forms that assume (merely) *locally* maximum or minimum values, see D. Lemons, *Perfect Form: Variational Principles, Methods, and Applications in Elementary Physics*, Princeton 1997, pp. 8-9, 71.

[51] "… que tout consiste dans le *pensés y bien* et dans le *memento*; le premier pour se faire des loix, et le second pour les suivre, lors même qu'on ne pense pas à la raison qui les a fait naistre" A.VI.vi, 189-190; Remnant and Bennett, pp.189-190.

that rule even in circumstances where lying seems to me to be the best thing to do all things considered and at a point at which I cannot, for the life of me, see any good even in the rule itself.

Although initially tempting, such a contra-appetitive picture of the role of reason should, I think, be resisted as a reading of Leibniz's considered position. For while one can read such a model back into some of Leibniz's statements, it simply does not square with the numerous passages in which Leibniz suggests that all creatures – not just non-rational ones – act under the guise of the good.[52] Nor does it fit well with Leibniz's account of the relationship between divine reason and volition, where reason and volition are always presented as concurring aspects of divine perfection.[53] Most importantly, however, the supposition that creatures might abide by the dictates of reason in opposition to the sum of their overall inclinations threatens to undermine the entire framework of Leibniz's account of monadic agency. For how are we to understand the proposed ability of an agent to abide by a rule of reason in opposition to the overall sum of her inclinations? Leibniz's dogged opposition to libertarian and voluntaristic conceptions of the will, as well as his more foundational commitment to the principle of sufficient reason, indicate that for him the will must have some reason for abiding by any resolution. If an agent does *not* see abiding by a particular rule – even a rule she arrived at earlier – as in keeping with the overall best course of action to follow, it is hard to see how she could follow it at all given Leibniz's framework; and, if she *does* see following the rule as according with her overall inclinations, then her acting in accordance with that rule needn't constitute a violation of the law of subjective teleology after all.

But if reason does not act as a contra-appetitive power, how does it assist rational creatures in pursuing not only locally, but globally optimal courses of action? A closer look at Leibniz's texts suggests three distinguishable strategies consistent with his commitment to the (non-miraculous) inviolability of the law of subjective teleology.

First, reason might assist rational creatures in their pursuit of long-range goods by reducing the discrepancy between what they perceive to be, and what actually are, the best courses of action available to them. Leibniz is firm in his conviction that virtuous action is always accompanied by greater pleasure in the long run, and conversely that vicious action always brings with it diminished pleasure and greater pain either immediately or subsequently as the result of divine punishment.[54] The sinner, for Leibniz, thus turns out to be not so different from Bayle's dog. In pursuing salient pleasures, he runs headlong into greater, if less obvious, miseries. Through the use of reason, however, rational creatures might come to see more clearly the evil contained in merely apparent goods as well as "the good which exists on the opposite side."[55] They may thus, in short,

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[52] A.VI.vi, 180; A.VI.vi, 182; A.VI.vi, 185-188; GP III, 341; GP III, 347; G III, 349; GP III, 469; GP VI, 588; GP IV, 438.

[53] See, for example, GP VI, 106-108; GP IV, 438.

[54] *Monadologie* § 90; GP VI, 622-623; *Principes de la Nature et de la Grace* §15; GP VI, 605

[55] "...le bien qui est dans le parti contraire..." A.VI.vi.186; NE 186; Remnant and Bennett, p. 186.

come to better see the true costs of sinful behavior as well as the full rewards of virtuous actions, and in doing so pursue courses of action that are pleasurable not merely in the short term, but in the long run as well.

Second, reason might come to the aid of rational creatures by contriving circumstances or habits for avoiding ultimately harmful appetitions as well as for cultivating ultimately helpful ones. Leibniz notes that a lover, in a virtuous frame of mind, might undertake a journey to guard himself against the later call of "confused but potent pleasures." He cites with approval the case of "Francisco Borgia, the General of the Jesuits" who cured himself of his habit of drinking heavily "by each day letting a drop of wax fall into the flagon which he was accustomed to drinking dry." And he suggests that we may hope to avoid the vices of "dangerous interests" and "idleness" by opposing them with innocent virtues such as "farming or gardening," carrying out experiments, or engaging in "useful and agreeable conversation or reading."[56] By promoting appropriate circumstances and habits, reason fulfills it function not so much by helping us to see the good and bad often hidden in virtuous and vicious actions, but by contriving ways of preserving our appreciation of the good, and avoiding situations in which our confused perceptions and appetites are likely to overwhelm our better natures.

Third, reason may help us to pursue globally optimal courses of action by making available to us higher pleasures that would otherwise be inaccessible to us. In an important passage from the *New Essays*, prefaced by a reference to the stone analogy discussed above, Leibniz relates that there are certain "distinct inclinations which reason gives us … which occur in the knowledge and production of order and harmony, [and] are the most valuable."[57] Likewise in letter to Christian Wolff, dated 18 May 1715, Leibniz implies that while animals are capable of certain sorts of pleasures, we, in virtue of being rational creatures, are capable of enjoying non-empirical, a priori pleasures.[58] Finally, in the *Principles of Nature and Grace*, Leibniz suggests that it is only through reason that we can come to love God in a disinterested way that not only "constitutes our greatest good and our greatest interest" but that also "assures us future happiness" since such a love of God necessarily "fulfills our hopes, and leads us down the road of supreme happiness."[59] In this respect, reason comes to our aid,

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[56] "plaisirs … qui sont confus mais touchans … François de Borgia General des Jesuites … en faisant tomber chaque jour une goutte de cire dans le bocal qu'il avoit accoustumé de vuider … A des sensibilités dangereuses on opposera quelqu'autre sensibilité innocente, comme l'agriculture, le jardinage; on fuira l'oisiveté … ou dans quelque conversation ou lecture utile et agreable." A.vi.vi.187; Remnant and Bennett, 187; see also A.VI.vi,182, 196; Remnant and Bennett, 182.

[57] "…et enfin il y a des inclinations distinctes que la raison nous donne … qui se trouvent dans la connoissance et production de l'ordre et harmonie sont les plus estimables" A.VI.vi.194-195; Remnant and Bennett 194-195.

[58] G.W. Leibniz to C. Wolff 18 May 1715 in *Briefwechsel zwischen Leibniz und Christian Wolff*, C. I. Gerhardt (ed.), Halle, 1860; reprinted, Hildesheim 1963, p. 171; Ariew and Garber, p. 233.

[59] " … il fait par luy même notre plus grand bien et interest … qui nous assure même un bonheur futur … car l'amour de Dieu remplit encore nos esperances, et

according to Leibniz, not simply by maximizing the promise of pleasure already implicit in our mundane appetites and perceptions, but by also providing us with access to a higher, more potent source of enduring happiness.

Significantly, none of the three strategies just sketched require rational creatures to abandon locally optimal courses of action in order to pursue globally optimal courses of action – to act contrary to the sum of their present inclinations in order to gain a greater unforeseen outcome. In helping us to see the true benefits and costs of our actions, reason may directly affect which options seem most attractive to us – knowing that there is a stone in my sundae makes it much less desirable to me – but it does not require me to choose an overall state of affairs other than what I perceive to be the best at the time of acting. Likewise, in helping us to cultivate circumstances and habits conducive to long term happiness, reason may influence what desires we are likely to have in the future – my habit of gardening is likely to lead me to desire to be outside, to till the soil, etc., whereas my habit of gambling is likely instead to lead me to desire to be at the casino, to covet money, etc. As before, reason may thus influence – indirectly in this case – what I perceive to be the best state of affairs overall; in exercising its influence, however, it does not require me to act contrary to what I perceive to be the best at the time of acting. Finally, in making available higher pleasures – including those of the a priori sciences, and the intellectual love of God – reason makes it possible for rational creatures to enjoy appetites unavailable to non-rational creatures. Rational reflection might lead me to a greater appreciation of eternal truths and divine love, and in doing so prompt me to further study and pious reflection. As before, however, reason's fulfilling its role in this way does not require rational creatures to run contrary to what they perceive to be the best. A brief survey of the various ways in which reason may assist finite, rational agents in pursuing long-range goods can thus be seen to lend support to the suggestion that Leibniz's considered view is that no agent – rational or non-rational – ever acts contrary to the law of subjective teleology.

Conclusion

There has been much debate recently over whether Leibniz was or was not a systematic philosopher. A once standard view presents Leibniz as a universal genius, eager to draw connections between various fields and striving in general for systematic coherence, even if not always quite achieving it. Such a view was endorsed early in the last century in an especially strong form by Bertrand Russell, who suggested that Leibniz's thought might even suitably be arranged as series of deductive inferences in the *more geometrico* of Spinoza's *Ethics*.[60] While few commentators today would go as far as Russell, more modest views of Leibniz as a systematic philosopher have remained popular. Offering an analogy that, I think, captures nicely the spirit in which many recent

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nous mene dans le chemin du supreme bonheur ..." (*Principes de la Nature et de la Grace* §18; GP VI, 606).

[60] B. Russell, *A Critical Exposition of the Philosophy of Leibniz, 2nd edition*, London 1937, p. 1.

commentators have read Leibniz, Michel Serres has suggested that Leibniz's thinking might be likened to a web in which various elements are linked together, not in a deductive system, but through a series of weaker and stronger, more direct and less direct, more obvious and not-so-obvious connections.[61]

In a significant turn, this traditional view has recently come under attack by some of Leibniz's best and most distinguished commentators. In an important and provocative paper, Catherine Wilson proposes that the search for a coherent metaphysical system in Leibniz's writings is ultimately a fool's errand, inspired by the eighteenth century cult of genius and a misunderstanding of the principles of interpretative charity. In contrast to the more traditional view, she suggests that a failure to find systematicity in Leibniz's writings need not be a "subject-based failure" grounded in "the inability of a commentator to grasp the systematicity" of Leibniz's *oeuvre*, but rather an "object–based failure" rooted in the facts that Leibniz's writings do "not cohere to form a systematic unit" and that he never "tells an interpretative story that is consistent … in the sense that it contains no deep and serious contradictions."[62] Although more inclined to see Leibniz's views on central metaphysical themes as progressing throughout his career, Daniel Garber has, in a similar vein, recently cautioned that "it is a distortion to want to see more order and connection in Leibniz's thought than is really there," and has suggested, as an alternative to Serres's net analogy, that Leibniz's thought might perhaps be better likened to "the night sky, [with] some stars tightly clustered into galaxies, some more loosely into constellations, but some shining independently, isolated from the others."[63]

On a first pass, Leibniz's account of monadic teleology may appear to lend support to the increasingly popular view of Leibniz as a brilliant, but not deeply systematic philosopher. It is not easy to see how monads might be subject to both the laws of objective and subjective teleology. How monads might be causally autonomous, always be inclined to what they perceive to be the best, and yet plunge into sudden bouts of pain and misery. Nor is it obvious how the rich mental lives and the use of reason that Leibniz ascribes to sophisticated

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[61] M. Serres, *Le Système de Leibniz*, Paris 1968, pp. 7-90. See also D. Garber, "Leibniz and the Foundations of Physics: The Middle Years," in: Kathleen Okruhlik and James Brown (eds.), *The Natural Philosophy of Leibniz*, Dordrecht 1985, p. 73.

[62] C. Wilson, "The Illusory Nature of Leibniz's System," in: Rocco Gennaro and Charles Huenemann (eds.), *New Essays on the Rationalists*, New York 1999, pp. 373-388. *Cf.* G. Hartz, *Leibniz's Final System: Monads, Matter and Animals*, New York 2007, pp. 14-18.

[63] The set up of this conclusion, my own recent thinking about the systematicity of Leibniz's philosophy more generally, was prompted by my response to D. Garber, "Metaphysics and Theology: The Role of the Monadology in Leibniz's *Essais de Théodicée*," presented at a conference entitled *Leibniz's Theodicy: Context and Content* hosted by the University of Notre Dame in September of 2010. It should be noted that Garber has since moderated his position concerning the systematicity of Leibniz's work. His astronomical metaphor nonetheless brings out rather elegantly, I think, a quite natural and tempting view of Leibniz's thinking.

monads are to be reconciled with his psychological foundation of tiny inclinations and petite perceptions. And if it is difficult to see how the threads of Leibniz's treatment of finite agency might themselves be coherently woven together, it is admittedly even harder to see how they might be tied into other aspects of his far-ranging thought. How they might be related to, for example, his much-vaunted work in mathematics and the natural sciences. It is indeed tempting to conclude that Leibniz's thinking about finite agency represents at best a loose array of semi-consistent theses developed in perhaps fortunate isolation from his other more promising studies.

       The aim of the present essay, of course, has been to suggest that there are, after all, good reasons for remaining optimistic with respect to both the internal coherence of Leibniz's views on human agency and their systematic relation to other areas of his thought. Towards that end, it has been argued most centrally that attention to Leibniz's notion of an optimal form shows how many of the apparent tensions in his treatment of finite agency may be resolved: how monads might always will what seems best to them individually and what is in fact best for the world as a whole; how finite spirits might remain imperfect and miserable even as they continually strive in causal isolation for what seems best to them given their unique perspectives and limitations; how reason might play a substantive role even in minds determined to unfold in accordance with their immediate perceptions and appetites. In arguing that there are important parallels between Leibniz's treatment of finite agency and his handling of central problems in the natural sciences, including the paradigmatic problem of determining the shape of the catenary, the present paper has also aimed to bring out some hidden connections between some of Leibniz's seemingly most distant studies. In doing so, it may hope to lend a measure of support to the hoary, if embattled view of Leibniz as one of the great system builders of the early modern period.