Hegel's Critique of Kant on Matter and the Forces

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Our views about the validity of Hegel's critique of Kant, as well as of his claim to have made significant philosophical progress beyond Kant, surely depend most on what we think of his insistence that Kant's philosophy is an instance of subjective idealism. By subjective idealism, Hegel means the scepticism which may be thought to result from the thesis that human knowledge is conditioned by subjective forms—in Kant's case, by the a priori forms of our faculties of intuition and understanding. These forms mediate our cognitive access to the thing itself (so this version of subjective idealism goes), reducing the object of our knowledge to a mere representation or projection. This is the conception of subjective idealism I suspect Hegel has in mind when he remarks in the *Encyclopedia Logic* that,

> ...even the objectivity of thinking in Kant's sense is itself again only subjective in its form, because, according to Kant, thoughts, although they are universal and necessary determinations, are still *only our* thoughts, and are cut off from what the thing is in-itself by an impassable gulf.[1]

In the Transcendental Aesthetic of the *Critique of Pure Reason*, however, Kant tells us that we misunderstand his notion of "appearance" if we conclude from the fact that our knowledge is conditioned by the a priori forms of space and time that its object must be "mere illusion."[2] In the Transcendental Logic, furthermore, he tells us that we give the sceptic just what he "most desires" if we take the categories to be no more than a kind of "preformation-system" of reason, valid only as "subjective [and therefore contingent] dispositions of thought" and not also valid of objects.[3] Given these and other such warnings in the first *Critique*, it is no wonder that, to many, Hegel's charge of subjective idealism has seemed unworthy of serious consideration.

But Hegel is critical not only of the subjective form of idealism he discovers in Kant. He also rejects Kant's conception of substance. This latter critique is probably less familiar to us, but I believe it bears importantly on the former. Hegel argues that Kant is essentially an atomist about substance. As will become clear shortly, this does not mean that, with regard to Kant's theory of material nature, Hegel seeks to convince us that Kant embraces a Newtonian account of atoms as absolute impenetrables moving about in empty space. What he does tell us is that, following Newton (and a host of others, including Locke and Leibniz), substance for Kant is something ultimately "self-related" or self-subsistent, like the "closed universe" of a Leibnizian monad. This means that its further properties, the properties which characterize its relations to other substances, can never be products of its own determination, but must rely on

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something outside itself or "external," such as God's will, a pre-established harmony, or the force of attraction.

I believe that Hegel assumes that there is a close connection between the atomism and the subjective idealism he discovers in Kant. Very roughly, I suspect that the connection is this: On Hegel's account, overcoming subjective idealism means closing or at least sufficiently narrowing the gap between the object which can be known by us (as conditioned by a priori forms) and the object as an independently given and formless content, so that we relieve ourselves of reason to worry about the correspondence of our knowledge of appearances with the things themselves. To put this point differently: overcoming subjective idealism means finding some way of avoiding what we might call the *imposition model* of subjective form. For Hegel, we achieve this by acknowledging that form and content are mutually dependent and determining—by demonstrating what is untenable about the assumption of their absolute opposition. But this move is not open to Kant. As an atomist about substance, Kant must hold the view that the relational properties of a thing can never be part of its self-determination, even if those properties are responsible for the thing's knowability—the forms which determine the thing as appearance. It is not open to Kant, in other words, to understand the thing qua appearance as a determination or "moment" of the essence of the thing itself. Hegel's critique of Kant's idealism, I am suggesting, is logically inseparable from his rejection of Kant's conception of what it is to be a thing.[4]

Hegel draws our attention to Kant's atomism again and again, whether the focus of his attention be Kant's conception of matter and the forces in his metaphysics of material nature, his characterization of substance in the Principles of Pure Understanding, or his conception of moral substance as it emerges in his account of practical agency. Hegel's critical aim is always the same: to expose the unhappy consequences of Kant's atomism for his idealism.

In this paper, I outline what I take to be the key features of one instance of Hegel's portrayal and critique of Kantian substance: his discussion in the early pages of the *Science of Logic* of Kant's treatment of matter and the forces in the *Metaphysical Foundations of Natural Science*. While my concern with these passages is motivated by an interest in the connection Hegel makes between Kant's atomism and his subjective idealism, my project in this essay is simply to draw out why Hegel suggests that Kant is an atomist about matter, and why he thinks that atomism is a metaphysical standpoint we ought to reject.

I

Hegel prefaces his discussion in the *Science of Logic* of Kant's treatment of matter and the forces by drawing some comparisons between Kant's metaphysics of material nature and Leibniz's monadology. Kant's project shares with the monadology the virtue, Hegel tells us, of endeavoring to provide an alternative

to the "vulgar mechanistic" or Newtonian conception of matter as "motionless and inert."[5] The vulgar mechanistic view, Hegel writes, "stops short at one determination of impenetrability"; it explains the interrelations of matters only in terms of "action from without" or in terms of the external forces of pressure and thrust. SL 181/WL 204 Kant was right to discover in matter itself the principles of its own activity, or to insist that, as Hegel puts it, "we must not regard matter as present on its own account, and only fitted out afterwards ('on the side' as it were) with the two forces..." EL 98A1 In contrast to Leibniz, however, Kant is furthermore to be praised for not trying to account for the plurality or interrelations of matter by means of a pre-established harmony. Nonetheless, Hegel tells us, Kant is no more successful than Leibniz in detaching himself completely from the influence of the mechanical philosophy.

What Hegel argues in the *Science of Logic* is that Kant's treatment of the forces of attraction and repulsion is plagued by two untenable dualisms, both of which result from his adherence in the end to the mechanical view. They result from his commitment to a conception of substance as, in Hegel's language, "pure Being-for-self"—the very same conception, according to Hegel, which motivated Leibniz to draw on the resources of a pre-established harmony in order to explain how self-sufficient monads achieve plurality or interrelation.

Hegel's discussion of Kant's treatment of attraction and repulsion (as well as of Leibniz's monadology) occurs as part of a much more extensive discussion in the early pages of the *Logic* of the dualism of the one and the many. At one point he tells us that, "the forces of attraction and repulsion, in so far as they are regarded as forces of empirical matter, are ...based on the pure determinations here considered of the one and the many and their interrelationships..." SL 179/WL 201 Philosophers who follow the ancient atomists in embracing a dualist conception of the one and the many, Hegel here suggests, will in turn be predisposed to advance a dualistic conception of matter and the forces. His intention in these pages is to convince us that this dualism (in its various incarnations in the history of philosophy) is an instance of bad metaphysics, and that in so far as Kant belongs to the tradition of those who hold it, his philosophy is prevented from achieving the status of a genuine idealism.

Just what does Hegel tell us is the relation between the dichotomy of the one and the many and the distinction in physics between the attractive and repulsive forces of matter? It is with reference to the repulsive force, he says, that we explain how a plurality of atoms remains a plurality or a many—how the individual atoms are prevented from coalescing into a one. Repulsion, in Hegel's language, maintains the ones in a condition of mutual exclusion; or, repulsion is the force which, in keeping the atoms apart, negates their interrelatedness. SL 173, 175/WL 193f, 196 On the other hand, in the absence of the force of attraction, we could not speak of a many or of a plurality or community of atoms; without attraction, the atoms would, in Hegel's words, "disperse into

somewhere undetermined, outside the sphere of repulsion itself..." SL 175/WL 195f

While atomism takes the dualism or non-identity of the one and the many as its point of departure, Hegel of course wants to persuade us that this dualism must break down. In his discussion of attraction and repulsion, he proceeds to argue that we can make no sense of the assumption of two truly independent forces, coming together to maintain an equilibrium of the one and the many. Rather, the forces are fundamentally interrelated, such that, in his language, each force "contains the other as a moment within it." SL 176/WL 195

How does Hegel support this position? The function of repulsion, he says, is to maintain plurality or to prevent the many atoms from coalescing into a one; but as has already been suggested, repulsion can only perform this function if the force of attraction is presupposed. In the absence of attraction, there would be a dispersion of the atoms to infinity and therefore no plurality to maintain. So, while repulsion is supposed to be the force which negates the interrelatedness of the atoms or their coalescence into one, it must, Hegel insists, presuppose relation in order to do its work of repelling. To negate interrelatedness, repulsion requires relation—requires, in other words, the force of attraction.

Likewise, attraction is attraction, Hegel claims, "only through the mediation of repulsion." SL 175/WL 196 Were there only an attractive and no repulsive force, he tells us, the many would coalesce at a single point and "there would be present only an inert one and no longer any attraction." SL 173/WL 194

Note that Hegel is not claiming what he is so often interpreted as claiming: that the two forces are in the end strictly identical or simply collapse somehow into one. What he says is that each force presupposes the other as a condition of its own possibility—or, in what is to us less familiar language, that each force is "mediated by" the other or "contains the other as a moment..." SL 175, 176/WL 196, 197 Hegel explicitly concedes that the forces are unique or "self-subsistent" in *some* respect. While each, in his words, "is through the mediation of the other as other," "their self-subsistence consists in the fact that in this mediation each is posited for the other as a different determining: repulsion as the positing of the many, attraction as the positing of the one..." SL 175/WL 196 So, the forces of attraction and repulsion are not without difference or self-subsistence, in Hegel's view; they just do not have the kind of self-subsistence he thinks they are typically awarded.

II

We can probe these points further if we turn to Hegel's comments on Kant's treatment of the forces of attraction and repulsion. As already noted, he thinks that Kant's effort to "banish the vulgar mechanistic way of thinking" must be "highly esteemed." SL 181/WL 203 That effort gets expressed in two ways: First, in Kant's proposal to derive or construct matter from the forces. Second,

in his elevation of attraction to the status of a fundamental force. For the mechanistic view, as we have seen, matter is mere impenetrability acted on by external forces only—the forces of pressure and thrust. To his credit, however, Kant claims that both forces—attraction as well as repulsion—are forces of matter itself. SL 181/WL 203f

What does Hegel tell us is the significance of the fact that Kant recognizes that not only repulsion but also attraction is a fundamental force of matter? The answer, very briefly, is that, according to Hegel, this indicates some weakening of atomism's hold on Kant. For the atomist, in Hegel's words, "the Absolute determines itself as being-for-itself, as One, and as many Ones." Repulsion is assumed to be the fundamental force of the ones, and what holds the ones together or prevents their dispersion to infinity is taken to be something *external* to the one itself: for the ancient atomists, this is chance; for Leibniz, it is pre-established harmony. EL §98 So Kant is to be praised, Hegel writes, for his "correct insight that attraction should certainly be recognized as the other of the two moments in the concept of being-for-itself..." EL §98A1

But, as I have already mentioned, Hegel finds Kant's attempt to provide an alternative to the mechanical view in the end unsuccessful. He argues that Kant's treatment of the forces is plagued by two dualisms, each deriving from the fact that, in spite of his professed rejection of the mechanical view, he is unable to abandon it entirely. First, Kant's treatment suffers from a dualistic understanding of the relation of the forces to each other; second, he adheres to dualism about the relation of matter to the forces. I will consider Hegel's discussion of each of these dualisms in turn.

Regarding the dualism of the forces, Hegel tells us that Kant's treatment suffers from the fact that he assumes that attraction and repulsion are, "external to and completely independent of each other." SL 181/WL 204 A truly dynamic conception of matter, Hegel insists, not only discovers the forces of motion in matter itself, but also acknowledges that the two forces are, in his words, "connected with each other through their own nature" or are "only moments which pass over into each other..." SL 178, 182/WL 200, 204 In claiming that attraction as well as repulsion is an essential determination of matter, Kant takes an important step away from atomism; but in treating attraction and repulsion as independent forces rather than as "connected with each other through their own nature," Hegel charges, he in effect reintroduces within matter the atomist's dualism of the one and the many.

To those familiar with the *Metaphysical Foundations of Natural Science*[6] this charge may seem mystifying at best. It is far from obvious how Kant could be guilty of a mechanical conception of matter given his insistence in that text that attraction is just as essentially a force of matter as repulsion, and given his explicit acknowledgment of the interdependence of the two forces. Indeed, a close reading especially of his chapter on the "metaphysical foundations of

dynamics" could certainly raise the suspicion that Hegel's own portrayal of what he takes to be the *proper* understanding of the relation of the forces is in fact *borrowed from Kant*. In that chapter Kant tells us (in his note to Proposition 6) that neither force can be "separated from the other in the concept of matter." "[W]hether one posits neither [force] or assumes merely one," he says, "space always remains empty and no matter is found in it." MFNS [511] If no other force counteracted the repulsive force, matter "would be held within no limits of extension, i.e., would disperse itself to infinity, and no assignable quantity of matter would be found in any assignable space." MFNS [509] Were there only an attractive force, on the other hand, in his words, "all parts of matter would approach one another without hindrance and diminish the space that matter occupies." The parts would "move toward one another until no distance between them could be found, i.e., they would coalesce in a mathematical point and the space would be empty and hence without any matter." MFNS [511]

Although Kant surely seems in these passages to acknowledge the interdependence of the forces, Hegel nonetheless claims that he gets entrapped in futile attempts to hold them apart. "Conceived as forces," Hegel says, Kant regards attraction and repulsion,

> ...as self-subsistent and therefore as not connected with each other through their own nature; that is, they are considered not as moments, each of which is supposed to pass into the other, but rather as fixed in their opposition to each other...When it is said that matter has the forces within itself, they are understood to be so conjoined in this unity that they are at the same time presupposed as intrinsically free and independent of each other. SL 178f/WL 200

In what ways is Kant guilty of assuming that the forces are "free and independent of each other"? Hegel argues as follows: First, in spite of his expressed acknowledgment of the interdependence of the two forces, Kant attempts to characterize each force in abstraction from its relation to the other. This lands him in contradictions—for example, the contradiction of telling us in one passage in the MFNS that it is repulsion which is the force by means of which matter fills space [499], and then only a few pages later attributing this same feature to attraction. [508] Were there only repulsion and no attraction, Kant acknowledges in the later passage in, space would be empty. Without attraction, he says, the atoms would disperse to infinity and there would be nothing for repulsion to repel. As Hegel sees it, Kant's mistake is to try to assign sole responsibility for the filling of space to either force alone. Repulsion is the force by means of which space is filled only if attraction is presupposed, as Hegel puts it, "as a moment." As Kant finally admits, the function repulsion is supposed to perform cannot be carried out without attraction. Expressed in a different way, the feature which is supposed to single out or individuate the force of repulsion has attraction as a precondition. Repulsion is what it is, Hegel writes, "only through the mediation of" attraction. SL 175/WL 196f

In another attempt to characterize the forces in abstraction from each other, Kant asserts that although attraction is no less essential to matter than repulsion, it is only repulsion which we take to be "contained in the concept" of matter. MFNS [509] Impenetrability, he says, is "given immediately" with the concept of matter via the sense of touch, while "attraction is not thought in the concept but only attributed to it by inference." This is because attraction, unlike repulsion, can give us "no determinate object of sensation..." MFNS [510] The source of an attractive force, Kant explains, is not perceivable by us; if we think we have identified it in a particular case, it is because we have inferred it from our observations of the behavior of matter. Even could we perceive the workings of attraction as we do those of repulsion, he contends, "our understanding would nevertheless choose the filling of space in order to designate thereby substance in space..." This is because our understanding *necessarily* , on his view, connects the concepts "substance in space" and "solidity." MFNS [509]

For Hegel these remarks provide only further evidence of Kant's reluctance to embrace a truly dynamical view. In making "nature as given in sense perception the basis of science," he writes, Kant privileges the "empirical conception" of matter as solidity or impenetrability. SL 179, 180f /WL 201, 202f

Once again, the reader of the MFNS is likely to be at a loss to discover just how Hegel's comments are supposed to count as criticism. There is surely no trace of embarassment in Kant's announcement in his preface that his *Foundations* lays the "empirical concept of matter...at its foundation." The business of a metaphysics of corporeal nature, he explains there, is to defend a priori laws governing the possibility of its objects. In this way it is distinct from physics whose "laws" are merely generalizations based on the observation of particular material bodies. On the other hand, the a priori principles of a metaphysics of corporeal nature are distinct from the transcendental principles put forward in the *Critique of Pure Reason* because those transcendental principles govern the possibility of our cognition of a nature in general, be its objects of inner or of outer sense. A metaphysics of corporeal nature, Kant says, is a "special metaphysics of natural science." It concerns the a priori possibility of a particular kind of object of nature: corporeal nature or "what in external intuition is an object of sensation." MFNS [481] Its objects, unlike those of mathematics or geometry, cannot be produced in pure intuition. Their content (or "matter") is given only in sensation; *this* is the sense in which they are "empirical." CPR A19f/B34 The special metaphysics of corporeal nature begins with the empirical concept of matter, and then, in Kant's words, "searches the range of cognition of which reason is a priori capable regarding [it]." MFNS [470] Since matter affects our senses only through its motion, what the metaphysics of natural science claims to set forth are the a priori laws governing the possibility of matter in motion: laws of mechanics. MFNS [476f, 470] These laws are of

course further constrained by the principles of the possibility of our experience of a nature in general, the Principles of Pure Understanding which Kant defends in the first *Critique*.

Why does Hegel think that by beginning in this manner with a conception of matter derived from perception, Kant places an obstacle in the way of achieving a dynamical view? For Kant, as we have just seen, sensation is supposed to explain why we identify repulsion but not attraction as immediately contained in the concept of matter. What Hegel wants to convince us, however, is that this explanation cannot be adequate as it stands. Why should we claim that matter's repelling force is any more evident to us in sense perception than its tendency to offer resistance when pulled apart? There is no reason to assert that sensation explains our temptation to discover repulsion more essentially contained in matter than attraction—unless, of course, we are already persuaded by the Newtonian conception of matter as impenetrability. SL 180f/WL 202f This conception, Hegel is suggesting, determines what Kant discovers in the data of sensation. And what this means is that the "empirical" concept of matter with which the MFNS is supposed to begin is not strictly speaking empirical at all.

Hegel wants us to bear in mind two points here: The first is the narrow point about the way in which Kant's Newtonianism prevents him from acknowledging that attraction is just as essential to matter as repulsion, and therefore also prevents him from achieving a truly dynamical conception of matter. The second is a larger point about Kant's apparent obliviousness to some of the conditions of his own philosophizing. Since his Newtonianism determines what he discovers in the data of sensation, it cannot be accurate to follow him in characterizing the MFNS as an attempt to provide a priori or transcendental support for what we can simply *take for granted* to be given in perception. Hegel in other words wants us to acknowledge that Kant lacks a sufficiently historical awareness of his own metaphysical foundations. This is a point he of course makes about Kant over and over again. While Kant characterizes his critical project as aimed at determining the limits of our knowledge of possible experience, in Hegel's view it is more accurately described as aimed at determining the limits of our knowledge of a particular (and by no means universally accepted) conception of possible experience.[7]

III

This brings us to the second dualism which Hegel says follows from Kant's adherence to the mechanical view of matter. Kant insists in the MFNS that he is offering a "construction" of matter from the forces. By such a construction, Hegel says, Kant means that each force is "regarded as a first, as being in and for itself, and matter, or its determinations, are supposed to be realized and produced by them." SL 179/WL 200 Matter, in other words, is supposed to first

come into being by way of the forces. SL 184/WL 207 But "whereas matter is supposed to be derived from its elements," Hegel writes,

> ...it is presented throughout the entire discourse as already formed and constituted. In the definition of surface and penetrative force, both are assumed as motive forces by means of which matter is supposed to be able to act in one or other of these ways. Here, therefore, they are represented as forces, not through which matter first comes into being but through which matter, as an already finished product, is only set in motion. SL 183f/WL 207

Clearly, Hegel's critique of this second dualism follows from his critique of the first. Kant cannot recognize that attraction and repulsion are 'moments' of each other because he labors under the influence of the "empiricial" or Newtonian conception of matter as impenetrability. Since this is the conception which underlies the "Metaphysical Foundation of Dynamics," Hegel is now pointing out, matter doesn't get derived from or constructed out of the forces at all. Rather, the forces of attraction and repulsion are 'added on' or introduced in order to explain an already presupposed conception of matter. The forces are added on, Hegel says, "but not in such a manner that this unification is counted as their truth." Instead, matter and the forces are "presupposed as intrinsically free and independent of each other." SL 179/WL 200

IV

We can perhaps now better understand why Hegel's discussion of Kant's treatment of matter and the forces occurs alongside his remarks on Leibniz's monadology in the chapter of the *Science of Logic* called "Being-for-Self." Leibniz is forced to appeal outside the individual monad to explain community or relation only because of his insistence that, as Hegel puts it, "being-for-self" be "kept pure." Something is "for-itself," Hegel explains, "in so far as it transcends otherness, its connexions and community with other, has repelled them and made abstraction from them." SL 158/WL 175 The Leibnizian monad "transcends otherness" in this sense, because as pure "being-for-self" it lacks the resources to secure its interrelations.

What prevents Kant from acknowledging that the force responsible for preserving matter as a one has as a "moment" or precondition the force responsible for plurality (and vice versa) is that his metaphysics, according to Hegel, is likewise afflicted with a commitment to the non-identity of the one and the many, or with the view that "being-for-self" must be "kept pure." While as pure "being-for-self," the Leibnizian monad remains "related only to itself" and must rely on something external—a pre-established harmony—to account for its relations to others, the Kantian atom or matter reproduces within itself this dualism of being-for-self and being-for-other, Hegel suggests, as the dualism of the forces of repulsion and attraction. Kant's conception of matter in this way inherits the atomism of Leibniz which, according to Hegel, "does not grasp the one as an ideal being, that is, as containing within itself the two moments of

being-for-self and being-for-it, but only as a simple, dry, real being-for-self." SL 169/WL 189 Being-for-it or relation-to-other gets added on in Kant's Dynamics thanks not to a pre-established harmony, but to a force which cannot be "immediately contained" in the concept of matter .

For Hegel, however, "self-subsistence pushed to the point of the one as a being-for-self" "destroys itself." SL 172/WL 192 This is the lesson we are intended to learn from his critique of Kant's conception of matter. We cannot account for the impenetrable one which holds others off from itself with its repelling force without presupposing, as a condition of the possibility of that repulsion, relation to other ones. Without attraction as a precondition, there can be no force of repulsion and therefore no self-subsistent one. It is as little possible to account for repulsion without attraction as it is to account for the uniqueness or individuality of the Leibnizian monad without giving up the assumption that it is a "closed universe." For Hegel, uniqueness or self-subsistence presupposes relation or community; in the absence of relation or community, self-subsistence, as he puts it, "destroys itself." Since Kant in his view affirms the self-subsistence of the one in not fully granting the interdependence of the forces, his conception of substance, like that of Leibniz, is insufficently dynamical and as such also ultimately unstable.

Notes

1. § 41A2. I rely on the translation of the *Encyclopedia Logic* by T.F. Geraets, W.A. Suchting, H.S. Harris (Indianapolis: Hackett Publishing Company, Inc., 1991). Hereafter I will refer to this work as "EL."

2. See esp. B 69ff.

3. See § 27 of the B-Deduction.

4. This thesis is also argued by Robert Stern in his recent and important, *Hegel, Kant and the Structure of the Object* (London and New York: Routledge, 1990).

5. *Hegel's Science of Logic*, trans. A.V. Miller (Atlantic Highlands, N.J., 1989), 181; *Wissenschaft der Logik I: Theorie-Werkausgabe*, ed. Eva Moldenhauer and Karl Markus Michel (Frankfurt am Main: Suhrkamp Verlag, 1970), vol. 5, 203. Hereafter all references to this work will be cited in the text with page numbers first from the Miller translation, "SL," and then from the *Theorie-Werkausgabe* edition, "WL."

6. Hereafter referred to in the text as "MFNS" and followed by page numbers, in brackets, of the Academy edition. I rely on James W. Ellington's translation in *Kant's Philosophy of Material Nature* (Indianapolis, Indiana: Hackett Publishing Company, 1985).

7. These issues are discussed in Gerd Buchdahl's illuminating article, "Hegel's Philosophy of Nature and the Structure of Science," reprinted in Michael Inwood, ed. *Hegel* (Oxford: Oxford University Press, 1985).