

ARTICLE

MARGARET CAVENDISH'S EPISTEMOLOGY

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This paper provides a systematic reconstruction of Cavendish's general epistemology and a characterization of the fundamental role of that theory in her natural philosophy. After reviewing the outlines of her natural philosophy, I describe her treatment of 'exterior knowledge', i.e. of perception in general and of sense perception in particular. I then describe her treatment of 'interior knowledge', i.e. of self-knowledge and 'conception'. I conclude by drawing out some implications of this reconstruction for our developing understanding of Cavendish's natural philosophy.

1. INTRODUCTION

The category of knowledge – along with the (more specific) categories of interior and exterior knowledge, of self-knowledge and perception – plays a central role in Cavendish's system of natural philosophy. The current (first) wave of scholarship on Cavendish's system nevertheless so far does not include a sustained enquiry into her conceptions of interior and exterior knowledge, into the relationships she posits between self-knowledge and perception, into the precise roles these phenomena play in her system – the scholarship does not, in other words, contain a sustained enquiry into the epistemological dimension of Cavendish's natural philosophy.

It is not that the centrality of knowledge to her system has been disregarded by the scholars working to reconstruct Cavendish's thought – they uniformly note, in fact, the emphasis she places on the twin phenomena of self-knowledge and perception. It is, instead, simply that the scholarship on Cavendish is still in its infancy – there exists, so far, only a literal handful

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of articles and chapters devoted to investigating her natural philosophy,² and these are, of necessity, given over primarily to bringing its broad outlines into focus.³ The aim of this paper is to fill this gap in the literature: the extant literature on Cavendish now provides, I believe, a background sufficient for a more narrowly focused reading of her texts, and so I want to read her (mature) works of natural philosophy (Cavendish 1664; Cavendish 1666a; Cavendish 1668)⁴ with an eye to understanding the place of knowledge in her system.

The paper, in other words, investigates Cavendish's epistemology, her treatment of (familiar) questions about the nature, sources and kinds of knowledge.⁵ Given the highly integrated character of her system, taking this approach to Cavendish necessarily involves dealing with her answer to a (less familiar) question about what knows – her surprising answer, in brief, is: everything – and thus her general metaphysics; although my emphasis throughout is on her treatment of knowledge, there is no sharp distinction, for Cavendish, between metaphysics and epistemology.

Remarks on several limitations of the project of the paper are in order at the outset. First (as already noted), my focus is entirely on Cavendish's later writings on natural philosophy: I focus on Cavendish 1666a, the most useful statement of her mature views, in particular, relying to some extent also on Cavendish 1664 and Cavendish 1668; I deal, then, neither with her fiction (e.g. Cavendish 1666b), nor with her earliest, atomist work of natural philosophy (Cavendish 1653b),⁶ nor with the works setting out early versions of her non-atomist system (Cavendish 1653a; Cavendish 1655).⁷

²There is, on the other hand, a considerable body of work focusing on her other writings, much of which attempts to read her as a sort of proto-feminist. Especially interesting are Bowerbank 1984; Brown 1991; Keller 1997; Price 1996; Price 1998; Sarasohn 1984 and Tillery 2003 attend also to the texts on natural philosophy, and Boyle 2004 responds to some of this work. My aims in this paper do not require me to wade into the debate over Cavendish's putative proto-feminism.

³Perhaps the most important works here are Boyle 2004; Broad 2002; Detlefsen 2006; Detlefsen 2007; Hutton 1997; James 1999; O'Neill 2001. For an explanation of the dearth of work on Cavendish's natural philosophy, see O'Neill 1998; O'Neill 2005.

⁴Cavendish 1666a is the only contemporary edition of one of Cavendish's works of natural philosophy; for the sake of consistency, when quoting from her other works, I modify Cavendish's spelling, capitalization, etc. in line with the conventions adopted in this edition.

⁵I will not, however, have much to say about her philosophy of science (her reaction to the experimental method, etc.) in particular.

⁶Clucas (1994) argues that Cavendish in some sense remains an atomist even in her later works. I take for granted here the standard reading, on which Cavendish breaks with atomism in Cavendish 1653a. See O'Neill 2001, Broad 2002, and Detlefsen 2006 for responses to Clucas's reading.

⁷The most salient difference, for present purposes, between the early and the mature systems is that the category of self-knowledge appears only in the latter. The work done by self-knowledge in the mature system is done in the early system by the notions of sympathy and antipathy (notions which make no significant appearance in the later works): typical of the early Cavendish is her claim that 'all the motions which [the rational spirits] make, is according to those figures with which they sympathize and agree' (1655, 16). (Sympathy and antipathy, when

Second, my aims here are primarily reconstructive: I am interested, for now, simply in understanding the texts. This means, first, that I am not especially concerned to assess the plausibility of Cavendish's epistemological views. Second, it means that I will not seriously attempt the comparative project of understanding those views in relation to the views of other philosophers of her day (although a certain amount of informal comparison is inevitable). Finally, considerations of length require that I deal with certain relatively specialized questions about Cavendish's epistemology (for example, her discussion of knowledge of other minds) either briefly or not at all; a sustained treatment of these questions would anyway be premature at this stage of the investigation.

2. BACKGROUND: VITALIST MATERIALISM

Before turning to Cavendish's account of knowledge, I want, in order to provide an indication of the role of that category in her system, briefly to review the broad outlines of her natural philosophy. I rely for this especially (but not exclusively) on James 1999 and O'Neill 2001.

Cavendish, according to James, 'allies vitalism to materialism to produce the view that the world consists solely of self-moving matter, and then replaces a mechanist account of causation with the twin notions of perception and generation' (1999, 249). This picture of nature, although it is apt to be surprising to us today, would not have seemed especially strange to Cavendish's contemporaries: the rejection of mechanism in favour of a view on which matter possesses 'some kind of active or vital power', James points out, is consonant with the intellectual spirit of her time. James also points out, however, that Cavendish's materialist brand of vitalism nevertheless occupies a unique position 'in the exotic and crowded landscape of late seventeenth-century explanations of nature' (1999, 219). Cavendish, then, is to be viewed as a philosopher typical of her time but simultaneously as one whose views occupy a corner of logical space left vacant by other philosophers working then. It will thus be helpful briefly to contrast the space she occupies with those occupied by two of her contemporaries, viz., More and Hobbes.

Both More and Cavendish, James says, react to the perceived deficiencies of the emerging mechanist philosophy; but while More argues that since

they are mentioned in the later works, seem there usually to play a descriptive (rather than an explanatory) role: at Cavendish 1668, 15, e.g. Cavendish invokes the notion of sympathetic motion in an analysis of the notion of influence; but she does not there invoke the notion of sympathy in order to explain why influence occurs. The texts are not quite uniform in this respect, however: at Cavendish 1668, 160, e.g. she seems to revert to using the notion of sympathy to do explanatory work.) It might be suggested that the sympathy and antipathy of the early texts are understood by Cavendish in terms of self-knowledge; but the category of self-knowledge rarely (if ever) makes an appearance in those texts.

matter is inert, mechanist explanation must be supplemented with explanation in terms of non-material spirit, Cavendish refuses to posit anything non-material and so concludes that matter must be self-moving, not inert (1999, 229). Cavendish maintains that such a vitalist materialism is explanatorily superior to the non-materialist vitalism of More: she argues, as Broad points out, both that vitalist materialism is simpler and explanatorily more powerful than More's view and that, unlike his view, it does not stray beyond the bounds of natural reason (2002, 57). These advantages of her view, of course, derive from Cavendish's materialism, from the aspect of her thought in which she is closest to Hobbes; against Hobbes's mechanist materialism, Cavendish will claim the advantages of vitalism, the aspect of her thought in which she remains close to More.

Cavendish gives a variety of reasons in favour of the rejection of mechanism; some of these are directed against mechanism in general, while others are directed against the combined atomist-mechanist and dualist-mechanist views (James 1999; Boyle 2004).⁸ She also directs a series of arguments specifically against the mechanist account of perception (Broad 2002, 49). Finally, Cavendish directs similar arguments against the mechanist account of thought (Hutton 1997, 423). Her argument from the orderliness of nature against mechanism in general is perhaps Cavendish's favourite: mechanism, she maintains, is straightforwardly unable to account for the orderliness of nature, for, as a natural philosophy that posits no forces that might serve as guarantors of that orderliness, it describes a world that should descend into chaos.

Cavendish finds suitable forces in self-knowledge and perception: if nature were not self-knowing and perceptive, it 'would run into confusion: for, there could be neither order, nor method, in ignorant motion . . . nature being so exact (as she is) must needs be self-knowing and perceptive' (1668, 7). For Cavendish, then, knowledge is extraordinarily widespread: each thing, she argues, has knowledge both of itself (and of its activity) and of other things (and of their activities); each natural action ('as respiration, digestion, sympathy, antipathy, division, composition, pressure, reaction, etc.'), she argues, is perceptive and self-knowing (1666a, 139). If a thing is to 'know' how to move, then it must (literally) know how to move; this knowledge is the product of the knowledge the thing has of itself and of that it has of the things with which it interacts (1666a, 191–2).⁹ Self-knowledge and perception, in short, are central to her explanation of natural change.

⁸Although she rejects his dualism, Cavendish shares with Descartes (as she does with Hobbes) a basic methodological stance: for her, reason is to be trusted over the senses. For an expression of this stance, see, e.g. Cavendish 1666a, 195–97. Cavendish's distrust of the senses is, obviously, one source of her hostility to the new experimental method. On this connection, see Hutton 1997, 424–6; for an overview of Cavendish's objections to the use of microscopes and the like, see Boyle 2004, 206.

⁹I leave it open for now whether interaction between objects is, for Cavendish, genuine causal interaction; see §3.2 below.

Arguments against mechanism similar to those given by Cavendish are endorsed by other English vitalists, but the picture proposed by Cavendish as a replacement for the mechanist one, a picture of a world consisting entirely of self-moving matter, a picture suited to ground an explanation of the orderliness of nature in terms of perception and self-knowledge, is unusual. The world, for Cavendish, is an infinite whole composed of self-moving matter in motion. Bodies are parts of this whole, to be individuated in terms of the configurations of matter of which they consist. This individuation depends on Cavendish's distinction between three 'degrees' of matter, a distinction which is also crucial to her epistemology.

Cavendish first distinguishes between animate and inanimate matter; within the category of animate matter, in turn, she distinguishes between rational matter (which she describes as designing, subtle, penetrating, etc.) and sensitive matter (which she compares, for example, to a labourer) (1666a, 161). Both rational and sensitive matter are self-moving, while inanimate matter is not, being only carried along by the animate matter with which it is completely intermixed (1668, 6).¹⁰ Inanimate matter is, however, always in motion, for although it is itself inert, it is nowhere found unmixed with animate matter, and so it is always carried along by the motions of the latter. One might expect Cavendish to hold that only animate matter has life and knowledge, but she defies this expectation, saying that '[t]he inanimate part of matter has life, sense, and self-knowledge, as well as the animate', although its knowledge is not as perceptive and its life not as active (1666a, 98). The difference between animate and inanimate matter lies, instead, entirely in their different capacities for self-motion.¹¹

For Cavendish, a given thing is a particular configuration of rational, sensitive, and inanimate matter. It should be noted here that according to her doctrine of complete blending or mixture, any thing will contain matter of each of these three degrees: 'no particle in nature can be conceived, or imagined, which is not composed of animate matter, as well as of inanimate' (1666a, 158). Cavendish, recall, rejects atomism: she therefore does not posit animate atoms and inanimate atoms; and (as O'Neill points out) we are not to think of complete blending as coming down to the juxtaposition of portions of animate and inanimate matter: however small a portion of matter we choose, it will always contain both animate and inanimate matter (2001, xxv). Rational, sensitive and inanimate matter, then, are not three

¹⁰Note that the line between animate and inanimate matter is sharper than that between rational and sensitive matter: Cavendish says that 'reason is but a pure and refined sense, and sense a grosser reason', but says nothing similar about the other distinction (1664, 27); see also Cavendish 1666a, 161.

¹¹It is difficult to make sense of the claim that even inanimate matter has life and knowledge. Cavendish herself at times appears to be uneasy about this, seeming to suggest that the life and knowledge of inanimate matter are somehow derivative of the life and knowledge of animate matter (when, e.g. she attributes the former to 'the various divisions and compositions which the animate parts do make' (1666a, 156)).

kinds of matter, but rather (something like) three inseparable aspects of (the one kind of) matter.

Since she holds that all matter has life and knowledge (her vitalism) and that everything is material (her materialism), Cavendish is bound to hold that there is some sense in which every thing (every configuration of matter) is a living and knowing thing – she is bound, in other words, to accept panpsychism. Indeed, Cavendish is unusual not only in virtue of her combination of vitalism and materialism; her readiness to endorse the panpsychism implied by the position – she explicitly argues that ‘[a]s infinite nature has infinite self-motion and self-knowledge; so every part and particle has a particular and finite self-motion and self-knowledge’ (1666a, 138) – too, is unusual (James 1999, 229).¹² Cavendish’s readiness to endorse this implication can be explained: her panpsychist metaphysics grounds an explanation of natural change consistent with her reasons for rejecting mechanist accounts of natural change; she can, in particular, appeal to the life and knowledge of things in order to provide a sort of cooperative model of their interactions with which to replace the mechanist model of interaction as collision between mutually indifferent objects.

Her explanation of natural change has a second part, concerning the generation of new things. This part of the explanation is relatively straightforward: since Cavendish maintains that new matter is never generated, she is bound to say that new objects must be made out of existing matter; this happens, according to her, when the motions individuating a body are dissipated, so that the matter of which the body was composed can go to form new entities (Cavendish’s ‘translation’) (James 1999). In what follows, I am concerned, to the extent that I am concerned with Cavendish’s general explanation of natural change, primarily with the first part of the explanation, the account of change in existing things. James claims that Cavendish explains change in existing things in terms of perception (or ‘patterning out’); I differ with James over this reading, and so I set Cavendish’s account of change in existing things aside until §3.1.

3. EXTERIOR AND INTERIOR KNOWLEDGE

As noted in §2, both the infinite whole of nature and its finite parts are, for Cavendish, knowing. She claims, indeed, that all things necessarily have self-knowledge: ‘an interior or self-ignorance . . . cannot be in nature, by reason every part and particle has self-knowledge’ (1666a, 163). Only finite things have perceptive knowledge. Since the infinite whole is all that there is, its

¹²Cavendish has a ready response to the obvious objection that most things do not, as far as we can tell, sense or think. See the discussion of ‘vegetable knowledge’, ‘mineral knowledge’, etc. in §3 below.

knowledge must be self-knowledge; and self-knowledge – this is part¹³ of what she refers to as ‘interior knowledge’ – by definition is not perceptive: ‘an interior self-perception [cannot] be in nature, because perception presupposes ignorance; and if there cannot be a self-ignorance, there can neither be a self-perception, although there may be an interior self-knowledge’ (Cavendish 1666a, 138). Only finite things, then, have perceptive knowledge – Cavendish refers to this as ‘exterior knowledge’ – but although they also have self-knowledge, even they do not have it via perception: again, ‘perception, or a perceptive knowledge, belongs properly to parts, and ... extends to exterior objects’ (1666a, 138).

Self-knowledge is, in fact, in some sense prior to perception: it is ‘the ground of all particular knowledges and perceptions’ (1666a, 161). We are, unfortunately, never provided with a very detailed account of the sense in which self-knowledge is the ground of perceptive knowledge. The most we are told is that self-knowledge is prior to perceptive knowledge in that there could (in principle) be self-knowledge without perception, while there could not (even in principle) be perception without self-knowledge (1666a, 165). However, the nature of the priority of self-knowledge over perception remains obscure: at one point, Cavendish emphasizes that we are not here really dealing with two different ‘principles’ of knowledge, that perception and self-knowledge are ‘two different acts of one and the same interior and inherent self-knowledge’ (1666a, 138); and yet, at another point, she says that ‘there is as much difference betwixt [self-knowledge and perception], as betwixt a whole, and its parts; or a cause, and its effects’ (1666a, 155).

Crucially, perception, for Cavendish, is not confined to sense perception (her ‘animal perception’): if, as she claims, every thing perceives, then she must make perception into a phenomenon much more general than sense perception. She does not always use a distinct term to refer to sense perception, but she is careful to observe the distinction.¹⁴ sense perception is a particular, special kind of perception (roughly: the perceptive action of the sense organs). I return to her treatments of perception in general and sense perception in particular in §3.1.

The self-knowledge of the infinite whole of nature encompasses the finite knowledges of its finite parts: ‘[a]s infinite matter is divided into infinite parts; so infinite knowledge is divided into infinite particular knowledges’ (1666a, 137); but a finite part of nature cannot strictly have knowledge of the whole (in the way in which it might have knowledge of another finite part of nature), for a finite thing’s knowledge of the whole of nature would necessarily be infinite – Cavendish emphasizes that the self-knowledge of nature is infinite – while infinite knowledge is beyond the capacity of any finite thing: ‘[a] whole may know its parts; and an infinite a finite; but no

¹³See §3.2.

¹⁴She remarks, e.g. that ‘all self-motion is perception, but all perception is not animal perception, or after an animal way’ (1664, 61).

particular part can know its whole, nor one finite part, that which is infinite' (1666a, 138). A finite thing's ignorance of the infinite whole need not, however, be total – there is room here for more or less 'probable' judgement, for, when parts are regularly composed, 'they may by a general conjunction or union of their particular knowledges and perceptions, know more, and so judge more probably of the whole, or of infinite' (1666a, 155).¹⁵ Cavendish's strategy here is not entirely clear to me, but perhaps she means to say simply that the knowledge that can be produced by a number of things together, when they are appropriately organized, is more extensive than the sum of the knowledges those things might produce on their own.

Cavendish emphasizes not only the inability of a finite thing to have perfect knowledge of the infinite whole of nature, but also the inability of such a thing to have perfect knowledge even of an external finite object. Knowledge of external things is not bound to be completely superficial, since the rational component of a thing can penetrate to some extent beyond the surface of an external object to detect its inner motions.¹⁶ But there are definite limits to the knowledge that can thus be achieved: 'we see some bodies dilate, others consume, others corrupt; yet we do not see how they dilate, nor how they consume, nor how they corrupt' (1664, 166).

Reminders of the cognitive limitations to which all finite things (including humans) are subject are found throughout Cavendish's works. She goes so far as to admit, for example, that she cannot be certain that her own account of perception is true of all perceptions in nature (1666a, 169), although she seems in the end to be convinced that all perception does work this way. Note that perception, for Cavendish, is not monolithic: there are distinctions to be drawn within the category of perceptive knowledge. If a kind of thing is typified by a characteristic configuration of rational, sensitive, and inanimate matter, then, she argues, there will be associated with each kind of thing a kind of knowledge typical of it. Cavendish thus maintains that although 'a vegetable, or mineral . . . cannot have an animal knowledge or perception', it is also the case that 'the eye patterning out a tree or stone [cannot] be said to have a vegetable or a mineral perception' (1666a, 141). The line of argument, if it works, secures knowledge not only for non-human animals but also for (what we would classify as) non-living things (1668, 18).

As noted in §2, Cavendish is prepared to respond to the objection that entities other than humans (and perhaps animals) do not seem to have knowledge, arguing that 'their knowledges being different, by reason of their different natures and figures, it causes an ignorance of each other's knowledge' (1666a, 218) – it might not seem to us that a vegetable or a stone has knowledge, but that is only because we do not always know

¹⁵See also Cavendish 1666a, 144. Clearly, Cavendish needs to grant this – otherwise, she would not be in much of a position to do natural philosophy!

¹⁶See the discussion of conception in §3.2.

knowledge when we see it. Cavendish thus acknowledges that there are important differences between distinct kinds of knowledge: there is a kind of knowledge 'proper to the nature of man', and there is a kind 'proper to the nature of all animals' (1664, 535). It is noteworthy that she refuses to rank the kinds of knowledge from higher to lower: 'several kinds and sorts of knowledge, make not knowledge to be more, or less; but only, they are different knowledges proper to their kind' (1668, 163). This sort of radical epistemological egalitarianism shows up repeatedly in Cavendish's work.¹⁷

3.1. Exterior Knowledge

It will be necessary to return to the precise distinction between interior and exterior knowledge in §3.2, but we can begin to reconstruct Cavendish's account of exterior knowledge without having a detailed description of the distinction in place. I first review her treatment of perception in general and then move on to her treatment of sense perception in particular.¹⁸

Perception, according to Cavendish, occurs when the 'figurative motions' of a thing (the motions of the self-moving matter of which it is composed) are occasioned¹⁹ by the presence of an external object to 'pattern out' the figurative motions of the latter (1666a, 169).²⁰ Patterning out the figurative motions of a thing can be understood on the model of making a copy of the thing; to pattern out, Cavendish says, 'is nothing else but to imitate' (1664, 420):

By prints I understand the figures of the objects which are patterned or copied out by the sensitive and rational corporeal figurative motions; as for example, when the sensitive corporeal motions pattern out the figure of an exterior object, and the rational motions again pattern out a figure made by the sensitive motions, those figures of the objects that are patterned out, I name prints . . . Thus by prints I understand patterns, and by printing patterning.
(Cavendish 1664, 539–40)

Although patterning out is a sort of copying, it is an imperfect copying: when the figurative motions of a thing pattern out those of another thing, the former does not come to instantiate the very same figure as the latter, any more 'than when a painter draws a fire or light, the copy should be a

¹⁷See, e.g. Cavendish 1666a, 218.

¹⁸I omit a review of her arguments (mentioned in §2) against the mechanist explanation of perception; for these, see, e.g. Cavendish 1666a, 145–6.

¹⁹On Cavendish's use of the notion of an occasion, see §3.2.

²⁰There is an apparent difficulty here, since Cavendish will say – see §3.2 below – that the rational motions of a thing can pattern out its sensitive motions. The difficulty, however, is merely apparent: Cavendish can simply say that the perceptive knowledge had by the rational component of a thing of its sensitive component is not self-knowledge.

natural fire or light'; there is always a difference between the copy and the original of which it is a copy (1666a, 187).²¹ This allows Cavendish to account for the possibility of multiple, distinct perceptions of the same thing (1664, 74), and, more importantly, to avoid saying that perceiving a thing is a matter of coming to resemble it.

It is important to note that the production of a copy of a thing is an activity not of the thing copied (the thing perceived) but of the thing that copies (the thing that perceives): it is

not that the exterior object prints its figure upon the exterior sensitive organs, but that the sensitive motions in the organs pattern out the figure of the object . . . Therefore when I say, that solid bodies print their figures into that which is more porous and soft . . . I mean, the soft body by its own self-motion patterns out the figure of the solid body, and not that the solid body makes its own print.

(Cavendish 1664, 540)²²

This is as it must be, given Cavendish's basic postulates: if all motion is self-motion, perception must be understood somehow as a function of the self-motion of the perceiver.²³ Cavendish emphasizes that we are not to think of perception as a result of the self-motion of the perceiver. Perception is not a consequence of patterning but the activity of patterning itself: 'in those perceptions which are made by patterning, the action of patterning, and the perception, are one and the same' (1666a, 178).²⁴

Recall that every thing is supposed by Cavendish to contain both sensitive and rational matter and that she conceives of both sensitive and rational matter as self-moving and hence as capable of patterning out the figures of external objects. Cavendish is thus bound to admit that perception is in general twofold, that it is an activity both of the sensitive and of the rational parts of a body: '[t]here is a *double perception* in nature, the rational perception, and the sensitive: the rational perception is more subtle and penetrating than the sensitive; also, it is more generally perceptive than the sensitive; also it is a more agile perception than the sensitive' (1668, 9).²⁵

²¹See also Cavendish 1664, 64.

²²See also Cavendish 1664, 105: 'it is the wax that takes the print or pattern from the seal, and patterns or copies it out in its own substance'.

²³Cavendish has an independent reason for endorsing this account of perception as self-motion: she argues that 'the object is not the *cause* of perception, but is only the *occasion*: for, the sensitive organs can make such like figurative actions, were there no object present' (1668, 56), that, in other words, the object of perception cannot be a cause of perception because it is not necessary for the occurrence of the relevant bit of figuring. (See the discussions of hallucination and dreaming below.) This will strike us today as a terrible argument, since we do not think that a cause is always necessary for its effect; but Cavendish (like Hobbes) held the relevant view of causation (O'Neill 2001, xxxiii).

²⁴See also Cavendish 1664, 182.

²⁵See also Cavendish 1664, 115, 138 and Cavendish 1666a, 47.

Although it is apt to strike us at first as an unwelcome consequence of her division of animate matter into sensitive and rational matter, the possibility of twofold figuring enables Cavendish to offer a fairly unified account of a range of kinds of cognition (e.g. illusion and creative thought); I return to these in the appropriate places below.

In §2, I promised to explain my disagreement with James's claim (James 1999) that Cavendish explains all change in existing things in terms of perception or patterning out. The problem with James's reading is simply that it ignores Cavendish's distinction between patterning and figuring. Cavendish maintains that there is an element common to perception and, for example, dreaming, viz., that both are a matter of figuring (1664, 64).²⁶ However, perception is always 'involuntary', in the sense that it is occasioned by the presence of an external object; dreaming, on the other hand, is 'voluntary', in the sense that it is not occasioned by the presence of such an object (1666a, 170).²⁷ Figuring, in other words, is not always perception: the figurative motions in a thing sometimes move voluntarily, and when they do so (for example, when the thing is dreaming), the thing figures without perceiving (1664, 513; 1668, 8). The distinction between patterning and figuring plays an important role in the system, allowing Cavendish to avoid saying that all that animate matter ever does is make copies (1666a, 173): she argues, for example, that the fact that 'the rational [motions] can move without patterns, and so the sensitive' accounts for the fact that 'were a man born blind, deaf, dumb, and had a numb palsy in his exterior parts, the sensitive and rational motions would nevertheless move both in body and mind according to the nature of his figure' (1664, 174–5).

If this is right, then although Cavendish often says that all actions are 'perceptive', she should not be read as saying that acting is always a matter of patterning out; we should read her, instead, as saying that acting is always a matter of figuring, that acting always has this in common with perception. Dreaming, for example, will not count as perception. And neither will the other movements a thing makes when it is not responding to an external body. This is not to say that Cavendish denies that perception is a precondition of action. It is in this sense, in fact, that she holds that all actions are perceptive: 'there can be no commerce or intercourse', she writes, 'without perception; for how shall parts work and act, without having some knowledge or perception of each other' (1666a, 15). To the extent that the activity of a thing involves other things, then, it is perceptive: perception is a precondition of orderly action. But an activity can be perceptive in this sense without being the activity of perception (of patterning out).

One might worry that if sensitive and rational matter are present in all objects, then no account of the specificity of sense perception will be

²⁶See also Cavendish 1668, 23–4.

²⁷Boyle (2004, 205) misleadingly says that Cavendish characterizes perception as voluntary patterning.

available. More specifically, one might worry that if sensitive and rational matter are present throughout the body of a given organism, then we will not be able to distinguish between the perceptive knowledge had, for example, by the limb of the organism and that had by its eye. More specifically yet, one might worry that if sensitive and rational matter are present in, for example, both the eye and the ear of a given organism, then the eye and the ear will turn out to have precisely the same perceptive knowledge. Cavendish is aware of these worries and proposes in response to them fairly detailed accounts both of the special nature of sense perception in general and of sense perception in particular modalities,²⁸ accounts that differ dramatically from the mechanist account of sense perception she wants to reject.

In Cavendish's system, sense perception in general is treated as patterning out performed by the animate matter (and primarily by the sensitive matter) of certain dedicated organs:

though both [sensitive and rational] perceptions are in . . . every part of the body of a creature, yet the sensitive corporeal motions having their proper organs, as work-houses, in which they work some sorts of perceptions, those perceptions are most commonly made in those organs.

(Cavendish 1664, 19)

These sense organs are the main locus of patterning out in virtue of the special manner in which their sensitive matter is organized: sense perception occurs in the eye but not the hand due to the fact that 'the parts of the hand are composed into another sort of figure than the eyes, ears, nose, etc. are; and the sensitive motions make perceptions according to the compositions of their parts' (1666a, 185–6). The sense organs are specially configured to make copies of external objects (rather than to perform other kinds of figuring): they 'have their perceptive actions, after the manner of patterning, or picturing the exterior form, or frame, of foreign objects' (1668, 55). The role of rational matter in sense perception is unclear, although Cavendish sometimes seems to suggest that it plays a sort of integrative role (1666a, 180).

²⁸Note that at some points she seems to be prepared to deny the specificity of sense perception: at Cavendish 1664, 112, e.g. she writes that 'though man, or any animal hath but five exterior sense organs, yet there be numerous perceptions made in these sense organs, and in all the body; nay, every several pore of the flesh is a sensitive organ, as well as the eye, or the ear'; and at Cavendish 1664, 499, she writes that 'there are as many senses as there are sensitive motions'. It might be that she ultimately will have to grant that the difference between, for example, the perception that occurs in an eye and the perception that occurs in a limb is one of degree, rather than one of kind, that the sort of perception characteristic of the sense organs is characteristic of them only because it occurs in them more frequently than it does elsewhere in the body.

If the sense organs in general are dedicated to patterning out the figurative motions of external objects, a sense organ of a particular type (e.g., an eye) is dedicated to patterning out figurative motions of a particular type. Thus Cavendish accounts for the differences between perception accomplished by the eye, perception accomplished by the ear, and so on: the eyes copy out the objects of sight, the ears copy out the objects of sound, and so on (1664, 127–8). Thus the sense organs of an organism can work in an independent but coordinated fashion to produce a composite copy of an object: ‘although the several organs are not perfectly, or thoroughly acquainted; yet in the perception of the several parts of one object, they do all agree to make their several perceptions, as it were by one act, at one point of time’ (1668, 53).²⁹

Perhaps the key test for any theory of perception is whether it manages to distinguish successful perception from illusion and hallucination. Cavendish’s approach to these topics³⁰ is similar to that taken by contemporary causal theorists of perception, in that she holds that what marks unsuccessful perception off from successful perception is the absence in the former case of an appropriate external ‘occasioning’ object: the difference between successful and unsuccessful perception is that, in the latter case, the figurative motions made by the animate matter of the perceiving thing either are not occasioned by the presence of an external object or are occasioned by the presence of such an object but do not amount to a sufficiently accurate copy of the motions of the object.³¹ I take the cases of illusion and hallucination in turn.

An illusion, according to Cavendish, occurs when the ‘animal sense’ makes a ‘mistake’ (1666a, 188). She does not quite give a precise specification of this sort of error, but the basic explanatory strategy is made clear enough by her discussions of various examples: illusions, in general, occur when the sensitive motions in the perceiving thing, although ‘regular’, make an incomplete copy of the figurative motions of the perceived thing. She writes, for example, that

according as the object is presented, the pattern is made, if the motions be regular; for example, a fired end of a stick, if you move it in a circular figure, the sensitive corporeal motions in the eye pattern out the figure of fire, together with the exterior or circular motion, and apprehend it as a fiery circle . . . ; so that the sensitive pattern is made according to the exterior corporeal figurative motion of the object, and not according to its interior figure or motions.

(Cavendish 1664, 511)

²⁹See also Cavendish 1666a, 150, 179.

³⁰Note that she does not use the terms ‘illusion’ and ‘hallucination’.

³¹This description of the strategy of the causal theorist of perception is incomplete, since the causal theorist must supplement it with a solution to the problem of ‘deviant’ causal chains. Cavendish’s ‘occasionalist’ variant of the causal theory should be no more difficult to supplement with such a solution than are standard causal theories.

In this case, the exterior motions of the object are patterned out but its interior motions are not, giving rise to an inaccurate (because incomplete) copy. Cavendish explains illusions of various other kinds in similar ways; for example, she explains the illusion in which the figure in the mirror seems to retreat when in fact the person reflected in the mirror is moving by saying that the eye perceives ‘the distanced body’ but does not perceive ‘the motion of the distance or medium’ (which are not subject to sight) (1664, 510). In general, then, illusion is analysed as incomplete (and hence misleading) perception. Since perception itself, for Cavendish, is always a matter of making somewhat imperfect copies, the account generates the desirable result that illusion is in a sense continuous with successful perception.

Hallucinations, unlike illusions, are not occasioned by the presence of appropriate external objects; hallucination is a matter, instead, of a definite sort of voluntary figuring, voluntary figuring made by ‘irregular’ sensitive motions (1666a, 273):³²

the sensitive [parts] do not always make perceptions of exterior objects, but many times make figures by rote; as is manifest in madmen, and such as are in high fevers and the like distempers, which see or hear, taste or smell such or such objects when none are present.

(Cavendish 1666a, 189)

A hallucination will not necessarily deceive the organism in which it occurs, for the rational motions might ‘rectify’ the sensitive ones (1666a, 274); but the rational motions, if they themselves are irregular, can also cause the sensitive motions to figure irregularly and thus to produce hallucinations (1668, 127). Note that not all rote (i.e. voluntary) figuring by the sensitive matter in an organism counts as hallucination; such figuring, when made by regular sensitive motions, results in creative or imaginative thought. Thus Cavendish’s account of hallucination generates the desirable result that hallucination is in a sense continuous with creative thought.³³

Cavendish has much to say about certain more specialized questions about exterior knowledge; she deals, in particular, with the question of knowledge of other minds (1668, 22–3), with that of perception of so-called ‘secondary qualities’ (1666a, 76–7, 96–7) and with scepticism (1666a, 214). Considerations of length preclude a review of her treatments of these topics here.

³²Strictly speaking, then, hallucination will be classified by Cavendish as a sort of interior cognition.

³³See §3.2.

3.2. Interior Knowledge

I noted in §3.1 that it would be necessary at this point to attend more carefully to the precise distinction between interior and exterior knowledge. We have seen that Cavendish equates perceptive and exterior knowledge. Since self-knowledge cannot be perceptive, this means that self-knowledge is a kind of interior knowledge. But not only self-knowledge is interior. Cavendish says that all knowledge produced by the voluntary motions of animate matter is interior. And this means that the category of interior knowledge includes not only self-knowledge but also knowledge of external things that is not occasioned by the presence of those things (1666a, 170–1).³⁴ I first review her treatment of self-knowledge and then move on to her treatment of the remainder of interior knowledge.

I pointed out in §1 that the categories of perception and self-knowledge are central to Cavendish's system of natural philosophy, that she regularly invokes both in her explanations of natural change. I went on, in §3.1, to reconstruct in some detail her treatment of perception as patterning out. Unfortunately, my reconstruction of her treatment of self-knowledge must be far more tentative, for she does not give an explicit analysis of the phenomenon. Self-knowledge at times seems to function for Cavendish almost as a sort of theoretical primitive, posited as part of her explanation of the orderly behaviour of objects. That self-knowledge functions more or less as a primitive for Cavendish does not, however, mean that we can say nothing at all to characterize it: an indirect characterization of the main features of the category is possible if we attend to the main explanatory role it plays in her system.

One of Cavendish's overriding aims, recall, is the explanation of the orderliness of the natural world, of the orderliness of the interactions between things. She asks, in effect, how it is that objects always 'know' how to behave appropriately. Her simple but effective hypothesis – see §2 above – is that objects literally know how to behave. This knowledge of how to behave has two components: it includes both knowledge of (the behaviour of) other objects (the exterior knowledge discussed in §3.1) and the knowledge that an object has of itself (an object's interior self-knowledge).

It is helpful, in order to begin to come to grips with the latter sort of knowledge, to consider in some detail Cavendish's account of a typical interaction between two objects, the interaction between a ball and the hand that throws it. We know that for her, motion is always self-motion: the ball moves itself. But what, then, is the role of the hand that throws it? Cavendish writes that

the hand is only an occasion that the . . . ball moves thus or thus. I will not say, but that it may have some perception of the hand, according to the nature of

³⁴There is thus a certain heterogeneity to the category of interior knowledge.

its own figure; but it does not move by the hand's motion, but by its own: for, there can be no motion imparted, without matter or substance.

(Cavendish 1666a, 140)

The ball is not a passive recipient of the motion of the hand; the latter is only an occasion of the self-motion of the ball, which perceives the hand (patterns out its figurative motion) and so moves itself. But the self-motion of the ball does not simply duplicate the figurative motion of the hand – see §3.1 – and so the perceptive knowledge of the ball does not by itself ground the ball's response to the hand. How, then, does the ball know which specific motion to produce? This is where the self-knowledge of the ball comes into play. My proposal is that the self-knowledge of the ball consists in part of a sort of 'knowledge-how' to respond to the hand – in general: the self-knowledge of a thing includes knowledge of how to respond to the activity of external things, which knowledge is triggered when the thing patterns out the figurative motions of such an external thing.³⁵

It is important to see what Cavendish does and what she does not mean when she says that the hand is only an occasion of the motion of the ball. As noted above, she holds that any cause is necessary for its effect, and this is already enough to rule the hand out as a cause of the motion of the ball, since the former, obviously, is not necessary for the latter – there could, for example, be another potential 'cause' standing by to intervene; but this is not the whole of Cavendish's reason for treating the hand as a mere occasion of the motion of the ball: she holds that the hand is not necessary for the motion of the ball on the specific ground that the ball moves itself, so that it could have moved as it does even had the hand not been present – the actual cause of a thing's motion is always the thing itself.

Cavendish's general point about the non-necessity of the hand for the motion of the ball does not rule out that the hand causes the motion of the ball, in our sense of the term. What of her claim about the source of this non-necessity? If the ball moves itself, should we nevertheless say that the hand is (in our sense of the term) a cause of its motion? O'Neill points out that given a conception of an occasional cause with which Cavendish would have been familiar, something might count as an occasion for an effect simply because it only induces the primary cause of the effect to act and so is merely indirectly responsible for the production of the effect; note that this

³⁵A referee points out that the proposal that one component of self-knowledge is knowledge-how raises a range of further questions. Can we understand Cavendish's knowledge-how in terms of her sympathy and antipathy? Where, according to Cavendish, is knowledge-how located – in the thing which responds (as I assume) or in a complex thing including both the thing which responds and the thing which triggers the response (a reading for which there is some textual evidence)? I suspect that a proper treatment of these questions would require another complete paper, and so I do not attempt to answer them here.

allows that there can be a chain of physical connections between the occasion and the effect (2001, xxx–xxxi). O’Neill also points out that Cavendish at least sometimes seems to view the relationship between occasion and effect in these terms. At Cavendish 1664, 447–8, for example, after reminding us that the motion of the hand is not transferred to the ball, she writes:

I do not say, that the motion of the hand does not contribute to the motion of the ball; for though the ball has its own natural motion in itself . . . nevertheless the motion of the ball would not move by such an exterior local motion, did not the motion of the hand, or any other exterior moving body give it occasion to move that way; wherefore the motion of the hand may very well be said to be the cause of that exterior local motion of the ball, but not to be the same motion by which the ball moves.

Cavendish thus clearly permits that the hand exerts an indirect physical influence on the motion of the ball: the hand does not transmit its motion to the ball, but it does serve as a sort of signal that triggers the self-motion of the ball, so that the ball moves in a certain way; the ball would not have moved as it did, had the hand not been present, although it would have retained the capacity so to move. Thus, Cavendish permits that the hand, although it is merely an occasion for the self-motion of the ball, is nonetheless (what we would say is) a cause of the motion of the ball. However, while the hand is in this sense a cause of the motion of the ball, it is, for Cavendish, importantly secondary, since the self-knowledge of the ball, unlike the presence of the hand, is strictly necessary for the ball to move at all: were the ball not to have self-knowledge, then not only would it not move in a certain way when appropriately occasioned, but it no longer even could move at all.

Even if my proposal that self-knowledge includes knowledge-how is correct, knowledge-how does not exhaust the category of self-knowledge, for Cavendish often says that it is necessary, in order to account for the orderliness of natural interactions, to suppose that objects know what they are doing: it is not probable, she says, ‘that the infinite parts of nature should move . . . so orderly and methodically as they do, without knowing what they do, or why, and whether they move’ (1666a, 139). Hence my proposal has a second part: the self-knowledge of a thing includes (in addition to its knowledge-how) knowledge of its own current behaviour. We must take care to interpret the proposal correctly. Since (as Cavendish repeatedly emphasizes) the self-knowledge of a thing is never perceptive, the knowledge had by a thing of its own behaviour cannot be acquired by means of perception – the proposal is not that an object comes to know its own behaviour by patterning out its own figurative motions. It is tempting to think of this second component of self-knowledge, this awareness on the part of a thing of what it is doing, on the model of proprioception; but I

know of no textual evidence that suggests that the model captures Cavendish's conception of the awareness in question.³⁶

On, now, to the remainder of interior knowledge, non-perceptive knowledge of external things. Cavendish's term for this knowledge, knowledge produced by the voluntary motions of animate matter, is 'conception' (1666a, 192; 1668, 69); conception includes, for example, memory. It should be emphasized that the distinction between perceptive knowledge, on the one hand, and interior knowledge of external things, on the other hand, is not (as one might expect) that the former is produced by the sensitive part of the thinking thing, while the latter is produced by its rational part, but, instead, simply that only conception is produced voluntarily:

besides those exterior perceptions of objects, there are some other interior actions both of sense and reason, which are made without the presentation of exterior objects, voluntarily, or by rote; and therefore are not actions of patterning, but voluntary actions of figuring.

(1666a, 170)

This means that just as Cavendish was bound to admit that perception is twofold, that it is executed both by the sensitive and the rational parts of a thing, she will be bound to say that both of the animate parts of a thing play a role in its conceptions. This is not to say that the rational part does not play a more important role than does the sensitive part, just as – see §3.1 – the sensitive part plays the more important role in perception. The rational part of a creature 'does inform itself of things which the sensitive cannot', things which cannot be perceived via the senses, since the rational part is 'the purest, subtlest, most active, and inspective part of nature' (1666a, 192), while the sensitive motions, in contrast, are 'encumbered with the inanimate parts' and thus 'obstructed and retarded' (1668, 9). Cavendish invokes the relative independence of the rational motions to account for the productivity of thought, the ability of a thinker to do more than merely sense her immediate environment:

the rational parts can move in more various figurative actions than the sensitive; which is the cause that a human creature hath more conceptions than perceptions; so that the mind can please itself with more variety of thoughts than the sensitive with variety of objects.

(Cavendish 1668, 58)

³⁶There remains a general question about the relationship between self-knowledge and self-motion in Cavendish. It is plausible to suggest either that she holds that self-knowledge somehow supervenes on self-motion or even that self-knowledge and self-motion ultimately are the same for her. I know of no text that will enable us to decide the matter: it might well be that Cavendish, ultimately, is simply not very clear about this relationship.

Unlike the sensitive matter in an organism, its rational matter is free to do more than respond to its immediate environment: it can draw inferences, recall past experiences, etc. This is how 'the new world and the antipodes', for example, could be discovered, although they were 'neither seen, nor heard of, nor tasted, nor smelled, nor touched' (1666a, 192).³⁷

We have already seen that Cavendish offers a detailed account of sense perception. In addition to sense perception, it is usual to single out memory and reason as basic sources of knowledge, and Cavendish offers accounts of these sources of knowledge as well.³⁸ The difference between interior and exterior cognition lies in their respective voluntariness and involuntariness. Interior cognition is also distinguished by the roles that the sensitive and rational motions tend to play in it. I noted in §3.1 that Cavendish maintains that, in perception, the sensitive and the rational motions within a thing generally cooperate, making similar figures at the same time. In interior cognition, in contrast, the respective figurings of the sensitive and the rational motions tend to come apart in various ways.

Both memory and inference, in Cavendish's view, have these broad features. Remembering occurs when the animate part of a thing continues to pattern a figure out, or again patterns out a figure that it has previously copied:

as those figures are repeated, so is remembrance . . . As for example; a man remembers or calls to mind the figure of another man, his friend . . . and so often as he remembers him, as often is the figure of that man repeated; and as oft as he forgets him, so often is his figure dissolved.

(Cavendish 1664, 179–80)

Remembering is especially likely to occur when the figurative motions of a thing have often been patterned out in the past (1666a, 149). Although both the sensitive and the rational parts of a thing are at work in memory (1666a, 189), memory is primarily a function of the rational part (1666a, 145). This accounts for the fact that memories tend to be less vivid than original experiences: although 'imagination' is at work both when the object is present and when it is absent, in the latter case 'the figure patterned out in the sensitive organs, being altered, and remaining only in the rational part of

³⁷I noted above that Cavendish sometimes seems to be prepared to grant that perception can occur throughout the body, since all parts of the body include sensitive matter; similarly, she sometimes seems to be prepared to grant that because all parts of the body contain rational matter, thought is not localized in the brain (1666a, 151).

³⁸Introspection also is often listed as a basic source of knowledge. Cavendish cannot say that introspective knowledge is self-knowledge, since introspective knowledge is imperfect and the result of cognitive work, while self-knowledge, for her, is complete and automatic. But since Cavendish admits that one part of a thing can pattern out the motions of another part of the thing, there is no barrier to the development of an account of introspection in line with her accounts of memory and inference.

matter, is not so perspicuous and clear, as when it was both in the sense and in the mind' (1664, 26).

Inference, like memory, is explained by Cavendish in terms of the possibility of the independent activity of rational matter: this independence means that our knowledge of external things need not be simply superficial, observational (or perceptive) knowledge. Perception, being primarily a function of the sensitive part of a thing, 'can go no further than the exterior shape, figure, and actions of an object' (1666a, 175). But the rational part of a thing can speculate on the internal features of an object:

the rational being a more subtle, active, and piercing perception, by reason it is more free than the sensitive, does not rest in the knowledge of the exterior figure of an object, but, by its actions, as by several effects, penetrates into its interior nature, and doth probably guess and conclude what its interior figurative motions may be.

(Cavendish 1666a, 175)

There is a question about whether Cavendish would always classify this sort of inference as interior; but it is clear at least that she can say that there is some strictly interior inference, viz., speculation about the internal features of an object triggered, for example, only by a memory of the object.

Cavendish's treatments of other kinds of interior cognition follow the same pattern. (She accounts for certain sorts of creative thought, for example, by saying that 'the sensitive motions ... take patterns of the rational' (1666a, 171).) But the reconstruction of her treatments of memory and inference should suffice to give the flavour of her approach to non-perceptive knowledge of external things.

4. CONCLUSION

As I noted at the outset, there is no sharp distinction, for Cavendish, between metaphysics and epistemology; hence it should come as no surprise that a detailed reconstruction of her epistemological views has implications for our understanding of her general metaphysical views. It is impossible here to canvass all such implications; instead, I will simply point to one of particular interest, an implication for our understanding of her explanation of the nature of causal interaction.

O'Neill argues that Cavendish's explanation of causal interaction in terms of the perceptions of the interacting objects 'just pushes the initial question back a stage', since we can now ask: 'how does an occasional cause induce a primary cause to have the perceptions that it does, if there is no direct physical causation at work between the occasion and the primary cause?' (2001, xxxiv). The suggestion is that Cavendish offers no answer to this new question, perhaps because she thinks that no answer need be given, that,

once we have, for example, said that a cylinder has the ability to roll and cited a push as the occasional cause of that rolling, there is simply no more to be said about why the cylinder rolls.

With a detailed reconstruction of Cavendish's epistemology in hand, however, we can see that explanation of causal interaction does not quite bottom out for her in this way. Cavendish in fact offers a fairly detailed story about how an external thing induces an object to have the perceptions that it does, and so to move as it does, a story which goes via her epistemology.

The interior knowledge of the cylinder, for example, includes knowledge of how to respond in the presence of a pushing hand. It includes also knowledge of the current state of the cylinder itself. The presence of the pushing hand thus can act as a sort of trigger for the motion of the cylinder: the cylinder patterns out the motion of the hand and thus comes to have some new exterior knowledge; this exterior knowledge, together with the relevant interior knowledge of the cylinder, results in the motion of the cylinder. Cavendish thus has more to say here than O'Neill seems to acknowledge, although her explanation of causal interaction faces whatever problems are bound to be faced by any account on which nothing is transmitted from cause to effect.³⁹

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³⁹Detlefsen 2007 (which, unfortunately, was unavailable when this paper was written) offers an alternative reconstruction of Cavendish's views on occasional causation. On Detlefsen's reading, occasional causes play a more active role: an external thing can 'rationally suggest' a response to an object, thereby inducing it to make that response.

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