

CHAPTER ONE

THE CAUSE OF MOTION *VIS ACTIVA* NOT *VIS MOTRIX*:
KANT'S FIRST SOLUTION TO THE MIND/BODY PROBLEM

This chapter is divided into six sections. The first discusses Kant's relation to the German post-Leibnizian philosophical tradition with respect to questions about change and action, monadism, and methodology. The second section focuses on Kant's understanding and criticism of a traditional view of force, change and action—the *vis motrix* view—that Kant thought was incompatible with mind/body interaction. I discuss Kant's alternative view, which I label the doctrine of transeunt inner change, at the end of section two and throughout section three. Section four is devoted to a close analysis of Kant's argument in *Living Forces*, Part I, section four that his conception of transeunt inner change can explain bodies' motions. Mine is, as far as I know, the first detailed analysis of this argument.

Section five focuses on several of Kant's general cosmological and metaphysical doctrines that help illuminate the solution to the mind/body problem he gave in *Living Forces* sections five and six. I discuss Kant's solution in the sixth and final section of this chapter. This section is both exegetical and critical; among my conclusions are that Kant's argument was weakened by his dogmatism and that it may have the unintended consequence of committing Kant to hylozoism.

1.1 Kant with—and against—the philosophical tradition

In this section, I situate Kant's discussion of mind/body interaction within the historical context of post-Leibnizian German rationalist philosophy. Like Leibniz, but in contrast to Wolff and others whom he referred to as Leibniz's successors, Kant believed that the metaphysical notion of action could be applied to more than changes in motion.²¹ The traditional post-Leibnizian view was that the production or destruction of motion was the *only* way to cause changes from one state to another. Leibniz's successors used the notion of force—which they called *vis motrix*—to explain motion. Kant followed Leibniz in using a different concept of force, *vis activa*. For Kant, as for Leibniz, the concept of force could be used to explain motion, but was not used *just* to explain motion. As I show later in this chapter, this point was essential to Kant's earliest solution to the mind/body problem, for it made it possible for Kant to assert that bodies can exert a force on souls that has as its effect not a change in motion but the production of a representation.²²

²¹ Although Kant did not mention them by name, other members of the Wolffian camp included Samuel Formey, Johann Heinius, Johann Sulzer, and Samuel König. For good discussions of the various partisan disputes in which they engaged see Ronald Calinger's "The Newtonian-Wolffian Controversy (1740-1759), *Journal of the History of Ideas* 30 (1969), 319-330; Calinger's "The Newtonian-Wolffian Confrontation in the St. Petersburg Academy of Sciences," *Cahiers d'Histoire Mondiale* 11 (1968), 417-435; and Irving Polonoff, *Force, Cosmos, Monads and Other Themes of Kant's Early Thought* (Bonn: Bouvier Verlag Herbert Grundmann, 1973), pp. 24-29.

²² See section 1.6 below.

This section is divided into four sub-sections. In section 1.1.1, I discuss two traditional questions that Kant posed about change and action. In section 1.1.2, I discuss how Kant's account of interaction was embedded in a traditional metaphysical view, monadism. In section 1.1.3, I discuss Kant's commitment to the methodological doctrine that a primary task of metaphysics is to provide a derivation of the principles of mechanics. Finally, in section 1.1.4, I introduce the central topic of this chapter, how Kant's understanding of force and motion broke from the post-Leibnizian tradition of Wolff and others.

1.1.1 Traditional questions about change and action

Kant's first writings examined two traditional questions: (I) Can individual finite substances act? If not, as the occasionalists held, each change is due to God's direct action. (II) If finite substances can act, can they act on each other? If not, change arises when each substance acts on itself. On this view, the body acts on itself to cause all its motions, the soul acts on itself to cause all its perceptions, and the appearance of interaction is due to God's harmonious arrangement of the world. Kant argued, against both occasionalism and pre-established harmony, that substances can act on each other—for example, he affirmed that perceptions are the effect of the body's activity on the soul and voluntary motion is the effect of the soul's action on the body.

1.1.2 A traditional doctrine: Kant's monadism

Kant's account of interaction was embedded in a monadology. Monadologies attempted to derive a comprehensive theory of the entire world—a cosmology—from the properties of and relations among the monadic simple constituents of the world. As a physical influx monadist, Kant was committed to explaining how real interaction takes place between the monads that underlie all matter. He faced two high hurdles, namely explaining the nature of monadic interaction and explaining why this interaction is the sufficient reason for change and order among bodies.

1.1.3 A traditional methodology: metaphysics and the principles of mechanics

Kant's early philosophy was traditional in a third way: he assumed that the principles of mechanics, which were used in the seventeenth and eighteenth centuries to explain a wide variety of natural phenomena, were correct. To be sure, there was no agreement at this time about what the principles of mechanics were; for example, there were major disagreements between Descartes and Leibniz about the laws of motion.²³ Kant assumed, first, that some set of principles was correct and, second, that it was the task of metaphysics to provide

²³ I am grateful to Hannah Ginsborg for emphasizing this point in her commentary to an earlier version of this manuscript. Exactly which principles Kant took to be correct goes beyond the scope of this essay.

metaphysical derivations of those principles. Given Kant's monadism, the second point amounted to assuming that metaphysics should be able to show that monadic interaction is the sufficient reason for the applicability of mechanics to bodies.

1.1.4 An untraditional twist

Kant was influenced by philosophical tradition, but his views were deeply non-traditional because he argued that the post-Leibnizian rationalist understanding of motion, change, and action was incorrect. In his first published work, Kant held that Wolff and other unnamed followers of Leibniz were led to metaphysical error because they misunderstood the laws of mechanics and the nature of motion.²⁴ This argument occurred at the beginning of *Thoughts on the True Estimation of Living Force* (1747). It serves as the jumping-off point for my analysis of Kant's earliest solution to the mind/body problem in that work.

²⁴ This conclusion contrasts sharply with the traditional view that Kant was a dogmatic follower of Leibniz and Wolff at least until the "silent decade" of the 1770s. Despite recent work debunking this view—for example, by Alison Laywine, Susan Shell, and Eric Watkins—it is still common in the literature. See, for example, Graham Bird's "Kant and Contemporary Epistemology," *Kantian Review* 1 (1998), 1-16. For work against this tradition see Laywine, *Kant's Early Metaphysics and the Origins of the Critical Philosophy* (Atascadero, California: Ridgeview Publishing Company, 1993); Shell, *The Embodiment of Reason: Kant on Spirit, Generation, and Community* (Chicago: The University of Chicago Press, 1996); and Watkins, "Kant's Theory of Physical Influx," *Archiv für Geschichte der Philosophie*, 77 (1995), 285-324.

1.2 Kant's criticism of post-Leibnizian rationalist mechanics (*Living Forces*, part I, §§1-3)²⁵

In this section, I discuss *Living Forces*, Part I, sections one through three. I am specifically concerned with how Kant's discussion of force, change, and action illuminate his solution to the mind/body problem in *Living Forces* sections five and six.²⁶ As I noted in the Introduction, Kant's views on mind/body interaction can only be understood in terms of his general account of interaction. In this section, I approach this topic by examining his criticism of a traditional post-Leibnizian view that I call the *vis motrix* view.

Kant thought that the *vis motrix* view, which maintained that bodies act only by changing motion, was incompatible with mind/body interaction because it could not explain how bodies could cause mental representations. As Kant concluded in section five, if the *vis motrix* view is correct, then a body's force "can at most result merely in displacing the soul from its position in space," and it could not have as an effect causing the soul to have a representation (§5; 1:20).²⁷ He

²⁵ I refer to *Living Forces* by Kant's section number and by the standard page number of the Akademie edition. When I cite long passages, I sometimes number the sentences using numbers inside editorial brackets.

²⁶ See section 1.6 below.

²⁷ I use my own translations of *Living Forces*, although in some cases I have modified Kemp Smith's translation in John Handyside, ed., *Kant's Inaugural Dissertation and Early Writings on Space* (Chicago: Open Court, 1929).

believed that if a body's force "can only give rise to motions," then it is impossible for that force to "generate representations and ideas" (§5; 1:20).

In section one, Kant introduced the notion of a body's *essential* force. On the *vis motrix* view, bodies had no essential force, because force was "regarded as something which is communicated from a body entirely from without" (§1; 1:17). Kant maintained that metaphysical arguments proved that bodies possess an essential force, and he criticized Leibniz's successors for adopting the anti-metaphysical methodology of looking "no further than the senses teach" (§1; 1:17).²⁸

In sections two and three of *Living Forces*, Kant criticized the *vis motrix* view on two separate grounds. In section two, he argued that Leibniz's empirically-minded successors "would have been well advised to follow [Leibniz] in his metaphysical doctrines" (§2; 1:18). Instead, they used empirical observations to give Leibniz's metaphysical notion of force a more "definite" definition, but in doing this, Kant argued, they made the notion of force devoid of explanatory content.

In the next section, section three, Kant's reasoning is not entirely clear. He suggested that the *vis motrix* view is not just explanatorily empty, but also in-

²⁸ I am grateful to Daniel Warren, who emphasized this point in discussion.

volves fundamental metaphysical incoherence. Kant believed that there was something incoherent in conceiving of force as something that a body has only when it is in motion. He also introduced here his vitally important criticism of the idea that changes in motion are the *only* effects of the exertion of force. As I discussed above, Kant's solution to the mind/body problem affirmed that bodies exert a force that can have as its effect both changes in motion and the production of mental representations.

It is important to note that Kant did affirm that bodies have a power to move and thus, in a sense, that they have a *vis motrix*. Kant's criticisms were directed against the specific *vis motrix* view adopted by Wolff and other post-Leibnizians. In section 1.2.1, I discuss this view in greater detail. In section 1.2.2, I discuss Kant's first criticism of it, his argument in *Living Forces* section two that Leibniz's successors attempt to define force more definitely by appealing to "what the senses teach" resulted in an empty, unexplanatory concept of force. In section 1.2.3, I do my best to interpret the extremely unclear argument of *Living Forces* section three, where Kant discusses the metaphysical incoherence of the *vis motrix* view. Finally, in sections 1.2.4 and 1.2.5, I summarize the line of argumentation that led from Kant's discussion of these topics to the solution to the mind/body problem he proposed in *Living Forces* sections five and six.

This section also addresses several interpretive difficulties, most notably the obscurity of section three and Kant's apparent slide between discussing force

as something a body has when it moves and discussing it as something that causes changes of motion. Section 1.2.1 begins by discussing this second problem.

1.2.1 Kant's understanding of the *vis motrix* view (*Living Forces*, part I, §1)

I will begin my discussion of Kant's understanding of the *vis motrix* view by raising some of the philosophical tensions and interpretative problems that make *Living Forces* such a difficult text. Kant's discussion of *vis motrix* was hampered by his continual slide between two properties that the *vis motrix* view allegedly attributed to a body's force. In some passages, Kant treated *vis motrix* as a force that a body has only when it is in motion. In others, he treated *vis motrix* as a force that causes motion. He undoubtedly believed that these two properties were systematically linked, but he discussed neither this nor the general understanding of bodies and force that he took to be presupposed by the *vis motrix* view.²⁹ Kant could have connected the two properties of *vis motrix* by holding that only something in motion could cause a change in motion, but it is unclear whether he attributed this view to Wolff and other post-Leibnizian German rationalists. Fortunately, resolving these issues is not necessary for evaluating Kant's solution to the mind/body problem in *Living Forces*.

²⁹ I am grateful to Daniel Warren for pointing out this lacuna.

Kant began *Living Forces* “by defining certain metaphysical concepts bearing on force in bodies in general” (§1; 1:17). His definitions turned on a series of distinctions: between essential and non-essential force, between force that is internally directed and force that is outwardly directed, and between active and moving force. Like Leibniz, and in contrast to those post-Leibnizian philosophers who accepted the *vis motrix* view, Kant affirmed that “every body has a force essential to it” (§1; 1:17). Wolff and the other proponents of the *vis motrix* view held that force is inessential because it “is communicated to a body entirely from without” and it is something “in which the body does not participate when in a state of rest” (§1; 1:17). One can thus distinguish two claims that Kant made about a body’s essential force. First, if a body has a force essentially, this cannot be because the force is communicated to it “entirely from without.” To say that a body has a force essentially is to make a metaphysical claim that the source of that force is the body itself. Second, if a body has a force essentially, it always has the force, even when the body is at rest.³⁰

³⁰ Hegel was an astute student of Kant's understanding of substance and force. In the *Science of Logic*, he praised Kant, first, for providing an alternative to the vulgar Newtonian mechanism, which explained motion only “action from without,” second, for arguing that matter is essentially active, and, third, for providing an account of this activity that avoided pre-established harmony. Kant's account was unsatisfactory in Hegel's eyes, however, because it did not attribute a power of *self*-determination to substance. Hegel argued this in “Remarks on the Kantian Construction of Matter from the Forces of Attraction and Repulsion” in the Being-for-Itself section of the *Science of Logic*. See pages

It is important to emphasize that, despite his agreement with Leibniz that every body has a force essential to it, Kant's own position was profoundly anti-Leibnizian. As I show later in this chapter, Kant maintained that every change involves the exertion of a transeunt or externally-directed force. This contradicted Leibniz's doctrine of pre-established harmony, according to which each substance acted only through self-affection or by the exercise of internally-directed forces. I discuss this point further when I discuss Kant's early physical influx view in sections 1.2.5 and 1.3 below.

What Kant admired most about Leibniz was Leibniz's commitment to a metaphysical methodology: Leibniz believed that a metaphysical examination of body and force was necessary to understand action, change, and motion. This methodology contrasted sharply with that adopted by the defenders of the *vis motrix* view, whom Kant considered to be overly enthusiastic about the role of experience in philosophy. Kant believed that, as Leibniz had taught, a metaphysical examination would show that every body has a force essential to it and

178-184 of A.V. Miller's translation, *Hegel's Science of Logic* (Atlantic Highlands, New Jersey: Humanities Press International, 1989).

Evaluating Hegel's argument, which made extensive references to the critical *Metaphysical Foundations of Natural Science*, falls well outside the scope of this study, but this is a task I hope to perform someday. For useful discussions see Sally Sedgwick's "Hegel's Critique of Kant on Matter and the Forces" in Hoke Robinson, ed., *Proceedings of the Eighth International Kant Congress* (Milwaukee, Wisconsin: Marquette University Press, 1995), Vol. I, Part III, pp. 963-972 and Gerd Buchdahl's "Hegel's Philosophy of Nature and the Structure of Science," *Ratio* 15 (1973), pp. 1-27.

therefore that the *vis motrix* view was incorrect. It must have seemed particularly ironic to him, therefore, that Leibniz's own successors adopted an anti-metaphysical stance that led them to consider force by "look[ing] no further than the senses teach" (§1; 1:17).

Drawing only on what they found in experience, the defenders of the *vis motrix* view asserted that "a body which is in motion has a force...[for example when it] overcomes hindrances, bends springs, and displaces masses" (§1; 1:17). They held that a body has force only when it causes changes of motion in other bodies, for example when a weight bends a spring or displaces a mass. Bodies that do not cause changes in motion, for example bodies at rest, were held to possess no force. This view sounds odd to modern ears, but the notions of kinetic energy and work were undeveloped in the first half of the eighteenth century.³¹ This is why the defenders of *vis motrix* did not accept that a body at rest—for example a compressed spring or a ball at the top of an incline—can possess potential energy. In this, the defenders of *vis motrix* were in step with the mainstream of seventeenth century mechanics, according to which a body at rest acquired a force only when it was set into motion after colliding with a moving

³¹ For a discussion of this see René Dugas, *A History of Mechanics* (Neuchâtel, Switzerland: Éditions du Griffon, 1955); Dugas, *Mechanics in the Seventeenth Century* (Neuchâtel, Switzerland: Éditions du Griffon, 1958); and Erwin Hiebert, *Historical Roots of the Principle of the Conservation of Energy* (Madison, Wisconsin: State Historical Society of Wisconsin, 1962).

body. Even though he defended the contrary view that bodies have force essentially, Kant was forced to admit that the only available model of essential force, Aristotle's notion of an entelechy, was obscure and that nobody had yet "understood this mysterious teaching" (§1; 1:17).

Leibniz attributed to substance *vis activa*, an internal, active force modeled after the Aristotelian entelechy.³² Kant praised Leibniz—"to whom human reason owes so great a debt"—for teaching that "in body there inheres a force which is essential to it, and which indeed belongs to it prior to its extension" (§1; 1:17). Leibniz held that a monad acts by exerting its *vis activa* on itself in a manner that causes its own inner perceptions to change. This idea was central to Leibniz's pre-established harmony, according to which this is the *only* way that monads can act. Since Kant's monadism embraced physical influx between monads, he would not have praised Leibniz for this. Rather, Kant was indebted both to the idea of the essential force of a body and to a presupposition of Leibniz's conception of active force, namely that not all action involves motion. I explain this last

³² There is a large literature on Leibniz's notion of active force. Particularly useful are Margula R. Perl's "Physics and Metaphysics in Newton, Leibniz, and Clarke," *Journal of the History of Ideas* 31 (1969), 507-526; Joseph Agassi's "Leibniz's Place in the History of Physics," *Journal of the History of Ideas* 31 (1969), 331-344; and the series of essays on this topic by George Gale, including "The Physical Theory of Leibniz," *Studia Leibnitiana* 11 (1970), 114-127; "Leibniz's Dynamical Metaphysics and the Origins of the *Vis Viva* Controversy," *Systematics* 11 (1973), 184-207; and "The Concept of 'Force' and Its Role in the Genesis of Leibniz's Dynamical Viewpoint," *Journal of the History of Philosophy* 26 (1988), 45-67.

point in section 1.2.3, when I address Kant's confusing argument in *Living Forces* section three that the *vis motrix* view is metaphysically incoherent. I will first discuss a criticism that is easier to understand, namely Kant's claim in section two that the *vis motrix* view cannot be employed as an explanation for the cause of motion.

1.2.2 Kant's first criticism: the *vis motrix* view cannot explain the cause of motion (*Living Forces*, part I, §2)

Kant began section two by noting the irony that Leibniz's own followers reinterpreted his notion of an essential active force in a manner that made it accidental:

Leibniz gave to this force the general title of active force. His successors would have been well advised simply to have followed him in his metaphysical doctrines; but the attempt has been made to define this force more definitely. The force in body, it is said, is a *moving* force, since we never observe it to generate anything except motion. If it exerts pressure, it is striving towards motion; but the force is only then exercised when the motion is actual" (§2; 1:18)

Their reliance on experience misled the defenders of the *vis motrix* view in two ways: they were misleadingly caused to believe that the effect of force is always a change of motion (Kant's first point in this passage) and that only bodies in motion possess force (Kant's second point). As I discuss when I evaluate the argument of *Living Forces* section three in 1.2.3 below, Kant maintained that stationary bodies possess a force, for example "a sphere which through its weight

presses upon the table on which it lies” (§3; 1:18).³³ Nor is it true, Kant argued, that all action involves a change in motion. If this were so, then the sphere on the table would not exert a force or act in any way because it neither moves nor causes the table to move.³⁴

Although it illustrated the two points that Kant makes in *Living Forces* section two, the sphere example is best discussed when within the context of section three. Kant’s main conclusion in section two was different from either of these metaphysical points, which I discuss in detail in section 1.2.3 below. He went on to argue that their reliance on empirical observation led the defenders of the *vis motrix* view to define force in a way that made them unable to explain the cause of motion.

If force is defined as “moving force,” Kant argued, then the notion of force is unsuitable for one of its main philosophical tasks, serving as the cause of motion. If a body’s force is *vis motrix*, then the definition of “force” presupposes the very thing that force is supposed to explain. Kant argued that to say that moving

³³ Unfortunately, as I explain in section 1.2.3, Kant did not discuss this case in detail, an omission that left many confusions in its wake.

³⁴ This assumption was not limited to Wolff and other followers of Leibniz. For example, Descartes assumed that action of the soul on the body must entail a change in the motion of some part of the body. I am grateful to Hannah Ginsborg for helping me to understand Descartes’ position.

force is the cause of motion is as vacuous as claiming that a *vis calorifica* is the cause of heat:

I assert that in professing to secure an answer to the question of the cause of motion, by thus ascribing to body an essential moving force (*vis motrix*), we practically resort to the same artifice as the Schoolmen, who in their inquiry into the grounds of heat and cold took refuge in a *vis calorifica aut frigifaciens*." (§2; 1:18)³⁵

It was precisely by eschewing Leibniz's metaphysical definition and searching for a more "definite" definition that accorded with common experience that Leibniz's followers squandered the promise of Leibnizian *vis activa*. Wolff and others did not correctly identify the cause of motion, an error that caused them to misunderstand the nature of motion and of the laws of dynamics and mechanics. To be sure, Kant did not think that the Wolffians had misunderstood the content of those laws; he admitted that the consequences of the error "do not indeed show themselves in mechanics and natural philosophy" (§5; 1:20), which is to say that the defenders of *vis motrix* could do mechanical calculations correctly. However, Kant concluded that construing force as *vis motrix* presupposed a false metaphysical understanding of the *nature* and *source* of the laws of natural science.

³⁵ Kant argued in a similar vein in the *Lectures on Metaphysics*. In the *Metaphysik Herder* (1762-64), an enumeration of the properties of matter included "inertia (but not *vis inertiae*)" and "mobility (but not *vis motrix*)" (28:45). The contrary view was "the philosophy of the lazy" (28:48). All citations to the *Lectures on Metaphysics* are to *Immanuel Kant: Lectures on Metaphysics*, tr. and ed. by Karl Ameriks and Steve Naragon (Cambridge: Cambridge University Press, 1997).

It is important to realize that Kant's comparison of *vis motrix* to *vis califica* went only so far. Even if *vis motrix* cannot be invoked as the cause of motion, does this really show that Leibniz's followers misconceived the nature of motion? Kant attempted to show this by raising a second problem with the *vis motrix* view: its supporters' conception of mechanics was based on an untenable conceptual foundation because their notion of force was metaphysically incoherent.

1.2.3 Kant's second criticism: the *vis motrix* view is metaphysically incoherent (*Living Forces*, part I, §3)

Kant made this criticism in *Living Forces* section three, which is, word for word, one of the most obscure passages Kant published.³⁶ This section's ambitious scope far out-reached its scant length: Kant attempted, in just seven sentences, to discuss three examples where the degree of a body's motion is not commensurate to the extent of its action and to provide at least two arguments that the *vis motrix* view is metaphysically incoherent. The examples used a tenet of the *vis motrix* view—that a body acts when it overcomes hindrances³⁷—to show that “we do not speak correctly if we treat motion as a kind of action, and so ascribe to it a force synonymous with it” (§3, sentence one; 1:18).

³⁶ I am grateful for the extensive conversations I had with Daniel Warren about this section. He and I jointly developed the interpretation I give here.

³⁷ See my discussion of *Living Forces* §1 in section 1.2.1 above.

Two of these examples were relatively clear. The first was a case of a body “to which an infinitely small opposition is made” (§3, sentence two; 1:18). When such a body moves, it overcomes almost no hindrance, for it faces only an “infinitely small” opposition. Since, as the *vis motrix* view itself affirms, the extent that a body acts is commensurate with the hindrances it overcomes, Kant concluded that such a body “hardly acts at all” (§3, sentence two; 1:18). However, Kant noted that such a body “has motion in an especial degree,” for there is (almost) nothing opposing its motion. The case approaches that of inertial motion, which Kant defined later in *Living Forces* as motion that “has the characteristic of maintaining itself indefinitely...if no obstacle is set against it” (§15; 1:28).³⁸ Since a body in inertial motion has no obstacle set against it, it overcomes no hindrances and, hence, according to the *vis motrix* view, it does not act. Although motion may sometimes be an effect of action, action is, contrary to the *vis motrix* view, not “synonymous” or commensurate with motion or with change of motion.

Kant also argued that there are cases of extreme action that involve the loss of all motion. He gave an example of this in the fourth sentence:

³⁸ Kant distinguished free from violent motion. Free motion is inertial motion, for example a body moving in empty space. Violent motion, in contrast to free motion, presupposes a continuing force; Kant's favorite example was an object being pushed by hand across a flat surface. In *Living Forces*, Kant spoke of, on the one hand, motion that “stops as soon as the driving force withdraws” and, on the other, of motion that “has the characteristic of maintaining itself indefinitely...if no obstacle is set against it” (§15; 1:28).

If, however, through [meeting] an object, it loses its motion suddenly—that is, in the moment in which it is brought to rest—it is then active. (§3, sentence four; 1:18)

The case is one where a moving body faces an overwhelming hindrance: a moving body collides with a massive stationary body and is brought to a complete standstill. In this case, the body acts to a great extent because it expends its force on a great hindrance. Since the extent of action is commensurate with the degree of hindrance, the body is active “in the moment that it is brought to rest.”

Kant concluded that *vis motrix* is not an “appropriate title” for the force of a body: a body in inertial motion does not act while a body acts greatly at the very moment it is brought to rest (§3, sentence seven; 1:18). The second example was meant to show that a body acts as it is brought to rest. The third was meant to show that a body could continue to act while it is stationary. Unfortunately, Kant’s discussion of this example was obscure. In the fifth sentence, he referred to “bodies which act while they are at rest” and gave with no explanation the example of “a sphere which through its weight presses upon the table on which it lies” (§3, sentence five; 1:18). What is clear about this example is that it is a case where a body is not in motion. Kant believed that there is a question about whether or not such a body acts. If it is right to say it acts (as Kant apparently thought, although he gave no reasons for thinking this), Kant asserted that it is wrong to say that it does so in virtue of “striv[ing] to move” (§3, sentence five;

1:18). It is not clear what Kant meant by this, but apparently he thought that the *vis motrix* view would appeal to this idea and that the idea was absurd. Kant's reasoning remains obscure, but at least his point was clear enough: this example, like the other two, was designed to show that, although motion may be one effect of action, it cannot be the *only* effect, for the degree of action does not always correspond to the degree of motion.³⁹

The third and sixth sentences present at least two arguments that appear to have been meant to show that the *vis motrix* view is metaphysically incoherent. Unfortunately, Kant's exact conclusions, his arguments, and the relation of his arguments to the examples in the second, fourth, and fifth sentence are all obscure. The arguments focused on an idea that was connected to the examples, namely that there is no reason to assume that effects of force are only changes in motion. Of these two sentences, the sixth sentence is the clearest. It appears to be an explanation of why Kant believed it would not be satisfactory to say of the stationary sphere that it strives to move, although the sentence also seems to refer to the other two examples as well:

For* since in moving they would not be active**, we should have to maintain that in so far as a body is active it strives to fall into the state in which it does not act***. (§3, sentence 6; 1:19)

³⁹ As I explain in section 1.4.1 below, passages later in *Living Forces* provide evidence that Kant believed that the sphere and the table change each other's inner states through the exertion of *vis activa*.

* Referring to the conclusion that the sphere is not striving to act?

** Referring to the first example?

*** Referring to the second example?

There is something incoherent or perhaps paradoxical, Kant suggested, in maintaining that “in so far as a body is active it strives to fall into the state in which it does not act”. Unfortunately, exactly what Kant thought this objection amounted to remains unclear to me.

However obscure Kant’s arguments, it is clear that he believed that their reliance on common experience led the defenders of *vis motrix* to erroneously assume that motion is the only effect of action. As Kant put it, “we should not, therefore, take our title for the force of a substance from that which is not an action” (§3, sentence seven; 1:18). In section 1.2.1 above, I discussed an additional reason why Kant rejected the assumption that a body at rest does not possess a force: this assumption is incompatible with every body having an essential force. If bodies at rest possess no force, then force would be something that is accidental to bodies, and that is “communicated form without” (§1; 1:17).

If the defenders of the *vis motrix* view were committed to the Leibnizian thesis that bodies possess force essentially, then this assumption would lead to an incoherence, for it entailed that bodies possess force accidentally. Unfortunately, this criticism is not particularly biting, because, as Kant himself discussed in section one, the *vis motrix* view was committed to understanding force as an

inessential property of bodies. Kant's cryptic comments that the *vis motrix* view "maintains that in so far as it is active it strives to fall into the state in which it does not act" suggests that Kant may have had a deeper incoherence in mind, but unfortunately his reasoning is very obscure (§3, sentence six; 1:18).

Kant's overall strategy for arguing against the *vis motrix* view was clearer. He offered a relatively clear argument in section two that the defenders of the *vis motrix* view were led astray by common experience to develop a conception of force that was explanatorily empty. In section three, in a series of obscure comments, Kant discussed what he considered to be three counter-examples to the *vis motrix* view and he also suggested that this view was somehow deeply metaphysically incoherent. Although this last line of reasoning remains unclear to me, it may have been connected to the four main topics of *Living Forces* section three: first, that there is no reason to assume that effects of force are only changes in motion; second, that there is something incoherent in the assumption a body possesses force when and only when it is in motion; third, that objects in inertial motion do not act; and, fourth, that stationary objects can act.

Since the focus of this study is on Kant's earliest solution to the mind/body problem, I am obliged to set aside the interesting problems of interpreting section three. In the next section, I summarize the line of reasoning that led Kant from his criticism of the *vis motrix* view to his first solution to the mind/body problem.

1.2.4 A summary of Kant's argument

The first three sections of *Living Forces* contained a sustained criticism of the *vis motrix* view. In summary form, this was Kant's general line of argument:

- (1) Leibniz was correct to say that all bodies have an essential force (§1; 1:17);
- (2) Metaphysicians following Leibniz fundamentally misunderstood this idea (§2; 1:18), for they assumed wrongly that the only way a body can act is to cause changes in motion in itself or in other bodies (§3; 1:18);
- (3) Given this assumption, Leibniz's essential force must be understood as a moving force (i.e., a force through which a body causes motion in itself or in some other body) (§2; 1:18);
- (4) Thus interpreted, Leibniz's notion of essential force has no explanatory force: it amounts to saying vacuously that a body moves because it has the force to do so (§2; 1:18);
- (5) However, the assumption that the only way a body can act is to move is fundamentally mistaken, for inertial motion is not an action at all and stationary objects can act (§3; 1:18).

The first claim is a point on which Kant agreed with Leibniz. Claims two and three describe positions held by Wolff and the other defenders of the *vis motrix* view. Claims four and five summarize Kant's two lines of criticism in sections two and three, that the *vis motrix* view is unexplanatory and that it assumes wrongly that all action is motion. Claim five raises two distinct points, namely that inertial motion is not action and that stationary objects can act. The second case is the most

important for this study, for I have demonstrated that Kant's strategy was to show that a body can exert a force whose effect is something other than producing a change of motion. Unfortunately, Kant's explanation of this point was complex and defies easy summary; I discuss it in greater detail in section 1.4 below.

To connect these points with Kant's solution to the mind/body problem, it is necessary to draw an inference that Kant did not explicitly make:

- (6) A body's motion is either caused by that body acting on itself, or by its being acted upon by something external to it;
- (7) Since a body's essential force does not itself cause the body to move, the cause of a body's motion is not its own action on itself;
- (8) Therefore, the cause of a body's motion must be something external to it.

As I show in section 2.3.1 below, in the 1750s Kant made similar points by defending his "principle of succession," which stated that "no change can happen to substances except in so far as they are connected with other substances; their reciprocal dependency on each other determines their reciprocal changes of state" (1:410). Unfortunately, the crucial claim seven does not directly follow from the argument of claims four and five, which concluded that a body's force cannot be identified with *vis motrix*. This lacuna is significant, for this claim was extremely important to Kant. Claim eight entailed that pre-established harmony does not reign over bodies: a body's motion cannot be explained by its actions on itself. This position, in turn, was extremely close to one of Kant's most impor-

tant pre-critical conclusions, namely that bodies change only when they interact with each other or that each change involves the exercise of a transeunt force.

Kant did have an argument that bridged the gap between claim seven and his conclusion that a body's essential force is not *vis motrix*. This argument, which turned on the discussion in *Living Forces* §4 of the successive nature of the exertion of *vis activa*, was complex. Before discussing it in section 1.4 below, however, it will be useful to highlight the significance of claim eight by discussing Kant's early account of physical influx.

1.2.5 Physical influx and a new conception of change

Kant's argument might be extended to show that physical influx applies to bodies:

(10) Therefore, the existence of motion in bodies presupposes a community of externally-directed forces and thus genuine interaction.

There are several difficulties with understanding the leap to this claim. An argument against pre-established harmony is *not* tantamount to an argument for physical influx: claim ten would follow from claim nine only if occasionalism had been proven false. Although Kant gave no direct answer to occasionalism in *Liv-*

ing Forces, in Chapter Two I discuss why he believed that God acts to maintain the system of physical influx and does not intervene to cause each action.⁴⁰

Earlier I noted that, although he rejected the *vis motrix* view, Kant did not deny that motion can be an effect of the exertion of a body's force. He maintained that motion is not the only effect of *vis activa* and that it is not the most fundamental effect. Kant argued that motion is caused by the specific manner in which the primary effect of *vis activa* occurs in our world: as I show in section 1.4 below, it is only because our world is one where *vis activa* causes gradual change in substances' internal states that the exercise of *vis activa* causes changes in bodies' motion. Before explaining this, it will be useful to focus on one general point: Kant held that motion is an effect of a more fundamental action.⁴¹ Namely, he concluded:

(11) The correct employment of the concept of force is not to explain motion, but is to explain the change from one state to another.

This more general understanding of action was the key to Kant's first solution to the mind/body problem.⁴² I discuss the details of Kant's conception of change in

⁴⁰ See section 2.3 below.

⁴¹ I discuss this in greater detail in section 1.4 below.

⁴² I discuss this in section 1.6 below.

section 1.4. Here I simply note that this idea lent support to another key pre-critical doctrine, a generalized version of the community thesis of claim ten:

(12) Therefore, the existence of change in bodies presupposes a community of externally-directed forces and thus genuine interaction.

Although Kant did not argue directly that a body's *vis activa* must be externally-directed (i.e., that a body cannot change its own states), he did argue that in every case where a body is caused to move, another body's externally-directed *vis activa* is involved.⁴³ This contrasted sharply with Leibnizian monadism, which maintained that *vis activa* is always internally-directed: Leibniz held that monads act on themselves to change their own perceptual states. I return to this difference between Kant's and Leibniz's understanding of *vis activa* in section 1.4.

⁴³ Kant left open the possibility that changes of a body's motion always or sometimes have two causes, namely another body's externally-directed *vis activa* and the original body's internally-directed *vis activa*. There is no evidence in *Living Forces* that Kant believed this, but he did not rule out this possibility. In the *Metaphysik Herder* (1762-64), however, Kant was reported as teaching that one thing's being acted on by another presupposes both "outer" and "inner" grounds (28:82). This might be evidence that Kant thought every change involved both externally- and internally-directed *vis activa*, but unfortunately this intriguing notion falls outside the focus of this study. For a partial translation of the *Metaphysik Herder* see Karl Ameriks and Steve Naragon, editors and translators, *Immanuel Kant: Lectures on Metaphysics* (Cambridge: Cambridge University Press, 1997).

1.3 A problem and a solution: Kant's metaphysical principle of succession

In this section, I discuss a problem with Kant's early conception of change. In section 1.2.5, I argued that Kant defended the anti-Leibnizian doctrine that every change, or at least every change of a body's motion, involves the exercise of a transeunt force. The problem lies precisely in the manner in which I qualified this claim in the preceding sentence: Kant may have defended physical influx for bodies only, not for substances generally. Since Leibniz might plausibly be interpreted as having defended pre-established harmony for monads and physical influx for bodies, Kant's own discussion of influx may not have been as anti-Leibnizian as I have made it out to be.⁴⁴

I discuss two solutions to this problem, one speculative and one based on an idea Kant published in the 1750s. The speculative solution is what I call the "indifference thesis." Kant may have spoken indifferently about bodies and substances because he believed that the points he raised about bodies also applied to other types of substances.⁴⁵ If this thesis can be attributed to Kant, then his defense of influx should be interpreted as applying to all substances, including simple substances as well as bodies.

⁴⁴ I owe this point to Hannah Ginsborg.

⁴⁵ I am grateful to Daniel Warren for pointing out this possibility.

I discuss these points in section 1.3.1. In section 1.3.2, I discuss how Kant's metaphysical principle of succession, which he defended in the *New Elucidation* of 1755, provided a decisive solution. In the context of this principle, I argue, it is clear that Kant intended his defense of physical influx to be general and not restricted to bodies only. While there is no evidence that Kant had formulated the principle of succession in its final form when he published *Living Forces*, I conclude that there is evidence that Kant had developed the principle in 1747, or at least that he had accepted something akin to it.

1.3.1 Physical influx for bodies, pre-established harmony for monads?

I have shown that the first three sections of *Living Forces* contained the rudiments of arguments for physical influx and against pre-established harmony. It is important to emphasize that, although this result was anti-Leibnizian, it was not a criticism of the *vis motrix* view, since that view was compatible with physical influx and, indeed, many of its defenders did not defend pre-established harmony.⁴⁶ What I have shown is that Kant's arguments against the *vis motrix* view illuminate Kant's own rejection of pre-established harmony. I raise this issue because it is extremely important to my study of Kant's solution to the mind/body

⁴⁶ On this see Eric Watkins' unpublished manuscript, "From Pre-established Harmony to Physical Influx: Leibniz's Reception in Eighteenth Century Germany." I am grateful to Eric for providing me with a copy of this manuscript.

problem. As I show in section 1.6 below, Kant's rejection of pre-established harmony was essential to his views on space, interaction, and his claims about the sense in which souls exist in space and interact with other substances.

For now it will suffice to note that one conclusion Kant drew was that change always involves the exertion of an externally-directed force. Whereas Leibniz had held that force is always internally-directed, Kant maintained that a substance's own force, considered in isolation from the effects of other substances, can never be a ground for its own changes. Examining briefly how Kant used this idea in later pre-critical texts will help us better to understand its somewhat prolix employment in *Living Forces* to solve the mind/body problem.

In the *New Elucidation* of 1755, Kant defended the principle of succession, which stated "no change can happen to substances except in so far as they are connected with other substances; their reciprocal dependency on each other determines their reciprocal changes of state" (1:410). This principle remedied what Kant may have seen as an important limitation in his argument in the first sections of *Living Forces*, which discusses bodies only. As I discuss in section 1.4.1 below, there is some evidence that Kant spoke *indifferently* of bodies and other substances in *Living Forces*—that is, that he believed that the points he made about bodies applied equally well to other types of substances. The evidence about this is far from clear, however, and unless this point can be sub-

stantiated, Kant's discussion of pre-established harmony in *Living Forces* appears vulnerable to the charge that it applied to bodies only and not to monads.

Since in this period Kant held that bodies were ontologically derivative substances composed of monads, a defense of physical influx among bodies would not go far enough.⁴⁷ Unless the indifference thesis could be substantiated, Kant's original argument did not exclude the possibility that pre-established harmony might hold true for monads. In this case, however, could not defenders of pre-established harmony assert that their theory explains the true source of change?⁴⁸

⁴⁷ Unfortunately, pursuing the extremely general question of the status of bodies in Kant's early ontology would take me too far afield from my discussion of Kant's solution to the mind/body problem. There is a large question about exactly what Kant inherited from Leibniz's account of the dependence of the phenomenal on the non-phenomenal. One interesting question is this: Since we have a concrete idea of force that relates to spatiotemporal changes in bodies, what content is there to a metaphysically abstract notion of force that makes no reference to bodies, space, or time? I suspect that, in the pre-critical period, Kant may not have had the resources to answer this question satisfactorily.

⁴⁸ Leibniz and Wolff both entertained the idea of asserting pre-established harmony among monads while also asserting interaction between bodies. What makes this position coherent is the ontologically derivative status of bodies in their systems—in Leibniz's case as merely "well founded phenomena". For a discussion of their positions see Richard Miller, "Leibniz on the Interaction of Bodies," *History of Philosophy Quarterly* 5 (1988), 245-255 and Charles Corr, "Christian Wolff and Leibniz," *The Journal of the History of Ideas* 36 (1975), 241-262.

1.3.2 Kant's answer

Although it is difficult to say with confidence whether Kant believed that the argument of *Living Forces* applied to substances generally, his discussion of the principle of succession eight years later was admirably clear. This principle asserted that no substance undergoes change unless it is acted on by another substance. Thus the principle of succession applied to substances in general the same lessons that Kant drew about bodies in the first sections of *Living Forces*: no substance has the power to change itself, and all change in a substance involves the action of another substance.⁴⁹ Although he did not defend them explicitly, these conclusions are important to Kant's argument in *Living Forces*. As I show in section 1.6, Kant argued that immaterial substances like souls can change only if they are in real interaction with the community of bodies. If Kant's arguments against pre-established harmony applied to bodies only, then he would have no basis for concluding that the community of genuine interaction includes souls as well as bodies.⁵⁰

⁴⁹ It would be interesting (though a topic for a different study) to trace the exact relationship between these arguments and their critical counterpart, the Second Analogy of the *Critique of Pure Reason*. The Third Analogy bore interesting relations to Kant's principle of coexistence, which I discuss in Chapter Two.

⁵⁰ Unfortunately, this response proved to be not much of an argument against pre-established harmony. As I show when I discuss Kant's arguments for the principle of succession in section 2.3 below, Kant was fairly dogmatic and his position may have amounted to ruling pre-established harmony out without argument.

1.4 The “general concept of active force” and the real possibility of temporal order (*Living Forces*, part I, §4)

In *Living Forces* section four, Kant tried to show that a transeunt force that causes change in substances’ internal states could be the cause of *both* motion in bodies and representations in souls. As I explained earlier, Kant thought that the *vis motrix* view was incompatible with mind/body interaction.⁵¹ Because they believed that force only causes changes in motion, Wolff and others defended a conception of bodies’ force that was incompatible with change in souls’ perceptual states, a change that does not seem to involve only motion. In *Living Forces* section four, Kant articulated his own conception of a broader conception of change that was compatible with mind/body interaction.

Specifically, Kant discussed change in a substance’s internal determinations that is caused by an externally-directed force. As I explain in section 1.4.1, I call this change transeunt internal change. I am specifically concerned in that section with explaining why Kant thought that transeunt internal change could be the cause of bodies’ motion. In section 1.4.2, I compare and contrast Kant’s understanding of internal change with Leibniz’s. This provides the background necessary for a detailed analysis of the argument of section four, a task which occu-

⁵¹ See section 1.2 above.

pies sections 1.4.3, 1.4.4, 1.4.5., and 1.4.6. The last three of these sections are chiefly concerned with Kant's important doctrine that in our world force is exerted gradually, bit by bit over time. I call this doctrine the "*nach und nach* thesis."

I conclude by arguing that although Kant's understanding was weakened by the dogmatism that prevails throughout *Living Forces*, he nonetheless articulated a vision of change that supported a greater range of activity than did either Leibniz or the defenders of the *vis motrix* view. In sections 1.5 and 1.6, I show how Kant parlayed this new account of change and action into a solution to the mind/body problem.

1.4.1 Change is not just change in motion: Kant's account of transeunt internal change

In *Living Forces* section four, Kant discussed the notion of transeunt internal change. Leibniz believed that the only effect of a substance's force was a change in that substance's own internal states. Kant's conception of change was broader than this in two respects: he believed that transeunt or externally-directed force was involved in every change and he believed that force could have external effects including changes of motion. Kant's view was also unlike the *vis motrix* view, which held that force may be transeunt but is always external because forces cause changes in motion only.

As I show in sections 1.5 and 1.6 below, Kant believed that only his conception of transeunt internal change provided the resources for solving the mind/body problem. In this section, I focus on another facet of Kant's discussion of active force in *Living Forces* section four, namely the manner in which his doctrine that in our world active force is exercised in our world as a transeunt or externally-directed force provided him with an explanation of bodies' motion.⁵²

In section 1.2, I explained Kant's criticisms of Leibniz's successors, who identified the force of bodies with *vis motrix*. However, I have not yet answered a basic question: If the effect of force is not always a change of motion, exactly what else can the effect be? Unfortunately, Kant's answer was unsatisfyingly abstract. Leibniz's followers, he argued, went astray by giving a specific definition of force as whatever changes a body's state of rest or motion. Kant posited a broader and more abstract explanation of the effects of force: substance A exerts a force on substance B just in case A's agency changes the inner states or determinations of B. Kant outlined this view in *Living Forces* section four, where he argued specifically that this change provided the sufficient reason for bodies' motions and changes of motion. As I explain in section 1.6 below, this point was

⁵² It is unfortunate that section four was not included in the most readily available partial translation of *Living Forces* into English, Kemp Smith's partial translation in John Handyside's *Kant's Inaugural Dissertation and Early Writings in Space* (Westport, Connecticut: Hyperion Press, 1929).

crucial for Kant's project of showing that a single force could cause both motion in bodies and representations in souls.

Here is how Kant explained his understanding of transeunt internal change and its relation to the motion of bodies:

[1] There is, however, nothing easier than to derive the source of that which we call movement from the general concepts of active force. [2] Substance A, whose force is determined to act outside itself (that is, to change the internal state of other substances), either finds instantly in the first moment of its efforts an object which endures its whole power, or it does not find such an object. [3] If the first happens to all substances, we would know no movement at all and, therefore, we would not give that name to the force of bodies. [4] However, substance A cannot utilize its entire force in the one moment of its effort, it will therefore utilize only a part of its force. [5] However, substance A cannot stay with the remaining part of its force inactive. [6] Rather, it must act with its whole force, for otherwise, if the force were not applied completely, it would not be called a force anymore. [7] Thus because the consequences of this exercise [of force] cannot be experienced in the coexisting state of being of the world, one will have to find them in the second measurement of the world, namely in the successive series of things. [8] Therefore a body will not utilize its force all at once, but rather gradually. [9] However, in the following moments it cannot act into the very same substances on which it initially acted, for these substances endure only the first part of its force. [10] They are not capable of accepting the remaining force. [11] Substance A, therefore, works always continuously into other substances. [12] Substance C, however, which body A manipulates in the second instance must possess against substance A a relation of location and position [different] from substance B, upon which it acted initially right away; otherwise there would be no ground for A's not having acted initially on substance C as it did on B. [13] Even so, all substances on which A acts in the following moments have a different position compared to the first location of the body A. [14] That is to say, A changes its place in that it acts successively. (§4; 1:19)

At the beginning of this passage, Kant adopted what looks like a Leibnizian position: force is measured by its effect, and the effects of force are changes in the “internal states” of substances. Leibniz understood the internal states of monads to be perceptions, and he argued that monadic change occurs when a monad’s essential force changes its own perceptions. Unfortunately, Kant did not explain what he took the internal states of substances to be. If they are perceptions, then his view would have differed from Leibniz’s by affirming genuine interaction: a monad’s perceptions change because it is acted upon by the internal force of *other* monads.

Leibniz argued that God’s harmonization of the monads entails that each substance’s internal “script” is coordinated so that each monad “mirrors” the states of all the rest of the monads. Nothing of the sort went on in Kant’s understanding of internal change, for Kant rejected pre-established harmony and adopted a conception of transeunt force. I stated above that Kant’s account of transeunt internal change was unsatisfyingly abstract. One reason for this was that *Living Forces* provided no textual evidence explaining what Kant meant by internal change. Kant spoke only of abstract “determinations,” and avoided saying more by reminding his audience that a completely abstract definition of

change avoided the pitfalls experienced by Wolff and other supporters who appealed to *vis motrix* as the basis of a specific definition of change.⁵³

1.4.2 Four principles of monadic change

This problem was partially mitigated by Kant's use of several Leibnizian principles of monadic change. It is useful to list these here, even though I won't discuss the textual evidence for them attributing them to Kant until later in this chapter and in Chapter Two. The principles are:

- (A) If partless simples change, this is because their inner states change;
- (B) For this to be possible, there must be inner states that are capable of being determined by some principle of change;
- (C) This principle of change explains why each monad is part of a unified world; and
- (D) Inner monadic change, in accordance with this principle, is the sufficient reason for the existence and motion of bodies in space and time.

I show in section 1.6 below that the notion of internal change (or change in a substance's inner states) was central to Kant's solution to the mind/body problem: Kant believed that if one does not think of change in terms of internal change, then the mind/body problem is insoluble. If all change involved changes

⁵³ See section 1.2.3 above.

in external relations, Kant assumed, change would only involve changes of motion. As I have emphasized throughout this chapter, a central thesis of *Living Forces* was that there are other types of change in addition to change in motion.

It is important also to emphasize the extent to which Kant's conception of internal change was not Leibnizian. In contrast to Leibniz, Kant maintained that the spatiotemporal world constituted a genuine unity and he believed that that bodies and monads are united by the same principle of change. Finally, and as I have already explained, Kant's principle of change, in contrast to Leibniz's, appealed to transeunt force.

1.4.3 The argument of §4

Although he did not define it precisely, Kant's notion of transeunt internal change supported a comprehensive metaphysical explanation of the world. In *Living Forces* section four, Kant specified the relation between abstract inner change and the motion of bodies. Here is my reconstruction of his line of argument:

- (1) The force of a substance is determined by its transeunt effects (see §1; this was a presupposition Kant shared with the defenders of the *vis motrix* view);
- (2) These effects are changes in the inner states of other substances (§4, parenthetical remark to sentence two);
- (3) At the first moment of exertion of force, substance A either exerts all its force at once, or it does not (§4, sentence two);

- (4) There would be no motion if all substances always expended their forces on each other at once (§4, sentence three);
- (5) Since we want to explain motion, we must assume that in our world a substance only utilizes a part of its force at the initial moment of exertion (§4, sentence four);
- (6) A substance must utilize *all* of its force: it must act with all its force and it must have an effect that is commensurate with its force (§1 and §4, sentences five and six);
- (7) The consequences of this exercise of force are experienced by us in the successive series of things, i.e. in time (§4, sentence seven);
- (8) Bodies thus apply their force on other bodies not all at once, but gradually (§4, sentence eight);
- (9) Since each substance that is acted on by a body receives only part of that body's force, a body cannot act on exactly the same substance in subsequent exertions of its force (§4, sentences nine and ten);
- (10) It follows that substance A must exert its force on different substances at different times (§4, sentence eleven);
- (11) There must exist a ground or sufficient reason why substance A exerts its force on particular substances at different moments (§4, sentence twelve);
- (12) The ground for this is that as A acts successively it changes its position; substance A is in motion relative to the substances on which it acts (§4, sentences twelve, thirteen, and fourteen).

My reconstruction captures three striking features of Kant's argument. The first two features relate to Kant's own philosophical beliefs. The first is that, as

the steps one and two demonstrate, Kant used a specific account of active force, namely an account of a transeunt or externally-directed external force. As I have already mentioned, this made Kant's view staunchly anti-Leibnizian, for Leibniz denied the existence of transeunt forces. The second feature concerns Kant's argumentative strategy, which, as step eleven shows, accorded the principle of sufficient reason a central role. This represents an important parallel between the argument of section four and Kant's argument for the principle of succession in the *New Elucidation*.⁵⁴ In each case, Kant applied the principle of sufficient reason to argue that there must exist a sufficient reason why a substance exerts its force on particular substances at different moments.

The third feature captured by my reconstruction concerns a potential problem with Kant's argument: Kant began with claims about substances in general, but he ended by referring to bodies in relative motion in space. Although Kant was committed to the existence of several types of substances, for example material bodies and immaterial souls, his argument appears to have taken little heed of these distinctions. As I suggested in section 1.3.1 above, the most charitable response to this problem is to hold that Kant was merely indifferent to them because he believed that his claims apply equally well to all kinds of sub-

⁵⁴ I discuss this argument in detail in section 2.3.1 below.

stance.⁵⁵ This may be true, but it is a major thesis of this dissertation that Kant's early dualism was unsatisfactory because Kant could not prove that souls did not have the same material nature as the simple constituents of bodies. A less charitable but equally-plausible interpretation of Kant's apparent sloppiness to keep straight claims about different types of substances is that Kant lacked the conceptual resources necessary for drawing all the ontological distinctions that he wanted to draw.⁵⁶

I discuss this problem in Chapter Two. As I explain in detail in section 2.4, despite his clear intention to distinguish between material and immaterial substance, it became difficult for him to avoid the problematic, untenable view that monads and souls are all material in nature. I introduce this difficulty now because it proved so important for the development of the critical philosophy: as I argue in Chapters Three and Four, Kant's recognition of this problem, and his responses to it, prompted him to ask questions that led him to several important critical insights.

⁵⁵ This line is plausible only if one understood what Kant might have meant by referring to the internal states of bodies. I believe that he had the resources to make this clear: following Leibniz, he could have maintained that bodies have distinctly internal states in virtue of the internal spatial relations and motions of their parts. I am grateful to Daniel Warren, who pointed out this possibility to me.

⁵⁶ Another reason—related to this one—concerns a problem with Kant's early ontology: Kant did not specify in what sense or how the monadic realm grounds the realm of bodies.

The focus of this chapter remains understanding exactly what Kant asserted about mind/body interaction in *Living Forces*. To do this, it is essential to understand what Kant asserted in section four about the relationship between change, motion, and temporal succession. As I argue in section 1.6, Kant's reflections on these topics led him directly to his first solution to the mind/body problem.

1.4.4 The “*nach und nach*” thesis: time and the deferment of *vis activa*

Kant thought that his account of a transeunt force that caused inner change could also explain the motion of bodies. As he put it at the start of section four, “There is, however, nothing easier than to derive the source of that which we call movement from the general concept of active force” (§4; 1:19). Namely, as steps three and four summarize, Kant conceived of transeunt internal change as the *source* of motion. Motion exists because substances exert force on each other “*nach und nach*” (§4; 1:19), which in this context means gradually, a little bit at a time. If this were not the case, Kant stated, there would exist no motion.⁵⁷

⁵⁷ In assigning space a phenomenal status, Kant was of course following Leibniz. However, Kant's explanation of this status differed markedly from Leibniz's. A point that I owe to discussion with Hannah Ginsborg and Daniel Warren is that for Leibniz, space had a merely *imaginary* status; space and motion were imaginary manifestations of physical relations of well-founded phenomena. Kant followed Leibniz in thinking that the unity of space and time depends on the unity of the monadic realm, but in contrast to Leibniz he believed that space and time have a genuine unity. Although the details of his position were complex, Kant believed that Leibniz's ultimate ground for assigning space this

By the “*nach und nach* thesis” I mean the claim that our world is one where force is exercised gradually, a little bit at a time. Kant apparently found it obvious that a world where substances expended their force immediately would contain no motion, for he stated this dogmatically. As Kant put it at the end of the first paragraph of section four, if the world were like this, then the exercise of *vis activa* could be explained without our having to “name the force of bodies” or appeal to the concept of motion (§4; 1:19). Thus Kant believed that, to explain motion, we must assume that the *nach und nach* thesis is true or that substances in our world exercise their forces gradually over time.⁵⁸

This idea provided Kant with a novel explanation of the source of motion: motion is the effect of a transeunt internal force that is exercised gradually over time, which is to say that motion is caused by the *deferment* of the exertion of force. If the monadic substances that constitute our world were not able to resist each other’s *vis activa*, the *nach und nach* thesis would not obtain and our world would be motionless. Kant thus held that our world is composed of substances that have both an active and a passive power: every substance exerts force on

status was his doctrine that substances do not act on one another. On Kant’s own account, space and time have a phenomenal status, but this status depends on the fact that substances *do* interact. Although I cannot pursue this topic in depth in this study, I explain one source of this important difference between Kant and Leibniz when I discuss Kant’s notion of composite unity in section 2.1 below. To maintain the focus of this study, I must acknowledge these interesting questions and move on.

⁵⁸ I owe this characterization of Kant’s presupposition that the *nach und nach* thesis holds true in our world to Daniel Warren.

other substances, and each substance resists the force impressed on it by other substances. According to Kant, therefore, the defenders of the *vis motrix* view were right to think that motion is grounded on substances' force, but they erred in thinking that the exercise of force cannot cause anything else besides motion.⁵⁹

⁵⁹ Kant's pre-critical distinction between exerting and suffering *vis viva* was a model for his critical distinction between receptivity and spontaneity. This connection is made clear in the lectures on metaphysics. In the *Metaphysik Mrongovius* (1782-3), substances are portrayed as simultaneously active (in that they can exert their "power" in a way that changes the inner determinations or the outer relations of other substances) and passive (in that they suffer the power of other substances): "The possibility of acting is a faculty, and of suffering receptivity....Every substance is self-active, otherwise it could not be substance; it can be suffering in one relation, but can also be active..." (29:823). As in *Living Forces*, Kant held that all substances exist in an interactive community characterized by the "transeunt action" of externally-directed force (29:823). Similar statements are found throughout the lectures; for example, according to the *Metaphysik Dohna* (1792-3), he stated that "real connection is reciprocal influence (acting and suffering)" and "a multitude of substances without real connection makes no world" (28:657).

Of course, Kant's critical understanding of what it means for a substance to exert, suffer, or resist power differed considerably from his account in *Living Forces*. Most notably, the notion of *vis activa* dropped out of his discussion of substances' power. Instead, he appealed to the results of "natural science," which provide one with "good reason to regard the attractive and repelling powers as primitive powers" (29:821) and he adopted a skeptical attitude towards cognition of substances' inner states. What Kant retained was a model of the action of substances in an interactive community that appealed to substances' externally-directed forces, the exertion and suffering of which determined their inner determinations and outer relations. A work from late in the pre-critical period, the *Metaphysik Herder* (1762-64), stressed that "if two substances effect one another reciprocally" then one substance suffers change "*not merely by its own but rather also by external power*" (28:52).

1.4.5 A speculative defense of the *nach und nach* thesis

I have said that Kant assumed that the *nach und nach* thesis obtains because his aim was to explain the source of motion. In this section, I speculate about whether Kant had any other reasons for thinking that the *nach und nach* thesis obtains. I concentrate on two ideas, namely (1) that a body must act with all its force and (2) that the thing it acts upon is capable of being acted on just so much and no more. The first idea came from Kant's presupposition that a force is measured through its effects: it makes no sense to attribute to a substance a force that *never* has an effect. The second point was an assumption that Kant made about bodies: they can suffer or endure only so much change.

As I have explained it so far, the argument of section four shows only that, a substance cannot exert all of its force all at once *on one other substance* if that substance is to be thought of as the ground of motion. Could not such a substance exert all its force at one moment, namely by exerting some portion of it on a number of different substances? If the universe only contained two substances, then from this Kant would be entitled to conclude that, if substance A cannot exert all its force at once, then it must exert its force at some later time. However, consider the case of a world with three substances such that substances B and C could each endure exactly one-half of substance A's force. In this case, could not A exert all its force at the first moment, namely by acting *simultaneously* on B and C? Since we possess clear criteria for distinguishing one substance from

another (namely, their internal states), there seems no conceptual problem with the notion of a substance acting at the same time on two or more separate substances. However, in this case B could not endure any force exerted by C and, likewise, C could not endure any force exerted by B. It would follow that B and C would have to exert their force on substance A, and that they would be able to exert their force at the first moment only if substance A could endure the entire quantity of each of their forces. This would happen, for example, if substances B and C possessed relatively little *vis activa* or if substance A was able to endure relatively great amounts of this force.

It is hard to know what Kant would have described this seemingly empirical claim about the ratio of the quantity of force to the ability to suffer change. Unfortunately, he said almost nothing about the crucial notion of a substance's inability to endure unlimited quantities of *vis activa*. Perhaps Kant assumed that each substance would "repulse" enough *vis activa* to require successive exertion of force. This would be guaranteed if the ratio of total quantity of force there is to be exerted to force endured were high enough: for example, substances would necessarily exert their force over time if it were the case that a substance that could endure one unit of *vis activa* at a single moment had two units to expend. Although Kant could not prove this directly, he surely considered the existence of movement in our world sufficient reason for concluding that our world must be such that substances express their force over time.

However, even this was far from what Kant required. He asserted that, after the initial moment where A acted on B, at the next moment A goes on to exert its force on *another* substance, substance C. This is strange, because could not substance A exert its force on B bit by bit over time? At the very least it seems plausible to suppose that B might be able to endure more of A's force at a later time. Although Kant did not discuss this possibility, he might have argued like this:

(6) A substance must utilize *all* of its force;

(6') When substance A exerts part of its force on substance B, the remaining force is active (and not just potential);⁶⁰

(6'') This remaining force is not all exerted on other substances at the same time: the effects of this additional force are experienced not in the coexistent states of the world, but in the "successive series of things" (§4; 1:19);

(6''') From 6', at the very next moment the remaining force of A is active.

To say that substance B has endured as much *vis activa* as it is capable of enduring seems to entail that some time must pass before it can endure any more force. If at *the very next moment* B could endure more force, then it simply seems wrong to say that at the first moment B could have endured no more. If Kant were to assume that B could recover the ability to endure more force only at

⁶⁰ Kant wrote: "Substance A...works *always continuously* into other substances" (§4; 1:19; emphasis added).

some later moment, then step 6' would give him what he needed: If there is no time when substance A is not active, then at the very next moment, when substance B is incapable of enduring more force, A must exert its remaining force on some substance other than B.

1.4.6 From the *nach und nach* thesis to motion—and a host of problems

This argument would have provided Kant with an explanation of the real possibility of the existence of motion in our world: the ground of the real possibility of motion is the fact that the *nach und nach* thesis obtains in our world. Unfortunately, Kant did not provide many details about how this argument was supposed to go.

Thus far I have shown why Kant may have believed that substance A could not expend all its force on substance B and why, at the very next moment, it would move on to exert its force on substance C. It is important to recognize that this “movement” occurs at the metaphysical level and is analogous to motion but is not literally motion: all Kant has shown is that, after acting on B, A subsequently acts on C.⁶¹ Kant asserted dogmatically that substance A would possess

⁶¹ At least one astute reader of *Living Forces* failed to draw this distinction. Of the very few critics who mention *Living Forces*, most pass over section four. An exception is Susan Meld Shell, who devotes the second chapter of *The Embodiment of Reason: Kant on Spirit, Generation, and Community* (Chicago: Chicago University Press, 1996) to *Living Forces*. Unfortunately, Shell's brief analysis of section four conflates the metaphorical “moving on” from B to C with A's literal motion.

a different “relation of location and position” with respect to substance B and with respect to substance C (§4; 1:19). Kant used step eleven to move from this to conclusions about motion:

(11) There must exist a ground or sufficient reason why substance A exerts its force on particular substances at different moments;

Kant asserted that the only possible ground is that A is in motion relative to B and C or, as he put it, “A changes its place in that it acts successively” (§4; 1:19).

There are several reasons why Kant’s claim is hard to understand. Kant’s provided little detailed argument, and, on the face of it, the leap from successive action to motion is a non-sequitur of considerable grossness.

Consider Kant’s perplexing argument that A cannot bear *exactly* the same spatial relationships to substances B and to C.

(11) There must exist a ground or sufficient reason why substance A exerts its force on particular substances at different moments;

(11’) If A bore the same relationship of position and location to B and to C, then there would be no reason why A would not act on those substances simultaneously, not successively; and

(11”) Therefore, if A acts successively on B and C, then A must bear different relationships of position to B and C.

At the first moment of exertion of force, A bore a certain relationship of position and location to B. Although Kant gave no specific examples of the relations he

had in mind, he asserted that they provide a ground or sufficient reason why A acted on B at that moment. If C bore exactly the same relations to A, then “there would be no ground for A’s not having acted initially on substance C as it did on B” (§4; 1:19). Applied to *bodies*, this argument seems perfectly reasonable. As I show in Chapter Two, Kant believed that bodies possessed two primary forces, a force of attraction and a force of repulsion, the intensity of each of which varied according to distance. Suppose that, at a certain time, a body A exerted an attractive force on two other bodies, B and C. Since the intensity of the attractive force varies with distance, if B and C were the same distance from A, then A would exert the same degree of attractive force on both bodies. Indeed, if distance determines the intensity of force, then the only reason why A could exert different degrees of attractive force on B and C would be that B and C were *not* the same distance from A. Suppose further that body A initially exerted five units of attractive force on body B and one unit of force on body C, and that at a subsequent time A exerted one unit of force on B and five units of force on C. This would imply that A was in motion relative to B and C: A would have moved away from B and toward C.

The argument of section four was organized around two distinct claims. According to the *nach und nach* thesis, the real possibilities of space and spatial relation are grounded on our world being one where *substance* A is unable to exert all its force on substance B. Later in the argument, Kant spoke of *body* A,

and he made claims about motion that make sense only if force follows the model of the attractive and repulsive forces of bodies. Unfortunately, these two claims appear to be inconsistent: on the physical force model of universal attraction, all things continually act on each other and it is never the case that one thing can no longer endure another's force.

Kant provided a few hints for unraveling these confusions. In the next two sections, I examine two important arguments that Kant made about the relationship between substances' *vis activa* and bodies' physical force. The first, which maintained that all substances are in space, is an application of Kant's conclusions about motion in section four. The second drew upon the first as well as on the *nach und nach* thesis. This argument contained Kant's proposed solution to the mind/body problem.⁶²

I address these points in sections 1.5 and 1.6. First, however, I close section 1.4 with some general reflections on the argument of *Living Forces* section four. Earlier I argued that Kant's argument for physical influx had two main weaknesses: Kant had no response to occasionalism and his discussion of pre-established harmony may not have excluded the possibility that physical influx is true of bodies but not of monads. Kant's project of explaining real possibility was

⁶² The second argument occurs first in the text. However, because Kant's solution to the mind/body problem presupposes that all souls are in space, it is convenient to comment on it after examining Kant's argument that all substances are in space.

also incomplete, for he never attempted to explain the real possibility of interaction. Since his accounts of change, force, motion, and time all presupposed interaction, this omission limited the philosophical depth that Kant could reach in *Living Forces*. Fortunately, Kant addressed many of these problems in subsequent works. For example, just as the metaphysical principle of succession bolstered Kant's defense of physical influx (see above section 1.3.2), the principle of coexistence was meant to demonstrate the real possibility of interaction.⁶³ In Chapter Two, I examine the fruit that Kant's first work bore in the 1750s.

Living Forces was a dogmatic text based on incomplete philosophical project. Nonetheless, Kant's first publication was an important work, both because it set forth large elements of Kant's pre-critical metaphysical system and because—as I show in Chapters Two, Three, and Four—here for the first time Kant raised issues and problems that set him on the path towards the critical philosophy. Under no illusions that Kant's first work was complete or tenable on its own, in the remainder of this chapter I will sketch out as clearly as possible the

⁶³ I thus disagree strongly with Paul Guyer's and Allan Wood's interpretation of the principle of coexistence as a dogmatic "retention of Leibnizian theory." This view is mistaken on two counts: First, Kant used the principle of coexistence to *strengthen* his anti-Leibnizian argument. Second, Kant used it not dogmatically, but rather to counter dogmatic assumptions that real interaction is possible. For Guyer's and Wood's views see their introduction to their translation of the *Critique of Pure Reason* (Cambridge: Cambridge University Press, 1988), pp. 27-28.

remainder of Kant's metaphysical vision, with the goal of making understandable its most important element, Kant's first solution to the mind/body problem.

1.5 First application of Kant's account of *vis activa*: All substances in our world are in space (*Living Forces*, part I, §§7-8)

In this section, I connect Kant's notion of transeunt inner change with his explanation of the unity of our world. It followed from the argument of *Living Forces* section four, I maintain, that our world is unified *spatially*. From the specific manner in which the *nach und nach* thesis is realized in our world, two important conclusions followed. The first conclusion was that all of the substances in our world are located in space. The second was that each substance possesses an attractive force that attracts all other substances in accordance with Newton's inverse square law of universal gravitation. As I discuss in greater depth in Chapter Two, Kant conceived of gravity as the omnipresent force that unifies our world.⁶⁴ Here I focus on the first claim, that every substance in our world exists in space. This section is divided into three sub-sections. In sections 1.5.1 and 1.5.2, I discuss Kant's general metaphysical understanding of worlds. Section 1.5.2 also addresses Kant's specific account of the unity of our world, an account that I use in section 1.5.3 to show how the argument of *Living Forces*

⁶⁴ See section 2.3 below.

section four can be extended to show that all the substances in our world have a spatial location.

1.5.1 Kant's definition of a world

In *Living Forces* sections seven and eight, Kant affirmed the possibility of a plurality of actual worlds. He defined a world as a whole that is not a part of anything else. A world is not itself a substance, but rather is a composite of the substances that constitute its parts. These parts compose a genuine unity in virtue of the way that they relate to each other. Specifically, a world is unified in virtue of the principle of influx that specifies the manner that substances can act on each other. As many actual worlds are possible as are principles of influx; Kant concluded "it is actually possible that God has created many millions of worlds" (§8; 1:22). Each world would consist of a set of substances that are connected together by a different type of influx. Kant sometimes called this type or principle of influx the form or schema of a world.⁶⁵

1.5.2 The varieties of worlds

Kant conceived of two broad categories or types of worlds, each of which contained a different type of substance. First, a world may contain just one sub-

⁶⁵ I discuss Kant's notion of the divine schema of a world at length in Chapter Two.

stance, namely a solitary substances that is capable of interacting with nothing else. This is the limiting case: a solitary world has a form that makes *impossible* any influx. Second, there are worlds that contain several finite substances, all of which interact with each other in virtue of a principle of influx. In these populous worlds the *nach und nach* doctrine either holds true, in which case the world contains motion, or it does not, in which case the world is static and, Kant suggested, is not a spatial world.⁶⁶ That our world contains motion implies that it is a world of the second type whose form or schema involves a principle of influx that causes *vis activa* to be expended successively.

Worlds, for Kant, denoted limits of interaction: no substance in one world can interact with a substance in another world. Solitary substances are, by the nature of the schema of their worlds, incapable of interacting with anything else. Nor can substances in two populous worlds interact: if two worlds' principles of influx permitted inter-world action, then the worlds would each be parts of a greater unity, not wholes that are parts of nothing else. It follows that each of the spatiotemporal worlds is unified by a schema that allows its substances to interact with each other but not with the substances in any other world.

⁶⁶ Although Kant's views of the dependence of spatiality on the *nach und nach* thesis are extremely difficult and interesting, a detailed examination of them falls outside the scope of this study.

Kant maintained that each populous world where the *nach und nach* thesis obtains would have a different type of spatiality. The schema of our world, he believed, is such that in it the *nach und nach* thesis is realized in a way that causes the substances in it to interact in a three dimensional space where Newton's inverse square law of universal attraction holds true. It is just because our world is one where substances act outside themselves *in a certain way* that our world has these features. Our world is *not* unified with the substances in other worlds precisely because those substances possess different forces and exist in a different type of space. In those other worlds, the specific nature of substances' exertion of *vis activa* makes possible different types of interaction and spatiality.⁶⁷

⁶⁷ Kant developed these points later in *Living Forces*. Although he admitted that "the ground of the threefold dimension of space [in our world] is still unknown" (§9; 1:23), he concluded that "it is probable that the threefold dimension of space is due to the law according to which the forces in substances act upon one another" (§10; 1:24). Namely, Kant believed that the likely explanation for the space of our world being three dimensional is that in our world the *nach und nach* thesis is realized in a way that entails the inverse square law of gravitation: "the threefold dimension seems to arise from the fact that substances in the existing world so act upon one another that the strength of the action holds inversely as the square of the distances" (§10; 1:24). The implausibility of Kant's sketchy speculations is not important here. What matters is the general principle upon which those speculations were based, namely that God could create worlds with different types of interaction and, consequently, different types of spatiality. Here is Kant's clearest statement of this position:

I hold that substances in the existing world, of which we are a part, have essential forces of such a kind that in union with one another they extend the sphere of their actions according to the inverse square of their distances; secondly, that owing to this law the whole which thence arises has the property of threefold dimension; thirdly, that *this law is arbitrary, and that God could have chosen another*, for instance the inverse three-

1.5.3 The argument of §4 extended

Recall the argument of section four:

- (1) The force of a substance is determined by its external effects;
- (2) These effects are changes in the inner states of other substances;
- (3) At the first moment of exertion of force, substance A either exerts all its force at once, or it does not;
- (4) There would be no motion if all substances always expended their forces on each other at once;
- (5) Since we want to explain motion, we must assume that in our world a substance only utilizes a part of its force at the initial moment of exertion;
- (6) A substance must utilize *all* of its force: it must act with all its force and it must have an effect that is commensurate with its force;

fold relation; and lastly, that *from a different law an extension with other properties and dimensions would have arisen*. A science of all those possible kinds of space would undoubtedly be the highest enterprise that a finite understanding could undertake in the field of geometry. (§10; 1:22)

Kant's discussion contained an interesting anticipation of his critical doctrine that space and time are forms of intuition. In *Living Forces* he argued that there is a special fit between our specific mental constitution, our knowledge of the world, and our world's divine schema. In *Living Forces* section twelve, Kant wrote:

The impossibility which we observe in ourselves, of representing a space of more than three dimensions seems to me to be due to the fact that our soul receives impressions from without according to the law of the inverse square of the distances, and because its nature is so constituted that it not only suffers, but also acts outside itself in this way. (§12; 1:24-25)

- (7) The consequences of this exercise of force are experienced by us in the successive series of things, i.e. in time;
- (8) Bodies thus apply their force on other bodies not all at once, but gradually;
- (9) Since each substance that is acted on by a body receives only part of that body's force, a body cannot act on exactly the same substance in subsequent exertions of its force;
- (10) It follows that substance A must exert its force on different substances at different times;
- (11) There must exist a ground or sufficient reason why substance A exerts its force on particular substances at different moments;
- (12) The ground for this is that as A acts successively it changes its position; substance A is in motion relative to the substances on which it acts.

Kant's discussion of worlds in sections seven and eight of *Living Forces* allowed him to conclude that in worlds where the *nach und nach* thesis obtains, all substances—material and immaterial—are located in space:

- (13) A substance exists in a certain world just in case it is capable of interacting with the other substances in that world (§7);
- (14) In a world where *vis activa* is exerted successively, external relations of this kind entail a spatial location (§8);
- (15) Since our world is one where *vis activa* is exerted successively, it follows that *all* the substances in our world are located in space.

Step thirteen followed from Kant's definition of a world. Kant took himself to have shown in section four that, in each world where the *nach und nach* thesis obtains, the world's schema or form is such that its substances interact via an influx that puts them in spatial relation to each other. To show that all the substances in our world are located in space, Kant required two things: (1) knowledge that our world is one where the *nach und nach* thesis obtains, and (2) an argument that the *nach und nach* thesis entails that substances bear spatial relations to each other. The first point Kant considered inductively proven by everyday experience.⁶⁸ The second Kant considered himself to have demonstrated in section four. Kant concluded that the ground or sufficient reason why substance A exerts its force on substances B and C at different moments is that that A bears different relations of position and location to those substances. Since the *nach und nach* thesis requires interaction to be successive, this conclusion guarantees that *nach und nach* worlds are spatial, i.e. are worlds composed of substances that bear spatial relations to one another. Thus all the substances in our world are located in space.

The crucial point for the purposes of this work is that Kant applied this conclusion to *all* the substances in our world, material and immaterial alike. In

⁶⁸ Whether or not Kant is entitled to claim this I have already discussed above; see section 1.4.4 above.

particular, souls, which he considered immaterial substances, are located in space. This proved crucial to Kant's proposed solution to the mind/body problem.

1.6 Second application of Kant's account of *vis activa*: Kant's first solution to the mind/body problem (*Living Forces*, part 1, §§5-6)

In this section, I present and evaluate Kant's first solution to the mind/body problem. In section 1.6.1, I argue that Kant understood the traditional mind/body problem to presuppose several false interrelated assumptions, namely that bodies' force is *vis motrix*, that bodies act only by causing changes of motion, that bodies can be acted upon only by being moved, and that souls and bodies do not share a common force. In sections 1.6.2 and 1.6.3, I discuss why Kant believed that the *vis motrix* view was incompatible with mind/body interaction; these subsections address, respectively, the difficulties with matter acting on mind and the difficulties with mind acting on matter.

In section 1.6.4, I discuss Kant's own solution to the mind/body problem. I argue that his account of mind/body interaction can be understood as an application of his account of transeunt inner change. In accordance with the divine schema of our world, both souls and bodies possess a *vis activa* that is exerted successively (see section 1.4 above), and that has as its effect both the production of motion in bodies and the production of representations in souls. This follows because a condition of being in our world is being located in space, and a

substance can be in space only if it is capable of acting on and being acted upon by every other substance in the world.

On Kant's account, a soul is capable of causing a body to move by changing the inner states of the monadic substances of which the body is composed and a body is capable of causing representations in a soul by changing its inner states. In section 1.6.5, I criticize Kant's argument for being dogmatic, for failing to exclude the possibility of an objectionable hylozoism, and for presupposing a metaphysical dualism that is extremely difficult to understand. This last problem is the chief topic of Chapters Three and Four. To summarize one argument I make in Chapter Two, if, as I argued in section 1.5 above, Kant's understanding of the divine schema of our world entails that each substance in our world continually exerts an attractive force on every other substance, then there is reason to worry that souls are the same type of simple substances as the monadic constituents of bodies. Although this conclusion would seemingly strengthen Kant's claim that souls and bodies are capable of interaction, I argue in Chapters Two and Three that it contradicts one of Kant's specific doctrines about mind/body interaction and that the view amounted to an odd and possibly objectionable form of materialism, according to which souls are not matter but are of a material nature.⁶⁹

⁶⁹ See section 2.4 below.

1.6.1 Kant's understanding of the mind/body problem in 1747

Kant conceived of the mind/body problem as a series of related difficulties with understanding how souls can act on bodies and how bodies can act on souls. In each case, Kant argued, the difficulties arise only if one assumes that *vis activa* is *vis motrix*. He titled *Living Forces* sections five and six "the difficulties regarding the action of body and soul which arise from the view that body has no other force than *vis motrix*" (§5; 1:19-20) and "the difficulty which similarly arises regarding the action of soul upon body, and how through the introduction of *vis activa* it can be removed" (§6; 1:20). The first paragraph of section six demonstrates how Kant approached the mind/body problem:

We meet with a difficulty when the question is raised how the soul is capable of setting matter in motion. Both this and the above difficulties [regarding the action of the body on the soul] vanish, and considerable light is cast upon the nature of physical influence, when the force of matter is viewed not in terms of motion but in terms of those effects in other substances which we are not in a position to define more precisely. For the question whether the soul can cause motions, that is, whether it has a moving force, now takes the altered form, whether its essential force can be determined to an outwardly directed action, that is, whether it is capable of acting on other beings outside itself, and so of producing changes in them. (§6; 1:20)

Kant maintained that the alleged difficulties with mind/body interaction all share several false assumptions: that bodies possess *vis motrix* only, that a body can act only by causing motions in itself or something else, that a body can be acted upon only by being moved, and that the moving force of bodies is alien to what-

ever type of force immaterial substances possess. These assumptions generated two main difficulties for understanding mind/body interaction. First, if a body can act only by exerting *vis motrix*, then a body can act on a soul only if it can cause the soul to move. But, Kant objected, such an explanation would do nothing to explain the characteristic effect of matter on the soul, namely the production of representations. If bodily force is a moving force, he concluded, the body's power to produce mental representations is an unfathomable mystery. The second problem is closely related to the first. If bodies can be acted upon only by being caused to move, then the assumption that the essential force of the soul is not *vis motrix* (but some unknown power) provided no basis for explaining how souls could act on bodies. For these reasons, he concluded, the *vis motrix* view entails that the nature and possibility of the mind's action on the body are hermetic puzzles that philosophy will never crack.

Kant believed that the traditional conception of the mind/body problem was wrong on all counts. He believed, first, that both main assumptions were false and, second, that applying his account of *vis activa* could dissolve all of the alleged problems with the action of the mind on the body and the action of the body on the mind. In a slogan, Kant believed that the crucial question was not whether bodies and souls can move each other, but rather was whether each

can affect transeunt internal change on the other.⁷⁰

1.6.2 The difficulties with matter acting on mind

If the *vis motrix* view were true, Kant admitted, it is indeed mysterious how "matter can be capable...of generating representations in the soul of man" (§5; 1:20). Here is how he put the problem:

What, it is claimed, can matter do beyond causing motions? All its force can at most result merely in displacing the soul from its position in space. How is it possible that the force, which can only give rise to motions, should generate representations and ideas? The latter being things of so entirely different an order from motions, it is not conceivable that they should have their origin in a force of that description. (§5; 1:20)⁷¹

⁷⁰ Kant's approach was different in the critical period, and yet his solution was in some respects similar. In 1787, in the Conclusion to the Solution of the Psychological Paralogism of the second edition of the *Critique of Pure Reason*, Kant gave this characterization of the mind/body problem:

The difficulty presented by this problem consists, as it is well known, in the presumed difference in kind between the object of inner sense (the soul) and the object of outer sense, since to the former only time pertains as the formal condition of its intuition, while to the latter space pertains also. (B427)

Although he cast the problem in terms of the critical discussion of inner and outer sense, Kant's solution hearkened back to his pre-critical position: it is possible, he argued, that mind and body are appearances of the same substance and hence that mind/body interaction is no more difficult to explain than body/body interaction. In the second edition of the *Critique of Pure Reason* Kant argued that the mind/body problem can be solved if one understands "how a community of substances is possible at all" (B428).

⁷¹ In his notes to the *Metaphysik Herder* (1762-64), Gerhard Lehmann refers to Berkeley's objection to matter generating mental representations. One of Berkeley's last

If the *vis motrix* view was correct, then motion would be the only effect that matter could cause. Kant found it is "paradoxical" to think that something that can cause motions only could "impress certain representations and images on the soul" (6; 1:21). To think that motion could do this, Kant judged, was an inconceivable non sequitur.

Of course, Kant himself denied that motion is the only effect of the exertion of a body's force. As I have shown in sections 1.2 through 1.4 above, he believed that the primary or essential effect of force was change in a substance's inner states. To be sure, he also maintained that motion *may* be a secondary effect of the exertion of *vis activa*; this is the case in those worlds—including our own—whose schema or form determines that *vis activa* is exerted successively. However, even in worlds where the *nach und nach* thesis holds true, Kant's position was that matter can exert force without causing any motion, which was what his prized but obscure example of a sphere resting on a table was meant to demonstrate.⁷²

works, *Siris: A Change of Philosophical Reflexion and Inquiries Concerning the Virtues of Tar-water* (1744), was translated and published in Germany in 1745. Berkeley concluded that ".all phenomena are, to speak truly, appearances in the soul or mind; and it hath never been explained, nor can it be explained, how external bodies, figures, and motions should produce an appearance in the mind" (Lehmann's notes to 28:42). Lehmann's note is cited in Karl Ameriks' edition of the *Lectures on Metaphysics* (Cambridge, Cambridge University Press, 1997), p. 553.

⁷² See section 1.4.4 above.

1.6.3 The difficulties with mind acting on matter

Kant held a similar attitude about the alleged mystery of the mind's action on the body. If the *vis motrix* view is correct, then the action of the mind on matter is just as mysterious as the action of matter on mind. On the *vis motrix* view, the mind could act on matter only if it could cause the body to move, but once again this seems impossible because immaterial substances are "things of so entirely different an order from motions" (§5; 1:20).

However, as I have already shown, Kant denied that matter can only be acted upon by being moved. According to his monadism, matter is composed of monadic or simple substances. Matter changes, Kant concluded, when and only when a monad's internal states are changed by another monad's *vis activa*. As he argued in *Living Forces* section four, the motion that we sometimes observe accompanying change is a secondary phenomena that arises when *vis activa* is exerted gradually over time. Kant believed that the mind/body problem is dissolved "when the force of matter is viewed not in terms of motion but in terms of those effects in other substances that we are not in a position to define more precisely" (§6; 1:21). Indeed, it was precisely by attempting to define Leibniz's notion of *vis activa* more precisely that Leibniz's successors generated the diffi-

culties with understanding force, action, change, and mind/body interaction.⁷³

Kant's own notion of transeunt inner change was designed to turn away from the *vis motrix* view and recapture the philosophical utility of a *vis activa* whose activity is understood—in a general sense only—to cause change in a substance's inner states.⁷⁴

1.6.4 Kant's solution

I have explained Kant's strategy for solving the mind/body problem, but have not yet evaluated the details of his solution. Uppermost among the questions about Kant's solution are whether his account of *vis activa* and transeunt inner change could really account for the body's capacity to cause representations in the mind and explain the real possibility of matter being acted on by an immaterial substance. Kant's line of reasoning continued the extended argument of the opening sections of *Living Forces*:

(16) It follows from steps 1-15, that the source of motion is not a moving force;

(17) Likewise, physical influence does not have its origin in moving forces;

(18) Physical influence, rather, has its source in the external effects of *vis activa*;

⁷³ See section 1.2 above.

⁷⁴ See section 1.4 above.

- (19) The mind/body problem has its source in the mistaken belief that bodies have an essential moving force that is of a different order from whatever force spiritual substances possess;
- (20) Since all substances in our world possess *vis activa* that is exerted in accordance with our world's schema, the problem of causal interaction between minds and bodies is to be solved in precisely the same way as the problem of causal interaction between bodies;
- (21) Namely, the possibility of causal interaction between minds and bodies will be proven if one can show that souls, like bodies, are capable of acting on and being acted upon by things outside themselves;
- (22) Since each substance in our world is present in space (step 15), it follows that each soul is present in space;
- (23) Since a necessary condition of being present in space is acting outside oneself (steps 13 and 14), it follows that the soul is capable of acting on things outside itself;
- (24) Indeed, since both bodies and souls are present in space, it follows that, in accordance with the schema of our world, each type of substance must be capable of changing the inner states of the other type;
- (25) Since the motion of bodies is a secondary effect of changes of this sort, it follows that a soul is capable of causing a body to move by changing the inner states of the monadic substances of which that body is composed; and
- (26) Since each soul is a monad whose inner state is "the compound of all its representations" (§6; 1:21), it follows that a body's capacity to change the inner state of a soul implies a capacity to cause representations in that soul.

Kant argued that the real possibility of interaction between our bodies and our souls is guaranteed by the way that, in accordance with the divine schema, the *nach und nach* thesis holds true in our world. Kant's argument rests on two claims. Against the *vis motrix* view, Kant argued, it is possible for bodies to act without causing motion, and it is possible for bodies to be acted upon without being caused to move. Kant's example of a sphere sitting on a table provided him with a concrete model of this: the sphere acts on the table in a way that involves no motion, for the weight of the sphere presses down on the table even when the sphere is at rest. Kant's deep point about change was that this case is no different from those where change is accompanied by motion: at the most fundamental level, *all* change is change in a monadic substance's inner state. When the internal states of the monadic constituents of a body change in this manner, the body often moves, although, as the sphere example was meant to demonstrate, this is not always the case. Thus there is no mystery about how an immaterial soul could cause a body to change motion: like all the other cases of action in our world, a soul acts on a body by exerting its *vis activa* in a manner that causes transeunt inner change in the bodies' constituent monads.

The possibility of a body acting on a soul can of course be explained in exactly the same manner: a body acts on a soul by exerting *vis activa* on the soul in a manner that causes the souls to undergo transeunt inner change. Kant's solution gave him what he thought he needed to explain specifically why it is possi-

ble for bodies to act on souls in a way that causes changes in souls' *representations*. Unfortunately, his argument dogmatically presupposed that "the whole inner state of a soul" is nothing but a manifold of representation (§6; 1:21).⁷⁵ Although rationalist metaphysicians had long held similar views, Kant did nothing to defend or explain this claim. He could perhaps be excused for not defending a philosophical commonplace of his time, but in this case his silence vexes contemporary interpreters.

1.6.5 More problems: hylozoism, dogmatism, an unproven dualism

One problem is understanding how Kant distinguished the monads out of which bodies are composed from the monads that are identical with souls. Was his view that the inner states of the former—what he later called “physical monads”—consisted of manifolds of representations? If so, Kant would be hard pressed to avoid the hylozoism he criticized in Leibniz.⁷⁶ However, if the inner states of certain monads were *not* manifolds of representation, would not this require him to justify his claim that the inner state of each soul is simply "the compound of all its representations" (§6; 1:21)? By design, Kant's conception of mo-

⁷⁵ Kant speaks of the *Zusammenfassung* of representations (§6; 1:21).

⁷⁶ Among other places (including the well-known passage in the Amphiboly of the Concepts of Reflection section of the *Critique of Pure Reason*, A266/B322), Kant criticized Leibniz on this ground in the Foreword to *Living Forces*, Ak. 1:8-16.

nadic inner change was bereft of specificity – he described this change as causing "effects in other substances that we are not in a position to define more precisely" (§6; 1:21). Unfortunately, Kant's account of monads themselves was similarly imprecise, an imprecision that would eventually prove fatal to the system of metaphysics he developed in the 1740s, 1750s, and early 1760s.⁷⁷

Just as Kant's defense of physical influx was marred by his failure to refute occasionalism, so too his monadism required defense against hylozoism. As I show in the next chapter, the problems multiplied after Kant attempted to address these problems. I argue in Chapter Two that the principles of Kant's physical monadology left him with no resources for proving that souls are not physical monads. As my reconstruction of Kant's argument in *Living Forces* shows, however, Kant was firmly committed to metaphysical dualism, and he remained so throughout the 1750s and 1760s. By the late 1770s, avoiding this problem caused Kant to abandon his assumption that souls are substances—and with this most of the rest of his earliest system of metaphysics. The lessons Kant learned proved important indeed: in Chapter Four, I show how, in the mid-1770s, important elements of the critical philosophy began to emerge from the wreckage of Kant's ambitious metaphysical vision of *Living Forces*.

⁷⁷ I discuss this in chapters Three and Four below.