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Hegel's Theory of Measure

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That is "measured" in which [quality and quantity] are so unified that neither can be altered without altering the other.¹

Introduction

This article explores the theory of Measure² that is set forth in the seventh through ninth chapters of Hegel's monumental *Science of Logic*.³ Measure is the third and last province in the kingdom of Quality, which itself comprises the first third kingdom in the empire of the *Science of Logic*. When Measure concludes, we will have arrived at the portal of the negative, correlative underworld of shadowy Essence.

Hegel proclaims the development of Measure to be "extremely difficult,"⁴ (331) and many commentators have

¹ G.R.G. MURE, *THE PHILOSOPHY OF HEGEL* 116 (1965).

² Capitalization loosely signifies that the term in question has an official place in Hegel's Logic. Pictographic diagrams for every step of the Logic (through the end of Measure) can be found in the appendix. The beginning of the appendix describes how these diagrams are to be read.

³ All numbers in parentheses refer to page numbers from GEORG W.F. HEGEL, *HEGEL'S SCIENCE OF LOGIC* (A.V. Miller trans. 1969). Volume number and page numbers in brackets refer to G. W.F. HEGEL, *WISSENSCHAFT DER LOGIK* (1975) I have also omitted ellipses at the end of any quoted phrase. An ellipsis signals that a sentence does not end with the quoted words. Hegel's sentences, however, never end, and so ellipses convey no useful information.

⁴ "[E]ine der schwierigsten Materien." [1: 340] This has been found "a particularly significant observation, since such modesty is not often encountered in his writings." Louik Fleischhacker, *Hegel on Mathematics and Experimental Science*, in *HEGEL AND NEWTONIANISM* 209, 213 (Michael John Petry ed., 1993). Cinzia Ferrini finds in this remark, added to the 1831 version of the *Science of Logic*, a complex story involving Hegel's renunciation of his notorious early dissertation, *De Orbitis Planetarum*, where he deduced from Logic the existence of seven planets. Ferrini notes that Hegel simply renounced this conclusion in the 1817 "Heidelberg" Encyclopedia, and then omitted the renunciation in the later Berlin editions. The Heidelberg version was based on a "single" transition from Quality to Quantity, and a "single" transition back. In this single transition, only vanishing was emphasized. Hence, Hegel could flatly renounce *De Orbitis*. But in the 1827 and 1830 Berlin editions of the *Encyclopaedia*, Hegel realized that there was a "double" transition, which I have described at the end of chapter 6. In the double transition, each side of the syllogism vanishes and sustains itself. This leads Hegel to withdraw his renunciation of his earlier work, since empirical quanta are not entirely unrelated to Logic. Cinzia Ferrini, *Framing Hypotheses: Numbers in Nature and the Logic of Measure in the Development of Hegel's System*, in *HEGEL AND THE PHILOSOPHY OF NATURE* 283 (Stephen Houlgate ed., 1998) [hereinafter cited as Ferrini, *Framing*]; Cinzia Ferrini, *Logica e filosofia della natura*

concurrent.⁵ We can nevertheless describe the theme of Measure easily enough--change; more precisely, an exploration of the difference between qualitative and quantitative change.

Change has itself *changed* over our journey. At first, change was *transition*. Being became Nothing. Determinate Being became Negation. The Finite ceased to be. Starting with the True Infinite, however, change itself changed. The True Infinite did not cease to be. It stayed what it was even while it became something different. This was the beginning of *ideality*. In the True Infinite, immediate Being ceased to be *and* preserved itself in an idealized form.

WHen Being ceased to be (while surviving as the mere memory of immediacy), we entered the realm of Quantity, which was Being with all its content outside of itself. Whatever Quantity is, it is by virtue of outside force designating what it is. Quantity is open to mere *quantitative* change. Quantitative change is change imposed from the outside. The very quality of Quantum was that it was indifferent to change imposed upon it from the outside.

Qualitative change is self-imposed change from the inside. We will learn, however, that genuine qualitative change depends on quantitative change. Nature does make great leaps, but only after nature indifferently undergoes incremental quantitative change.⁶ Liquid water, as it gets colder due to outside force, indifferently stays liquid, but, at 0E centigrade, liquid, radically and all at once,

nella dottrina dell'essere hegeliana (I) 1991 RIVISTA DI STORIA DELLA ILOSOFIA 701; Cinzia Ferrini, *Logica e filosofia della natura nella dottrina dell'essere hegeliana (II)* 1992 RIVISTA DI STORIA DELLA ILOSOFIA 103. On Hegel's notorious dissertation, see Olivier Depré. *The Ontological Foundations of Hegel's Dissertation of 1801*, in *id.* at 257.

⁵ Errol Harris judges Measure to be

extraordinarily difficult . . . so obscure as to be, for the most part, hardly intelligible, and, while it contains some astonishingly prescient scientific comments, it also indulges in what, to us in the twentieth century, must appear ill-informed and perverse polemic against sound scientific insights.

ERROL E. HARRIS, AN INTERPRETATION OF THE LOGIC OF HEGEL 143 (1983).

⁶ For this reason, "a seemingly innocent change of quantity acts as a kind of snare, to catch hold of the quality . . ." GEORG W.F. HEGEL, HEGEL'S LOGIC § 108 Remark (William Wallace trans., 1975) [hereinafter cited as LESSER LOGIC].

becomes a solid.

Measure emerged in the Ratio of Powers (e.g., $x^2 = y$), which showed itself to be "self-related externality." (327)⁷ In $x^2 = y$, the identity of the first (internal) x is determined by the second (external) x . Hence the first x is in the thrall of externality. Nevertheless, $x = x$, and so it is self-related, even while externally determined. As self-related, the Ratio of Powers (which we may now call Measure) is "a *sublated* externality." (327)⁸ Under the law of sublation,⁹ externality is canceled *and* preserved. Hence, Measure "has within itself the difference from itself." (327)¹⁰

When difference was simply external, we had before us quantitative difference. But now, having been captured by Measure, this difference is a qualitative moment. The quantitative report of a Measure is the thing's own authentic report of itself.¹¹ When the mode is external but essential, Measure is before us. As John Burbidge remarks:

Measuring . . . introduces an explicit act of relating. It brings together two realities, indifferent to each other. This conjunction is recognized as valid, however, only if each term allows for, and indeed encourages, the association. Since mutual reference is now

⁷ "[S]elbstbeziehende Äußerlichkeit." [1:336] See Carlson, *Quantity*, *supra* note 4, at 2145-48. By "ratio" Hegel means *any* relation between two quanta, including xy , x^2 , or x/y .

⁸ "[A]ufgehobene Äußerlichkeit." [1: 336].

⁹ On sublation, see David Gray Carlson, *Hegel's Theory of Quality*, 22 CARDOZO L. REV. 425, 452 (2001) [hereinafter cited as Carlson, *Quality*].

¹⁰ "[H]at an ihr selbst den Unterschied von sich." [1: 336]

¹¹ As one commentator puts it:

In the Hegelian system, the quantities involved in measurement, which from an epistemological point of view are a means to cognition, are ontologized and treated as natural objects, that is to say as the objects of an overriding analytical cognition. What is more, the equalities in behaviour constituting the substance or content of the quantities measured are interpreted as being things. As a result, the natural world as determined by Hegel corresponds to the view of nature developed by *mechanicism*, the world-view of the mechanistically-minded popularizers of natural science.

Renate Wahsner, *The Philosophical Background to Hegel's Criticism of Newton*, in HEGEL AND NEWTONIANISM, *supra* note 4, at 81, 83.

an inherent characteristic of the concept, one passes beyond simple immediacy.¹²

Essence. Measures are brought together by an external measurer. Nevertheless, the Measures are *ready* to be brought together. Measure therefore is, as Hegel will later say, "the *immanent* quantitative relationship of *two* qualities to each other." (340)¹³ Each Measure, however, imposes quantitative change on the other Measure. Each Measure has a qualitative resilience against the change imposed upon it from the outside. If this resilience is isolated and considered on its own, we have the Measureless--or Essence. Hegel now provides his first definition of Essence--"to be self-identical in the immediacy of its determined being." (329)¹⁴ In the realm of Essence, things mediate themselves. They are not mediated by outside forces. Self-mediation is called "reflection." (330)

Though beyond Measure, Essence is nevertheless "already immanent in measure." (329)¹⁵ But self-mediation (Reflection) is still only implicit. Its determinations are "nothing more than moments of [the] negative unity" of the extremes of Dialectical Reason. (330)¹⁶ The Determinations of Reflection are destined to enjoy a self-subsistence and independence from the qualitative and the quantitative.

For the moment, Quality and Quantity are still with us, but in mediated form. Each of these extremes in the syllogism of Measure is equally the one and the other. This was not so before. In Quality, the Understanding grasped Being as an affirmative immediacy. In Quantity, the Understanding learned that the

¹² JOHN W. BURBIDGE, ON HEGEL'S LOGIC: FRAGMENTS OF A COMMENTARY 63 (1981). In his later book on chemistry, however, Burbidge less plausibly remarks: "Measuring uses a quantity to specify a quality. That definition sets the logical task." JOHN W. BURBIDGE, REAL PROCESS: HOW LOGIC AND CHEMISTRY COMBINE IN HEGEL'S PHILOSOPHY OF NATURE 53 (1996). This formulation threatens to obscure the fact that, for Hegel, a Measure's quality *is* its quantity--accurate reportage of what the thing is.

¹³ "Das Maß ist so das immanente quantitative verhalten zweier Qualitäten zueinander." [1:350]

¹⁴ "[I]n der Unmittelbarkeit des bestimmtseings identisch." [1:339]

¹⁵ "Es liegt in dem Maße bereits." [1:339]

¹⁶ "[A]ber in diesem Sein schlechthin nur als Momente ihrer negativen Einheit." [1:339]

negative, quantitative moment of Continuity was the truth of Being. Now the Understanding sees that the qualitative and the quantitative are two Verona houses both alike in dignity. The difference between them is "indifferent and so is no difference." (330)¹⁷ The difference between Quality and Quantity has been sublated. In Ratio, Quantity showed itself to be a return-into-self. This very reflection-into-self *is* Quality. It is not mere Being-for-self (which self-destructed and became nothing). Rather, this form of Being--reflection-into-self--is "being-in-and-for-self"--the attribute of Essence. (330)¹⁸ Thus, Hegel introduces in Measure the portentous new brand of substance--being-in-and-for-self.

Being-in-and-for-self, however, is merely implicit in Measure. "Measure, still as such is itself the *immediate [seiende]* unity of quality and quantity; its moments are determinately present as a quality, and quanta thereof." (330)¹⁹ Immediate Measure is actually a mediation of qualitative and quantitative moments. Measure will be revealed as always a ratio of Measures. Within the ratio, each side itself will further be a "*ratio* of specific quanta having the form of self-subsistent measures." (330)²⁰ The sides of this ratio have mere quantitative difference. This implies that each measure continues into the other, and therefore beyond itself entirely. The name of this passage into the beyond is the Measureless.

The Measureless is the negativity of Measure, but only in principle. The indifference of the determinations of Measure to their negative "Measureless" soul must be posited. This is the final result of Real Measure.²¹ Real Measure is "real through the negativity

¹⁷ "[D]er unterschied ist als gleichgültig." [1:339]

¹⁸ "[D]as An- und Fürsichsein." [1: 339]

¹⁹ "Das Maß noch als solches ist selbst die seiende Einheit des Qualitativen und Quantitativen; seine Momente sind als ein Dasein, eine Qualität und Quanta derselben." [1:339]

²⁰ "Verhältnis von spezifischen Quantis als selbständigen Maßen." (340)

²¹ "Real," for Hegel, tends to be a dialectical word, denoting a determinateness. See JOHN W. BURBIDGE, *HEGEL ON LOGIC AND RELIGION: THE REASONABLENESS OF CHRISTIANITY* 44 (1992); Richard Dien Winfield, *Concept, Individuality and Truth*, 1999 *BULLETIN OF THE HEGEL SOCIETY OF GREAT BRITAIN* 35, 42 ("reality is the determinacy something in virtue of its contrast to something else"). Here, Real Measure is the second, "dialectical" chapter of Measure.

contained in the indifference." (330)²² It is "an *inverse ratio of measures*." (330)²³ In this Ratio, which must remain largely mysterious until the third chapter of Measure,²⁴ the extremes of the syllogism show themselves to be self-subsistent--indifferent to their negative soul. Because they are so, the Measures are only quantitatively related and qualitatively distinct. They can dispense with their negative unity entirely. That is, the Qualitative Measures retreat within themselves and shed their true content--Essence, "which is their reflection-into-self." (331)²⁵ At this point, externality has sublated itself, and Being's journey draws to a close.

Measure and the social sciences. Because Measure entails external imposition upon a phenomenon that is partly free and independent of outside oppression, Hegel is able to set forth a kind of hierarchy in the natural sciences in terms of conduciveness to Measure. "The complete, abstract indifference of developed measure . . . can only be manifested in the sphere of *mechanics*" wherein matter is abstract. (331)²⁶ In the inorganic and even more in the organic spheres, Measure is "subordinated to higher relationships." (332)²⁷ The free development of Measure according to logic is still less to be found in politics or constitutional law--"the realm of spirit." (332)²⁸ It may be that the Athenian constitution is suited only to city-states, "but all this yields neither laws of measure nor characteristic forms of it." (332)²⁹ In this sphere "there occur differences of *intensity* of character, *strength* of imagination,

²² "[R]eell mit der in ihr enthaltenen Negativität." [1:340]

²³ "[U]mgekehrtes Verhältnis von Maßen." [1:340]

²⁴ See *infra* text accompanying notes 318-409.

²⁵ "[W]eclhe ihre Reflexion-in-sich . . . ist." [1:340]

²⁶ "Die vollständige, abstrakte Gleichgültigkeit des entwickelten Mases . . . can nur in der Sphäre des Mechanismus statthaben." [1:341]

²⁷ "[H]öhern Verhältnissen untergeordnet." [1:341] Professor Ferrini suggests that these observations were designed to answer Goethe, who questioned the propriety of measuring organic processes. She reads Hegel as *not* entirely rejecting measures of organic life, in the nature of Goethe, but conceding the limitations of doing so. Cinzia Ferrini, *On the Relation Between "Mode" and "Measure" in Hegel's Science of Logic: Some Introductory Remarks* 20 OWL OF MINERVA 20, 47-48 (1988) [hereinafter cited as Ferrini, *Mode and Measure*].

²⁸ "[I]n Reich des Geistes." [1:342]

²⁹ "[A]ber dies gibt weder Gesetze von Maßen noch eigentümliche Formen desselben." [1:342]

sensations, general ideas, and so on." (331)³⁰ The "measure" of such phenomena never goes "beyond the indefiniteness of *strength* or *weakness*." (332)³¹ Ordinal, not cardinal, measures are the most political science can expect to achieve.

Hegel terminates his introduction to Measure with a blast at empirical psychology--of late quite the fashion in American law reviews:³²

How insipid and completely empty the so-called laws turn out to be which have been laid down about the relation of strength and weakness of sensations, general ideas and so on, comes home to one on reading the psychologies which occupy themselves with such laws. (332)³³

Hegel, I think, objects to empirical psychology because it proposes to reduce human freedom to a set of inviolable laws. Any such attempt to measure freedom is what Hegel attacks elsewhere as mere phrenology.³⁴

Modality. Before proceeding on to Specific Quantity--Hegel's first chapter on Measure--I would like to backtrack and discuss Hegel's treatment, early in his introductory essay, of a topic seemingly unrelated to physical measurement--Kant's notion of modality. At the beginning of the *Science of Logic*, Hegel wrote:

Measure can also, if one wishes, be regarded as a modality; but since with Kant modality is supposed no longer to constitute a determination of the content, but to concern only the relation of the content to thought, to the element, it is a quite heterogeneous

³⁰ "Im Geistigen als solchem kommen Unterschiede von Intensität des Charakters, Stärke der Einbildungskraft, der Empfindungen, der Vorstellungen usf." [I:342]

³¹ "[A]ber über die Unbestimmte der Stärke oder Schwäche geht die Bestimmung nicht hinaus." [I:342]

³² For a critical view of this fashion, see Gregory Mitchell, *Taking Behavioralism Too Seriously? The Unwarranted Pessimism of the New Behavioral Analysis of Law*, 43 WM. & MARY L. REV. 1907 (2002).

³³ "Wie matt und völlig leer die sogenannten Gesetze ausfallen, die über das Verhältnis von Stärke und Schwäche der Empfindungen, Vorstellungen usf. ausgestellt werden, wird man inne, wenn man die Psychologien nachsieht, welche sich mit dergleichen bemühen." [I:342]

³⁴ GEORG W.F. HEGEL, PHENOMENOLOGY OF SPIRIT ¶309 (A.V. Miller trans. 1977). On social science's hatred of freedom, see Jeanne L. Schroeder, *The Stumbling Block: Freedom, Rationality and Legal Scholarship*, 44 WM. & MARY L. REV. 263 (2002).

relation . . . (80)³⁵

This passage in effect accuses Kant of believing that thought has no effect on the object measured.³⁶ Hegel now elaborates on this criticism.³⁷ Modality--where thought meets object--is the "sphere of coming-to-be and ceasing-to-be." (329)³⁸ By this, Hegel means to comment on Kant's notion that the gap between subject and object is unbridgeable. Hence, subjectivity "ceases to be" in the thing-in-itself. And the thing-in-itself "ceases to be" in subjective experience. In Hegel's opinion, objects "come to be" in the measure of thought.³⁹ Kantian modality is faulted for *not* being Measure to the extent thought leaves the object unaffected.⁴⁰

For Kant, modality, fourth in his famous table of categories,⁴¹

³⁵ "Das Maß kann auch für eine Modalität, wenn man will, angesehen werden; aber indem bei Kant diese nicht mehr eine Bestimmung des Inhalt ausmachen, sondern nur die Beziehung desselben auf das Denken, auf das Subjektive, angehen soll, so ist dies eine ganz heterogene . . . Beziehung" [I:65]

³⁶ See IMMANUEL KANT, *CRITIQUE OF PURE REASON* 142 (J.M.D. Meiklejohn trans., 1990) (the categories of modality do not determine the object, but only express its relation to the faculty of cognition).

³⁷ It has been suggested that Hegel's identification of modality as a form of measure constitutes "the essence of Hegel's response to the challenge of the way in which transcendental idealism treated determinate being." Ferrini, *Mode and Measure*, *supra* note 4, at 40. Professor Ferrini notes that most commentators view the discussion of modality to be a digression that has nothing to do with Measure, a position she criticizes. *E.g.*, HARRIS, *supra* note 5, at 144. Harris, however, vindicates himself by pointing out that Hegel's remarks here "serve to show that Measure in the Doctrine of Being is really an inchoate disclosure of the relation between universal and particular . . .," *id.*, a relation Hegel will address directly in the Subjective Logic many chapters hence.

³⁸ "[D]ie Sphäre des Estehens und Vergehens." [I:338]

³⁹ See Carlson, *Quality*, *supra* note 9, at 522.

⁴⁰ Ferrini, *Mode and Measure*, *supra* note 7, at 43.

⁴¹ Kant's categories are as follows:

I.	II.
<i>Of Quantity</i>	<i>Of Quality</i>
Unity	Reality
Plurality	Negation
Totality	Limitation
III	
<i>Of Relation</i>	
Of Inherence and Subsistence (substantia et accidens)	
Of Causality and Dependence (cause and effect)	

is the choice of possibility or impossibility, existence or non-existence, necessity or contingency. In his table, Kant leads with "quantity" and "quality"--a priority Hegel reverses.⁴² For Kant, quantity comes first. Within quantity, "unity" stands over against "plurality." The unity of unity and plurality is "totality." Quality is second. Within Quality, Kant opposes reality to negation; their unity is limitation. The triplicity that Hegel so much favored is confined within a given category. But no triplicity inheres between quantity, quality, relation and modality. For this very reason, Hegel writes, Kant "was unable to hit on the third to quality and quantity." (327)⁴³

Hegel implies that "modality" was Kant's true third. If so, then we can see why Hegel equates modality with Measure. "Relation"--Kant's nominal third--is dismissed as merely "inserted."⁴⁴ (327) Kantian modality, Hegel says, is "the relation of the object to thought." (327)⁴⁵ Kant perceived thought as entirely external to the thing-in-itself. The first three categories belong to thought alone--though to the objective quality of thought. Modality involves the relation of thought to object. It contains the determination of

Of Community (reciprocity between the agent and patient)

IV

Of Modality

Possibility.--Impossibility.

Existence.--Non-existence.

Necessity.--Contingence.

CRITIQUE OF PURE REASON, *supra* note 36, at 62.

⁴² Earlier, we saw Hegel advertising the wisdom of beginning with Quality and deriving Quantity therefrom. *See* Carlson, *Quantity*, *supra* note 7, at 2030-31; *see also Science of Logic* at 79 ("hitherto the determination of *quantity* has been made to precede *quality* and this . . . for no given reason"); [I:65] ("der Quantität vor der Qualität aufgeführt wird . . . ohne weitem Grund").

⁴³ "[D]aher hat er nicht auf das Dritte der Qualität und Quantität kommen können." [I:337]

⁴⁴ Gadamer suggests that Relation in Kant corresponds to Essence in Hegel's Logic. HANS-GEORG GADAMER, *HEGEL'S DIALECTIC: FIVE HERMENEUTICAL STUDIES* 81 (Christopher Smith trans., 1976).

⁴⁵ *See* Ferrini, *Mode and Measure*, *supra* note 7, at 36 ("for Kant, modality was concerned solely with the meaning of the verb "to be," as is used in order to indicate or establish a connection between an object and a proposition, and this use had to be based upon the faculty of cognition in that the modality is understood as *de re* and not *de dicto*.").

reflection-into-self, meaning that, by encountering objects, modality renders the objects into thoughts and brings them under the jurisdiction of the mind. This signifies that the objectivity common to the other categories is lacking in modality. The modalities--possibility, existence and necessity--do not add to the determination of the object. They only express the relation of the object to the faculty of cognition. In short, for Kant, thought leaves the object unaffected.

For Spinoza, "mode" was third after substance and attribute. Mode was the "affections"--i.e., affectations--of substance: "that element which is in an other through which it is comprehended." (327) Accordingly, mode for Spinoza is "externality as such." (327) Because "mode" is external, it is the untrue, and "the rigid nature of substance lacks the return into self." (328)⁴⁶ With Spinoza, being or infinity is first. Second comes what is finite, accidental or perishable. The connection of the second with the first, Hegel says, "is so evident that one cannot avoid grasping it as also in a unity with the latter." (328)⁴⁷ That is to say, at least on Hegel's analysis, Being is precisely what is finite and perishable. For Spinoza, substance must be apprehended by the intellect "which is itself a limitation or mode." (328)⁴⁸ Mode, then, is "the non-substantial generally, which can only be grasped through an other." (328)⁴⁹ Modal being for Spinoza is precisely what does not endure. Yet when the thought of substance disappears (back into substance), nothing of mode remains. As Hyppolite puts it, Spinoza "failed to see that if every determination is a negation, that negation is genuinely expressed (for-itself and no

⁴⁶ This may refer to the discussion in Hegel's chapter on Determinate Being, where Hegel criticizes Spinoza for radically separating thought and being. See Carlson, *Quality*, *supra* note 9, at 490-93. Or to the chapter on quanta, where Hegel criticizes Spinoza for equating infinity with absolute affirmation--an inert entity. Carlson, *Quantity*, *supra* note 4, at .

⁴⁷ "Aber es drängt sich zu sehr der Zusammenhang dieses Zweiten mit dem Ersten auf, um es nicht zugleich in einer Einheit mit demselben zu fassen." [I:337]

⁴⁸ "[S]elbst einer Beschränkung oder Modus." [I:337]

⁴⁹ "[D]as Nichtsubstantielle überhaupt, das nur aus einem Andern gefaßt werden kann." [I:337] See 1 HARRY AUSTRYN WOLFSON, *THE PHILOSOPHY OF SPINOZA: UNFOLDING THE LATENT PROCESSES OF HIS REASONING* 370-99 (1934).

longer only in-itself) only in the mode . . . "⁵⁰

The Hindus had a similar triune organization, leading to comparisons with Christianity, but, Hegel insists, the comparison is misleading. In Hindu religion, the unity of Brahma disperses but does not return. The supreme goal is "submergence in unconsciousness, unity with Brahma, annihilation." (329)⁵¹ But in Christianity, "there is not only unity but union, the conclusion of the syllogism [which] is a unity possessing *content* and *actuality*, a unity which in its wholly concrete determination is spirit." (328)⁵²

Like the Brahmans, Spinoza does not manage return-into-self. The mode is external and untrue. Truth lies only in substance. "But this is only to submerge all content in the void, in a merely formal unity lacking all content," Hegel complains. (328)⁵³

In Spinoza's thought, the mode is abstract externality, "indifferent to qualitative and quantitative determinations." (329)⁵⁴ These "unessential elements are not supposed to count," but, nevertheless, "everything depends on the kind and manner of the mode." (329)⁵⁵ This dependence is a confession that the mode belongs to the essential nature of a thing--"a very indefinite connection but one which at least implies that this external element

⁵⁰ JEAN HYPOLITE, GENESIS AND STRUCTURE OF HEGEL'S *PHENOMENOLOGY OF SPIRIT* 106 (Samuel Cherniak & John Heckman trans., 1974). On Hegel's personal history with Spinozism, see Hans-Christian Lucas, *Spinoza, Hegel, Whitehead: Substance, Subject and Superject*, in *HEGEL AND WHITEHEAD: CONTEMPORARY PERSPECTIVES ON SYSTEMATIC PHILOSOPHY* 39 (George R. Lucas, Jr., ed. 1986).

⁵¹ "[D]ie Versenkung in die Bewußtlosigkeit, die Einheit mit Brahm, die Vernichtung [I:339]

⁵² "In der wahrhaften Dreiheit ist nicht nur Eniheit, sondern Einigkeit, der Schluß zur inhaltvollen und wirklichen Einheit, die in ihrer ganz konkreten Bestimmung der Geist ist, gebracht." [I:338]

⁵³ "[W]elches dann ein Versenken alles Inhalts in die Leerheit, in nur formelle, inhaltlose Einheit ist." [I:338]

⁵⁴ "[D]ie Gleichgültigkeit gegen die qualitativen wie gene dies quantitativen Bestimmungen." [I:338]

⁵⁵ "[Das] Unwesentliche nicht ankommen soll, so wird auch wieder in vielem zugenstanden, daß alles auf die Art und Weise ankomme." [I:338] The Greeks get better marks. They taught that "everything has a measure." (329) ("[D]aß alles ein Maß hat." [I:338]) This was "the beginning of a much higher conception than that contained in substance and in the difference of the mode from the substance." (329) ("[D]er Anfang eines viel höhern Begriffs, als die Substanz und der der Unterschied des Modus von derselben enthält." [I:339])

is not so abstractly an externality." (329)⁵⁶

A. The Specific Quantum

At the end of Quantity, the Ratio of Powers was "the simple relation of the quantum to itself, its own determinateness within itself." (333)⁵⁷ In short, Quantity had recaptured its Quality, conceived as Ratio's immunity from outside manipulation.

Our first step is Immediate Measure:

[All Figures can be found in an Appendix at the end of this article]

Figure 18(a) Immediate Measure⁵⁸

Figure 18(a) is "an immediate quantum, hence just some specific quantum or other," but it is equally an immediate *quality*, "some specific quality or other." (333)⁵⁹ It is therefore appropriate to represent the *mediated* nature of Immediate Measure as a dialectic moment:

[All Figures can be found in an Appendix at the end of this article]

Figure 18(b)

⁵⁶ "[I]n welcher sehr unbestimmten Beziehung wenigstens dies liegt, daß dies Äußerliche nicht so abstrakt das "Äußerliche sei." [I:338]

⁵⁷ "[D]ie einfache Beziehung des Quantums auf sich, seine eigene Bestimmtheit an sich selbst." [I:343] This was one side of the matter. The Ratio of Powers was equally "self-related externality." (327) That is, in the ratio $x^2 = y$, where y is fixed, x is self-determined, but it still needs that other (external) x to complete its determination.

⁵⁸ See the appendix for a description of what this drawing means.

⁵⁹ "[E]in unmittelbares, daher als irgendein bestimmtes Quantum . . . sie ist irgendeine bestimmte Qualität." [I:343]

Mediated Immediate Measure

The side of Quantum [1] is not indifferent to [2, 3] but is "a self-related externality" and hence a Quality (333).⁶⁰

Why Immediate Measure, taken as a mediation between quantity and quality, is a self-relation should by now be apparent. [2] represents the mediation between [1] and [3], and it is the very being-within-self of the concept of Measure. But why is this self-relation an externality? The answer lies in the True Infinite nature of Measure. True Infinitude requires that [1] go out of itself and into [2], which, as always, instantly implies the externality of [3]. Hence, the externality of Immediate Measure is both inside and outside--[2] and [3]. Accordingly, Hegel says of the Quantum [1] that it is distinguished from Quality, but "does not transcend it, neither does the quality transcend the quantum. It is thus the determinateness which has returned into simple identity with itself." (333)⁶¹

The metaphysical proposition that these last two logical steps represent is that "all that exists has a measure" (333),⁶² the proposition of the Pythagoreans.⁶³ Quantum, then, "belongs to the nature of the something itself." (333)⁶⁴ Quantum is inherent in Being--its being-within-self. Accordingly, Being is not indifferent to its magnitude. If its magnitude is altered, the quality of the thing in question alters as well. Hence, "Quantum, as measure, has ceased to be a limit which is not limit; it is now the determination of the thing, which is destroyed if it is increased or diminished beyond this quantum." (333-34)⁶⁵

A measured thing exhibits a degree of resilience. It remains what it is even though its quantum is changed. But eventually there comes a dramatic moment when the measured thing becomes

⁶⁰ "[S]elbst beziehende Äußerlichkeit." [I:336]

⁶¹ "[E]s nicht über sie hinaus, so wie diese nicht über dasselbe hinausgeht. Es ist so in die einfache Gleichheit mit sich zurückgekehrte Bestimmtheit." [I:343]

⁶² "Alles, was da ist, hat ein Maß." [I:343]

⁶³ CLARK BUTLER, *HEGEL'S LOGIC: BETWEEN DIALECTIC AND HISTORY* 111 (1996).

⁶⁴ "[G]ehört zue Natur von Etwas selbst." [I:343]

⁶⁵ "Das Quantum hat als Maß aufgehört, Grenze zu sein, die keine ist; es ist nunmehr die Betimmung der Sache, so daß diese, über dies Quantum vermehrt oder vermindert, zugrunde ginge." [I:343]

qualitatively different. The example of water has already been given.⁶⁶ Water has a liquid quality over a range of temperatures. But if we lower the quantitative side of water's Measure to below zero degrees centigrade, water undergoes a sudden cataclysmic change. It turns into ice, which is qualitatively different from liquid water.

Quantitative determinateness, then, has a double nature. It is (1) "that to which the quality is tied" and also (2) "that which can be varied without affecting the quality." (334)⁶⁷ Immediate Measure brings forth both moments--the idea that quantitative change destroys the quality of a being and the idea that quality *is* indifference to quantitative change. This prior point proves that "the destruction of anything which has a measure takes place through the alteration of its quantum." (334-35)⁶⁸ It likewise proves that not every quantitative change is a qualitative change.

The idea of quantitative change that results in qualitative change is captured by the common sense notion of gradualness. Suppose we lower the temperature of water with a view of destroying its quality as liquid (*i.e.*, we make some ice cubes).

On the one hand this destruction appears as *unexpected*, in so far as the quantum can be changed without altering the measure and the quality of the thing; but on the other hand, it is made into something quite easy to understand through the idea of *gradualness*. The reason why such ready use is made of this category to render conceivable or to explain the disappearance of a quality or of something, is that it seems to make it possible almost to watch the disappearing with one's eyes, because quantum is posited as the external limit which is by its nature alterable, and so *alteration* of (quantum only) requires no explanation. But in fact nothing is explained thereby; the alteration is . . . essentially the transition of one quality into another, or the more abstract transition of an existence into a negation of the existence; this implies another determination than that of gradualness which is only a decrease or an increase and is a one-sided holding fast to quantity. (335)⁶⁹

⁶⁶ See *supra* text accompanying note 6.

⁶⁷ "[A]n welche dies Qualität gebunden ist . . . an der unbeschadet jener hin- und hergegangen werden kann" [I:344]

⁶⁸ "[S]o geschieht das Untergehen von etwas, das ein Maß hat, darin, daß sein Quantum verändert wird." [I:344]

⁶⁹ "Dies Untergehen erscheint einesteils als unerwartet, insofern an dem Quantum, ohne das Maß und die Qualität zu verändern, geändert werden kann, andernteils aber

In short, incremental change is simply easier to accept as a psychological matter, compared to radical qualitative change. Behind every incrementalist strategy, however, lies the radical program of obliterating what exists and installing something new.

Hegel asks:

[D]oes the pulling out of a single hair from the head . . . produce baldness, or does a heap cease to be a heap if a grain is removed? [the quote continues!!] An answer in the negative can be given without hesitation since such a removal constitutes only a quantitative difference, a difference moreover which is itself quite insignificant; thus a hair, a grain, is removed and this is repeated, only one of them being removed each time in accordance with the answer given. At last the qualitative change is revealed; the head . . . is bald, the heap has disappeared. In giving the said answer, what was forgotten was not only the repetition, but the fact that the individually insignificant quantities (like the individually insignificant disbursements from a fortune) *add up* and the total constitutes the qualitative whole, so that finally this whole has vanished; the head is bald, the purse is empty. (335)⁷⁰

wird es zu einem ganz Begreiflichen gemacht, nämlich durch die Allmählichkeit. Zu dieser Kategorie wird so leicht gegriffen, um das Vergehen von einer Qualität oder von etwas vorstellig zu machen oder zu erklären, indem man so dem Verschwinden beinahe mit den Augen zusehen zu können scheint, weil das Quantum als die äußerliche, ihrer Natur nach veränderliche Grenze gesetzt ist, hiemet die Veränderung, als nur Quantums, sich von selbst versteht. In der Tat aber wird nichts dadurch erklärt; Die Veränderung ist . . . wesentlich der Übergang einer Qualität in eine andere, oder der abstraktere von einem Dasein in ein Nichtdasein; darin liegt eine andere Betsimmung als in der Allmählichkeit, welche nur eine Verminderung oder Vermehrung und das einsetzige Festhalten an der Größe ist." [I:344-35]

⁷⁰ "[M]acht [etwa] das Ausraufen Eines Haares vom Kopf . . . kahl, oder hört ein Aufe, ein Haufe zu sein, wenn ein Korn weggenommen wird? Dies kann man unbedenklich zugeben, indem solche Wegnahme nur einen und zwar selbst ganz unbedeutenden quantitativen Unterschied ausmacht; so wird ein Haar, ein Korn weggenommen und dies so wiederholt, daß jedesmal nach dem, was zugegeben worden, nur Eines weggenommen wird; zuletzt zeigt sich die qualitative Veränderung, daß der Kopf . . . kahl, der Haufe verschwunden ist. Man vergaß bei jenem Zugeben nicht nur die Wiederholung, sondern daß sich die für sich unbedeutenden Quantitäten (wie die für sich unbedeutenden Ausgaben von einem Vermögen) summieren und die Summe das qualitativ Ganze ausmacht, so daß am Ende dieses verschwunden, der Kopf kahl, der Beutel leer ist." [I:345]

In the next chapter, Hegel returns to gradualness to suggest that the gradual, quantitative side of change is external to the thing:

On the qualitative side . . . the gradual, merely quantitative progress . . . is absolutely interrupted; the new quality in its merely quantitative relationship is, relatively to the vanishing quality, an indifferent, indeterminate other, and the transition is therefore a *leap* . . . People fondly try to make an alteration *comprehensible* by means of the gradualness of the transition; but the truth is that gradualness is an alteration which is merely indifferent, the opposite of qualitative change. (368)⁷¹

Hegel goes on to complain that gradualism quantifies and therefore externalizes qualitative change, thereby robbing change of its immanence. (370-71) Gradualness, in short, subjectifies what should be an objective process.⁷²

Jeanne Schroeder⁷³ finds in these passages the explanation of some American constitutional law familiar to every first year law student. American law permits land use regulation, but if the regulation goes "too far," it becomes a taking of the land itself. This triggers the government's obligation to pay just compensation (or to repeal the oppressive regulation). Thus, regulation's quantitative burden can be gradually increased with no qualitative change, but there comes a sudden moment when quantitative change is so great that a qualitative change is effected. Regulation has become expropriation. This moment, however, is never present but is always retroactively noted, after the qualitative change has occurred. For

⁷¹ "Nach der qualitativen Seite . . . das bloß quantitative Fortgehen der Allmählichkeit . . . ist, absolut abgebrochen; indem die neu eintretende Qualität nach ihrer bloß quantitativen Beziehung eine gegen dies verschwindende unbestimmt andre, eine gleichgültige ist, ist der Übergang ein Sprung . . . Man sucht sich gern für die Allmählichkeit des Übergang eine Veränderung begreiflich zu machen; aber vielmehr ist die Allmählichkeit gerade die bloß gleichgültige Änderung, das Gegenteil der qualitativen." [I:381]

⁷² For example, in an attempt to save the American legal system from the nihilism of Critical Legal Studies, Andrew Altman announces that we "more or less" live under a rule of law. I have suggested that the invocation "more or less" is designed to lend the American system some "give," so that counter-examples of lawlessness cannot blow apart the argument. David Gray Carlson, *Liberal Philosophy's Troubled Relation to the Rule of Law*, 43 U. TORONTO L. J. 257 (1993).

⁷³ Jeanne L. Schroeder, *Never Jam Today: On the Impossibility of Takings Jurisprudence*, 84 GEO. L.J. 1531 (1996).

this reason, neither the Supreme Court nor its innumerable interpreters can say in advance what constitutes too much regulation, just as we can never specify the exact hair that, if extracted, makes a man bald.⁷⁴

Hegel states that common sense errs when it answers that removal of a single hair does not produce baldness. The mistake is "assuming a quantity to be only an indifferent limit, i.e. of assuming that it is just a quantity in the specific sense of quantity." (336)⁷⁵ In other words, quantitative change is thought to have no bite. What common sense misses is that "quantity is a moment of measure and is connected with quality." (336)⁷⁶ When Quantum is taken as an indifferent limit of a thing, it leaves the thing "open to unsuspected attack and destruction." (336)⁷⁷ Gradual quantitative change *can* lead to a catastrophic *coupure*.⁷⁸

⁷⁴ Hegel endorses such analytic use of Measure in the *Lesser Logic*:

It would be a mistake to treat these examples [including that of the bald man] as pedantic futility; they really turn on thoughts, an acquaintance with which is of great importance in practical life, especially in ethics. Thus in the matter of expenditure, there is a certain latitude within which a more or less does not matter; but when the Measure, imposed by the individual circumstances of the special case, is exceeded on the one side or the other, the qualitative nature of Measure . . . makes itself felt, and a court, which a moment before was held good economy, turns into avarice or prodigality.

LESSER LOGIC, *supra* note 6, §108 Remark.

⁷⁵ "[E]ine Quantität nur für eine gleichgültige Grenze, d.h. sie eben im bestimmten Sinne einer Quantität zu nehmen." [I:345]

⁷⁶ "Moment des Maßes zu sein und mit der Qualität zusammenzuhängen, konfondiert" [I:344]

⁷⁷ "[U]nverdächtig angegriffen und zugrunde gerichtet wird."

⁷⁸ Hegel further remarks:

It is the cunning of the Notion to seize on this aspect of a reality where its quality does not seem to come into play; and such is its cunning that the aggrandizement of a State or of a fortune, etc., which leads finally to disaster for the State or for the owner, even appears at first to be their good fortune. (336)

Es ist die List des Begriffes, ein Dasein an dieser Seite zu fassen, von der seine Qualität nicht ins Spiel zu kommen scheint,--und zwar so sehr, daß Vergrößerung eines Staats, eines Vermögens usf.,

B. Specifying Measure

If Measure undergoes qualitative change at the alteration of magnitude, we are in the realm of Immediate Measure. But if we admit that *some* quantitative change can occur within a range without *any* qualitative change, then we are in the more advanced realm of Specifying Measure. Here Being has some independence from Quantum.⁷⁹ Therefore, we have:

[All Figures can be found in an Appendix at the end of this article]

Figure 18(c) Specifying Measure

As always, Speculative Reason names motion.⁸⁰ Gazing back at Figure 18(b), it notices that Measure can undergo some limited amount of quantitative change without also undergoing qualitative change.

How does Hegel derive the resilience of quality from quantitative change? Simply by pointing out that, at this point, resilience *is* quality:

As a quantum it is an indifferent magnitude open to external

welche das Unglück des Staats, des Besitzers herbeführt, sogar als dessen Glück zunächst erscheint. [I:346]

⁷⁹ As Hegel puts it:

Now that aspect of the quantum according to which it is an indifferent limit which can be exceeded without altering the quality, is also distinguished from its other aspect according to which it is qualitative and specific. (336)

Von der Seite nun, nach welcher das Quantum gleichgültige Grenze ist, an der ohne die Quantität zu ändern hin- und hergegangen werden kann, ist seine andere Seite, nach welcher es qualitativ, spezifisch ist, auch unterschieden. [I:346]

⁸⁰ On this aspect of Speculative Reason, see Carlson, *Quality*, *supra* note 9, at 440-41.

determination and capable of increase and decrease. But as a measure it is also distinguished from itself as a quantum, as such an indifferent determination, and is a limitation of that indifferent fluctuation about a limit. (334)⁸¹

But this does not mean that Quality is now independent of Quantity and therefore immune from change--Quantity being the source of all change. "[T]he quantitative determinateness of anything is thus twofold--namely, it is that to which the quality is tied and also that which can be varied without affecting the quality." (334)⁸²

(a) The Rule

The Understanding now intervenes to name the range of quantitative change that Measure might undergo without suffering from qualitative change. Hegel names this range Rule--"a measure which is external with reference to mere quantum." (336)⁸³

[All Figures can be found in an Appendix at the end of this article]

Figure 19(a) Rule

Rule is an intrinsically determinate magnitude. It is Unit to some other Quantum which is Amount. This other Amount is precisely what is measured by the Rule, which is, after all, Specifying Measure. Hence we have:

⁸¹ "Als Quantum ist es gleichgültige Größe, äußerlicher Bestimmung offen und des Auf- und Abgehens am Mehr und Weniger fähig. Aber als Maß ist es zugleich von sich selbst als Quantum, als socher gleichgültigen Bestimmung, verschieden und eine Beschränkung jene gleichgültigen Hin- und Hergehens an einer Grenze." [I:344]

⁸² "[D]ie Quantitätsbestimmtheit so an dem Dasein die gedoppelte ist, das eine Mal die, an welche die Qualität gebunden ist, das andere Mal aber die, an der unbeschadet jener hin- und hergegangen werden kann" [I:344]

⁸³ "[E]ine Maß äußerlich gegen das bloße Quantum." [I:346]

[All Figures can be found in an Appendix at the end of this article]

Figure 19(b) **Rule Measuring Its Other⁸⁴**

Rule as Unit [1] is external to what it measures [3]. We therefore have before us an act of mere comparison.⁸⁵ Rule as Unit is "an arbitrary magnitude which in turn can equally be treated as an amount (the foot as an amount of inches)." (337)⁸⁶ Measure, however, is not merely external Rule. "[A]s a specifying measure [1] its nature is to be related in its own self [2] to an other which is a quantum [3]." (337)⁸⁷

⁸⁴ The phrase Specifying Measure should be taken to refer to both the Rule and the ruled, considered together. Therefore, I have named [3]--a one-sided concept--as Specifying Measure as Amount, or "ruled matter."

⁸⁵ "Comparison" is an inferior brand of knowledge, according to Hegel. See Carlson, *Quality*, *supra* note 9, at 463-64.

⁸⁶ "[E]ine willkürliche Größe, die ebenso wieder als Anzahl (der Fuß als eine Anzahl von Zollen) gesetzt werden kann." [I:347] Earlier, Hegel remarks that it is "foolish to speak of a *natural* standard of things." (334) ("Es ist daher töricht, von einem natürlichen Maßstabe der Dinge zu Sprechen" [I:344]) Universal standards of measure serve only for external comparison. The adoption of a universal standard is therefore merely conventional--"a matter of complete indifference." (334) ("ist es völlig gleichgültig" [I:344]) A "foot" might be an internal measure--where a foot means literally the length of a human being's foot. But where that same foot is applied to some thing other than itself, it is only an external measure.

Anglo-American Lawyers are familiar with the chancellor in equity applying the measure of his own foot to cases before him:

Equity is a Rouguish thing, for Law we have a measure, know what to trust to, Equity is according to the Conscience of him that is Chancellor, and as that is larger or narrower, so is Equity. 'Tis all one as if they should make the Standard for the measure we call a Foot the Chancellor's Foot, what an uncertain Measure would this be? One Chancellor has a long Foot, another a short Foot, a third an indifferent Foot: 'Tis the same thing in the Chancellor's Conscience.

JOHN SELDEN, TABLE TALK 64 (1689).

On the conventionality of units of measurement, Harris protests that "today the physicist, following Eddington, will claim that there is indeed a natural standard of length, namely, the radius of curvature of space." HARRIS, *supra* note 5, at 146.

⁸⁷ "[A]ls spezifisches istes dies, sich an sich selbst zu einem Andern zu verhalten, das ein Quantum ist." [I:347]

Rule is an important concept for American jurisprudence, with its emphasis on negative freedom and the rule of law. In the typical (non-Hegelian) American vision, the human subject is a natural phenomenon, with preferences that are simply accepted as given. This natural subject is free to do what he will within the bounds of the law, which is imposed on the subject externally--positive law. The function of the law is to protect the rights of the next fellow from the exuberance of the natural subject. In this vision, the negative freedom of the subject accorded by positive law is the range of quantitative change that a person can enjoy without qualitative change. If, however, the subject transgresses the rule of law, the subject undergoes qualitative change--from lawful to lawless.⁸⁸

Hegel endorses the proposition that God is the measure of all things. Presumably this means that God Rules. God as Measure

is an external kind and manner of determinateness, a more or less, but at the same time it is equally reflected into itself, a determinateness which is not indifferent and external but intrinsic; it is thus *the concrete truth of being*. (329)⁸⁹

(b) Specifying Measure

Rule was external, indifferent magnitude "which is now posited by some other existence in general in the measurable something." (337)⁹⁰ Rule signifies the dependence of Measure [2, 3] on externality. Yet Specifying Measure, subject to external Rule, is likewise Quantum--an internal *qualitative* Quantum. This Quantum is "being-for-other to which the indifferent increasing and decreasing is proper." (337)⁹¹

As this internal Quantum, [2] in Figure 19(b) is, to a degree,

⁸⁸ See Carlson, *supra* note 72, at 268-73.

⁸⁹ "Äußerliche Art und Weise, ein Mehr oder Weniger, welches aber zugleich ebenso in sich reflektiert, nicht bloß gleichgültige und äußerliche, sondern an sich seiende Bestimmtheit ist; es ist die konkrete Wahrheit des Seins." [I:339]

⁹⁰ "[D]ie nun von einer andern Existenz überhaupt an dem Etwas des Maßes gesetzt wird." [I:347]

⁹¹ "Seins-für-Anderes an ihm, der das gleichgültige Vermehrt- und Vermindertwerden zukommt." [I:347]

indifferent to Rule. Accordingly, [2] can equally be taken as the *quality* of [2, 3]. Likewise, since [2] is also Rule, Rule is in some sense the content of Specifying Measure. Accordingly, the Quantum of Rule is likewise qualitative--and likewise located in [2]. In effect, [2, 3] and [1, 2] are two Measures--two separate unities of Quality and Quantity--facing each other.

It is a feature of Measure that it cannot alter itself. It must be altered from the outside. But "it does not accept this externally imposed alteration as an arithmetical amount." (337)⁹² Rather, the Measure alters at its own pace. By way of example, if you wish to bake a cake, you turn the oven on and place the batter inside the oven. The oven heats up faster than the cake batter. The heat of the oven of course can be measured. The cake batter stands for the ruled Measure [3]. It needs the oven to be altered from batter to cake, but it obstinately bakes at its own rate and takes longer to heat up (and undergo the qualitative change from batter to cake) than the ambient air in the oven. Meanwhile, the batter influences the oven as well. The oven full of cake batter heats up at a slower rate than an empty oven. Each measure--batter and oven--influences the other's rate of change.

The ruled matter [3] (or, in my example, cake batter) reacts against externally imposed matter (the oven) and "behaves towards the amount [2] as an intensive quantum." (337)⁹³ Why this reference to Intensive Quantum? This concept (also called Degree and Intensive Magnitude) is shown in Figure 14(b) in a negative mode and again in Figure 15(a) in its positive mode.⁹⁴ In Degree, Quantum recaptured some measure of its Being-for-self. It stood over against Extensive Magnitude. In Figure 14(b), Extensive Magnitude saw itself as a plurality and announced, "I am not a unit." Intensive Magnitude therefore represented the unit that Extensive Magnitude was not. In Degree, "determinate being has returned into being-for-self." (218)⁹⁵

Ruled matter (Specifying Measure as Amount) likewise has

⁹² "[E]s nimmt davon nicht die arithmetische Menge an." [I:347]

⁹³ "[R]eagiert dagegen, verhält sich als ein Intensives gegen die Menge." [I:347]

⁹⁴ See Carlson, *Quantity*, *supra* note 4, at 2070-74.

⁹⁵ "[D]as Dsein in das Fürsichsein zusammengenommen." [I:214]

being-for-self [3] which resists externally imposed change. Of course, it is not *entirely* immune. The cake cooks, but it does so at its own leisure, not at the rate the ambient air of the oven wishes. This is why it takes forty minutes to bake a cake and why a watched pot never boils.

This resistance of ruled matter also explains Hegel's earlier remark that Measure, in its more developed form, is necessity, or fate. Thus, Nemesis attacks those who are presumptuous, who think themselves too great. By bringing down the presumptuous and reducing them to nothing, "mediocrity is restored," Hegel remarks. (329)⁹⁶

Fate is Specifying Measure as Amount, which resists the subjective will of presumptuous rulers. Human society insists on its own rate of quantitative (and eventually qualitative) change. Those who insist on speeding up the rate of change are taught a hard lesson that bureaucracy has a *quality* of its own. Its quality is its own unique rate of change. Nevertheless, human institutions do change, and they require impatient reformers to work hard in order to effectuate that change.

Ratio of Measures. In Figure 19(b), two Measures face each other and form a unique Ratio of Measures which is an "exponent"⁹⁷ different from either Measure. (337) The Ratio of Measures,

⁹⁶ "[D]ie Mittelmäßigkeit, hergestellt werde." [I:339] This may be a comment on the fall of Napoleon. In a private letter, Hegel commented on the event:

There is nothing more *tragic* . . . The entire mass of mediocrity, with its irresistible leaden weight of gravity, presses on, without rest or reconciliation, until it succeeded in bringing down what is high to the same level or even below.

JACQUES D'HONDT, *HEGEL IN HIS TIME: BERLIN, 1818-1831* 31 (John Burbidge trans., 1988). A believer in historical greatness, Hegel showed a lack of patience for historians who sought to remove the halo from heroes by pointing out base motives for their great acts. "If heroes of history had been actuated by subjective and formal interests alone, they would never have accomplished what they have." *LESSER LOGIC*, *supra* note 6, § 140 Remark.

⁹⁷ Oddly, Hegel uses the term "exponent" to describe what we might call a quotient. Carlson, *Quantity*, *supra* note 4, at 2098 & n.181. Thus, if $A/B = C$, Hegel calls C the exponent.

sometimes called Realized Measure or Specified Measure, is shown in Figure 19(c):

[All Figures can be found in an Appendix at the end of this article]

Figure 19(c)
Ratio of Measures
(Realized or Specified Measure)

In Figure 19(c), the two Measures, each an arithmetic progression within which neither undergoes quantitative change, produce yet a third arithmetic progression, which is different from the "incommensurable ratios" that make it up. (138)⁹⁸ Alteration of the Measure, then,

consists by itself in the addition of such a numerical one and then another and so on. If in this way the alteration of the external quantum is an arithmetical progression, the specifying reaction of the qualitative nature of measure produces another series which is related to the first, increases and decreases with it, but not in a ratio determined by a numerical exponent but in a number of incommensurable ratios, according to a determination of powers.

⁹⁸ "[I]nkommensurabeln Verhältnisse." [I:348] Hegel compares Figure 19(c) to the progress concerning Intensive Quantum and Extensive Quantum. In Figures 14 and 15, each of these ideas was promoted in turn by the Understanding. In Figure 14(a), Extensive Quantum (or Extensive Magnitude) was presented as representing Amount. Then a single Degree was brought to the fore as *primus inter pares* of all the numbers—*i.e.*, the 100th degree. The Understanding next grabbed hold of Intensive Quantum (or Degree). But Dialectical Reason showed that Degree was dependent on plurality for its identity. Thus, the 100th degree was incoherent without an external reference to 1st-99th degree and 101st degree and higher. *See* Carlson, *Quantity*, *supra* note 7, at 1068-74. Throughout this process, Hegel now writes, "the quantum lying at the base suffers no alteration, the difference being only an outer form." (338) ("Das zugrunde liegende Quantum erleidet in diesem Unterschiede keine Veränderung, dieser ist nur eine äußere Form" [I:348]) Specifying Measure is different. Here, "the quantum is taken in the first instance in its immediate magnitude [1], but in the second instance it is taken through the exponent of the ratio [2] in another amount [3]." (338) ("hingegen ist das Quantum das eine Mal in seiner unmittelbaren Größe, das andere Mal aber wird es durch den Verhältnisexponenten in einer andern Anzahl genommen" [I:348]) The point seems to be that each Measure alters the other (through quantitative change). Measure therefore has physical consequence, whereas the alteration between Extensive and Intensive Magnitude did not.

(338)⁹⁹

This new range of values is the qualitative moment of the Ratio of Measure, and it is "the qualitative moment itself which specifies the quantum as such." (338)¹⁰⁰ What this implies is that, when a Measure is observed (or Specified), the reality of the Measure is *validly* observed. Yet the Measure in part escapes observation--the unmeasured thing [3] lies beyond the Ratio of Measures that is actually observed [4]. In short, to measure a thing is to change it.

Remark

In the Remark following Rule and Specifying Measure, Hegel gives temperature as an example of the Ratio of Measures. In temperature, he says, "two sides of external and specified quantum are distinguished." (338)¹⁰¹ The temperature of a body is registered in the external quantum of yet another body--mercury in a thermometer, for instance. Yet the body of a sick child and the thermometer differ in the rate at which they absorb temperature. The child's temperature affects the thermometer, but (it is forgotten) the thermometer affects the temperature of the child, "and the change of temperature in any one of them does not correspond in a direct ratio with that of the medium or of the other bodies among themselves." (338-39)¹⁰² Each body has a "specific heat."¹⁰³

⁹⁹ "[B]esteht für sich in dem dem Hinzutreten eines solchen numerischen Eins und wider eines solchen usf. Wenn so das äußerliche Quantum in arithmetischer Progression sich verändert, so bringt die spezifizierende Reaktion der qualitativen Nature des Maßes eine andere Reihe hervor, welche sich auf die erste bezieht, mit ihr zu- und abnimmt, aber nicht in einem durch einen Zahlenexponenten bestimmt, sondern einer Zahlenkommensurabeln Verhältnisse, nach einer Potenzenbestimmung." [I:348]

¹⁰⁰ "[D]as Moment des Qualitativen selbst zu verstehen, welches das Quantum als solches spezifiziert." [I:348]

¹⁰¹ "[D]iese beiden Seiten, äußerliches und spezifiziertes Quantum zu sein, unterscheiden." [I:348]

¹⁰² "[D]ie Temperaturveränderung desselben nicht der des Mediums oder ihrer untereinander im direkten Verhältnisse entspricht." [I:348]

¹⁰³ In physics, "specific heat" is the ratio of (a) the quantity of heat required to raise the temperature of a body one degree to (b) the quantity of heat required to raise the temperature of an equal mass of water one degree.

Temperature is in fact a ratio that differs from the temperature of either side of the ratio of child and thermometer.

The Ratio of Measures must not be looked at as the relation of mere Quantity to Quality. "In fact," Hegel writes, "the determining of the specifying ratio has now advanced to the stage where the moments of measure not only consist of a quantitative side and a side qualifying the quantum, both being sides of one and the same quality, but are related to each other as two qualities which are in themselves measures." (339)¹⁰⁴ In short, two complete Measures face each other, and produce yet another Measure which is a middle term--though mistakenly taken as being the truth of the Specified Measure.

(c) Relation of the two Sides as Qualities

In Figure 19(c), the qualitative side of the Ratio of Measures is intrinsic yet determinate (*i.e.*, constituted by Quantity). The quantitative side is said to be external [1]. But this externality is sublated and becomes internal [4, 5]. "This qualitative side," Hegel concludes, "thus has a quantum for its presupposition and its starting point." (339)¹⁰⁵ In other words, quality presupposes an externality, and, as we are still in the realm of Being, this externality is still taken as the starting point for determining what the thing is.

The external Quantity, however, has a quality of its own and so is qualitatively distinguishable from its other. Each Measure in the ratio is qualitatively distinguishable, and this very difference is their unity. This qualitative difference [2] is now sublated in the Ratio of Measures. It is "now to be posited in the *immediacy* of being as such, in which determination measure still is." (339)¹⁰⁶ That is,

¹⁰⁴ "Wie sich das spezifizierende Verhältnis gleich weiter bestimmen wird, daß die Momente des Maßes nicht nur in einer quantitativen und einer das Quantum qualifizierenden Seite einer und derselben Qualität bestehen, sondern im Verhältnisse zweier Quantitäten, welche an ihnen selbst Maße sind." [I:349]

¹⁰⁵ "[S]ie hat so dasselbe zu ihrer Voraussetzung und fängt von ihm an." [I:349]

¹⁰⁶ "[D]ieser Unterschied beider ist in der Unmittelbarkeit des Seins überhaupt, in welcher das Maß noch ist, zu setzen." [I:349]

externality is sublated, and Measure embraces immediacy.¹⁰⁷

Each of the two sides is qualitatively related and yet each is itself a Determinate Being--hence both qualitative and quantitative. The unity of the two extremes (each a Measure) is likewise a Measure. "Measure is thus the *immanent* quantitative relationship of *two* qualities to each other." (340)¹⁰⁸

Measure now has "*variable magnitude*." (340)¹⁰⁹ Quantum is sublated, so that it is no longer Quantum--determined externally. Now it is "quantum and something else." (340)¹¹⁰ This additional something is a qualitative element and "nothing else than its relation of powers." (340)¹¹¹ In Immediate Measure, alteration was not yet posited. Any change in the "arbitrary, single quantum" (340)¹¹² likewise changed the quality of the Measure. In Specifying Measure, however, we have "an alteration of the merely external quantum by the qualitative element." (340)¹¹³ A distinction is now posited between two specific magnitudes. There is a plurality of Measures constituting the Ratio of Measures, which is itself external to its two sides--as shown as [7] in Figure 19(c). Each side is to be distinguished from the Ratio of Measures [2, 4]. "It is in this distinguishedness of the quantum from itself"--*i.e.*, from each individual side--that a Measure "first shows itself to be a real [*daseiendes*] measure." (340)¹¹⁴ In this guise of distinguishing itself--[1] or [3]--from itself [2], each Measure "now appears as a

¹⁰⁷ In his account of Measure, John Burbidge tends to say things like "measurement is . . . nothing but a proportion between two numbers." BURBIDGE, REAL PROCESS, *supra* note 12, at 46. But it is very important to see the extremes as, not just numbers, but themselves independent Measures, the middle term of which is a metonymic "average" which we take to be the measure of a thing. To say that the extremes are mere numbers is to omit that they are *more* than numbers. They are Measures in and of themselves.

¹⁰⁸ "Das Maß ist so das immanente quantitative Verhalten zweier Qualitäten zueinander." [I:350]

¹⁰⁹ "[V]eränderlichen Größe." [I:350]

¹¹⁰ "[A]ls Quantum und zugleich als etwas anderes." [I:350]

¹¹¹ "[N]icht anderes als das Potenzenverhältnis desselben." [I:350]

¹¹² "[I]rgend und zwar ein einzelnes Quantum." [I:350]

¹¹³ "[E]iner Veränderung des bloß äußerlichen Quantums durch das Qualitative." [I:350]

¹¹⁴ "[D]as Quantum zeigt sich erst als daseiendes Maß in solcher Unterschiefenheit seiner von sich selbst indem es." [I:350]

Determinate Being which is both one and the same (e.g. the constant temperature of the medium), and also quantitatively varied (in the different temperatures of the bodies present in the medium)." (340)¹¹⁵ In other words, the Measures are both the Ratio of Measures and *not* the Ratio of Measures.

In the Ratio of Measures (or Realized Measure), one side of the ratio is Amount, "which increases and decreases in an external arithmetical progression." (341)¹¹⁶ This is the external Measure which is applied against the measured material. This is, for instance, the thermometer in the baby. The other side is the measured material--Unit to the external Amount. This would be the baby. But which side is which? Since the baby affects the thermometer as well as the thermometer affecting the baby, only external will can discern the difference. For themselves, "it is immaterial which is regarded as increasing or decreasing merely externally in arithmetical progression, and which, on the other hand, [is] specifically determining the other quantum." (341)¹¹⁷

Nevertheless, Rule and Specifying Measure as Amount must be present. Furthermore, the quality of one side of the ratio must be "extensive," and the other must be "intensive." Extensiveness stands for externality. Extensive quantity is Amount, power, and becoming-other. Intensiveness stands for being-within-self which is immune from, or "negative relatively" to, the other. (341)¹¹⁸ Intensive quantity is Unit and root.

Remark

In this remark, Hegel expostulates on velocity (s/t).¹¹⁹ If s/t

¹¹⁵ "[E]in und dasselbe (z. B. dieselbe Temperatur des Mediums), zugleich als verschiedenes und zwar quantitatives Dasein (--in den verschiedenen Temperaturen der in jenem befindlichen Körper) hervortritt." [I:350]

¹¹⁶ "[E]ine Anzahl, die in äußerlicher, arithmetischer Progression auf- und adgeht." [I:351]

¹¹⁷ "[I]st es gleichvel, an welcher die Vermehrung oder Verminderung als bloß äußerlich, in arithmetischer Progression fortgehend, und welche dagegen also an diesem Quantum sich spezifisch bestimmend angehesen wird." [I:351]

¹¹⁸ "Negative gegen jene." [I:351]

¹¹⁹ Here, s = space and t = time.

is merely taken as a Direct Ratio ($A/B = C$), then "it is immaterial which of the two moments is to be considered as amount or as unit." (342)¹²⁰ A Direct Ratio is merely a "formal determination which has no existence except as an intellectual abstraction." (342)¹²¹ Even if the Direct Ratio is the ratio of root and square ($s = at^2$ --Galileo's formula for the speed of falling bodies),¹²² the root (t) is an empirical, external quantum. The other side (s , as in $a = s/t^2$) is "taken as specified." (342)¹²³

The Ratio of Measures is more advanced, Hegel says, than the Direct Ratio. The logic of Measure requires "the qualifying of the quantitative." (342)¹²⁴ Because Measure brings to the fore the *quality* of both sides of the Ratio of Measures, $s^3 = at^2$ (Kepler's third law concerning the motion of planets)¹²⁵ is more "notional, because "both sides are related to each other in higher determinations of powers." (342)¹²⁶

At the level of Ratio of Measures, space, "like weight in specific gravity, is an external, real whole as such--hence amount--whereas time, like volume, is the ideal, negative factor, the side of

¹²⁰ "[S]o ist es gleichgültig, welches von beiden Momenten als die Anzahl oder als die Einheit betrachtet werden soll." [I:352] Direct Ratio is shown in Figure 17(a). See Carlson, *Quantity*, *supra* note 7, at 2141. It is represented by $A/B = C$. In Direct Ratio, either A or B could be Amount in which case either $1/A$ or $1/B$ was Unit. The problem with Direct Ratio was that both sides of the equation could be multiplied by B/C or A/C , in which case the "exponent," as Hegel called it (or quotient), could equally be said to be Unit or Amount.

¹²¹ "[Z]ur formellen, nicht existierenden, sondern nur der abstrahierenden Reflexion Betsimmung." [I:352]

¹²² $s = at^2$ can be viewed as Direct Ratio if it is taken as $a = s(t/t^2)$. The hallmark of Direct Ratio ($A/B=C$) is that, as A grows, B does as well. In Indirect Ratio ($A = BC$), as B grows C shrinks. The difference between Direct and Indirect Ratio is that, in Direct Ratio, the mathematician may switch the exponent with one of the sides. In Indirect Ratio, the exponent is fixed, which reveals a qualitative resistance to external manipulation. That is, in $A = BC$, if A is fixed, C can shrink (in which case B grows). But C can never shrink to zero without destroying the exponent. See Carlson, *Quantity*, *supra* note 4, at 2143-44.

¹²³ "[A]ls spezifiziert zu nehmen ist." [I:352]

¹²⁴ "Realization der Qualifikation des Quantitativen." [I:352]

¹²⁵ Here, s stands for the semimajor axis of an ellipse--*i.e.*, the farthest distance possible between the planet and the center of the sun. The variable t stands for the period of the orbit (for earth, one year).

¹²⁶ "[D]aß beide Seiten in höhern Potenzenbestimmungen . . . sich verhalten." [I:352]

unity." (342)¹²⁷ In other words, velocity is measured in *units* of time. Time is therefore internal and qualitative to velocity, but also negative, as time is a self-devouring "absolute coming-out-of-itself." (189)¹²⁸ Presumably, this means that the outside measurer can manipulate space traversed because she is in control of acceleration. But, no matter what she does, she cannot speed up or slow down the clock--not at least in a Newtonian universe.

Kepler's formula expresses "that which holds between the magnitudes of space and time in *free motion*." (342)¹²⁹ It is a formula more important than the formula for mere velocity. Hegel had earlier said that the free motion of celestial bodies "is determined solely by the Notion." (332)¹³⁰ That is, there is nothing contingent about the way the planets, in their evil mixture, move about the glorious planet Sol (according to Kepler's $s^3 = at^2$).¹³¹ In fact, Hegel

¹²⁷ "[W]ie in der spezifischen Schwere das Gewicht, ist äußerliches reales Ganzes überhaupt, somit Anzahl, die Zeit hingegen, wie das Volumen, ist das Ideele, das Negative, die Seite der Einheit." [I:352] Specific gravity is the ratio of (a) the density of a substance to (b) the density of some other substance (i.e., pure water taken at its maximum density at 4°C, when both densities are obtained by weighing the substances in air. For instance, if one cubic inch of gold weighs 19.3 times as much as one cubic inch of water, the specific gravity of gold is 19.3.

¹²⁸ "[E]in absolutes Außersichkommen." [I:182]

¹²⁹ "[D]aß in der freien Bewegung,--zuerst der noch des Falls--Zeit- und Raum-Quantität." [I:352-53]

¹³⁰ "[N]ur durch den Begriff bestimmte." [I:341] Harris proclaims such remarks to be Einsteinian. HARRIS, *supra* note 5, at 146.

¹³¹ As Shakespeare describes the planets:

The heavens themselves, the planets, and this centre,
 Observe degree, priority, and place,
 Insisture, course, proportion, season, form,
 Office, and custom, in all line of order
 And therefore is the glorious planet Sol
 In noble eminence enthroned and sphered
 Amidst the other; whose med'cinable eye
 Corrects the ill aspects of planets evil,
 And posts, like the commandment of a king,
 Sans check, to good and bad; but when the planets,
 In evil mixture, to disorder wander,
 What plagues and what portents, what mutiny,
 What raging of the sea, shaking of earth,
 Commotion in the winds, frights, changes, horrors,
 Divert and crack, rend and deracinate
 The unity and married calm of states

suggests such free motion rests "on the nature of the interrelated qualities of space and time." (342)¹³² In Kepler's ratio, time and space are said to be "*inseparable* and their quantitative relationship is the being-for-self of measure." (343)¹³³ Thus, time and space bear the relation that dy/dx bears in calculus. Neither dy nor dx has any meaning separate from their ratio. The *ratio* is what bore the Being-for-self of the derivative.

A true science, Hegel now reminds us, cannot be merely empirical, though this work is admittedly useful. Little has been done, however, with regard to Measure which is "strictly scientific" (i.e., non-empirical). (343)¹³⁴ "It is a great service to ascertain the empirical numbers of nature, e.g. the distance of the planets from one another." (343)¹³⁵ It is "an infinitely greater service,"¹³⁶ however, when the empirical numbers disappear and the universal forms (natural laws) are manifested¹³⁷--"immortal service which Galileo for the descent of falling bodies and Kepler for the motion of the celestial bodies have achieved." (343)¹³⁸ These laws were induced from mere experience. "But yet a still higher *proof* is required for

Quite from their fixure?

WILLIAM SHAKESPEARE, TROILUS AND CRESSIDA.

¹³² "[D]er Natur der im Verhältnis stehenden Qualitäten des Raums under der Zeit." [I:353] The motion of falling bodies ($s = at^2$), however, and mechanical motion in general are said to be conditioned. (342) Presumably this means that falling bodies start from rest and are impelled by external force to move. Not so with the happy planets, which simply move according to their nature.

With regard to unfree mechanical motion, Hegel says that the time factor (t) is said to be the root and the space factor is a square--that is, s is a function of t^2 . With the planets, however, the period of revolution around the sun (s^3) is one power higher than that of space (because $s = at^2$).

¹³³ "[U]ntrennbar . . . , und ihr quantitatives Verhältnis das Fürsichsein des Maßes." [I:353]

¹³⁴ "[E]igentlich wissenschaftlich." [I:353]

¹³⁵ "Es ist ein großes Verdienst, die empirischen Zahlen der Natur kennen zu lernen, z. B. Entfernungen der Planeten voneinander." [I:353]

¹³⁶ "[E]in unendlich größeres." [I:353]

¹³⁷ This may be a reference to Hegel's early dissertation *De Orbitis Planetarum*. See *supra* note 4.

¹³⁸ "[U]nsterbliche Verdienste, die sich z.B. Galilei in Rücksicht auf den Fall und Kepler in Rücksicht auf die Bewegung der himmlischen Körper erworben hat." [I:353]

these laws." (343)¹³⁹ The laws must be proven from the very notions of time and space themselves.¹⁴⁰ "Of this kind of proof there is still no trace in the said mathematical principles of natural philosophy." (343)¹⁴¹

C. Being-For-Self in Measure

The Ratio of Measures (or Specified Measure) has a Being-for-self, which will constitute the very negation of its being, in analogy to chapter 3 of Quality.¹⁴²

In Figure 19(c), the extremes had quantitative elements that were qualitatively determined. In other words, each extreme making up the Ratio of Measures was itself a Measure, as shown in Figure 19(c). These extremes had an existence that exceed the Specified

¹³⁹ "Es muß aber noch ein höheres Beweisen dieser Gesetze gefordert werden." [I:354]

¹⁴⁰ Professor Harris reads this appeal as one that Einstein would answer in the twentieth century. HARRIS, *supra* note 5, at 143.

¹⁴¹ Von dieser Art des Beweizens findet sich in jenen mathematischen Prinzipien der Naturphilosophie." [I:354] For a description of Hegel's attempt to "notionalize" Galileo's law, see Stefan Bütner, *Hegel on Galilei's Law of Fall*, in HEGEL AND NEWTONIANISM, *supra* note 4, at 331, 337-38.

Hegel goes on here to complain again of Newton's attempt to deduce the physics of the natural world from the calculus. "These proofs *presuppose* their theorems, those very laws, from experience; what they succeed in doing is to reduce them to abstract expressions and convenient formulae." (343) ("Diese Beweise setzen ihre Theoreme, eben jene Gesetz, aus der Erfahrung voraus." [I:354]) Hegel predicts:

Undoubtedly the time will come when, with a clearer understanding of what mathematics can accomplish and has accomplished, the entire, real merit of Newton as against Kepler--the sham scaffolding of proofs being discarded--will clearly be seen to be restricted to the said transformation of Kepler's formula.(343-44) (footnote omitted)

Das ganze reelle Verdienst, das Newton im Vorzug gegen Kepler in Beziehung auf die nämlichen Gegenstände zugeschrieben wird, wird--das Scheingerüste von Beweisen abgezogen--ohne Zweifel bei gereinigterer Reflexion über das, was die Maethematik zu leisten vermag und was sie geleistet hat, einst mit deutlicher Kenntnis auf jene Umformung des Ausdrucks. [I:354] (footnote omitted)

On Hegel's earlier attack on Newton, see Carlson, *Quantity*, *supra* note 4, at 2110-11.

¹⁴² Carlson, *Quality*, *supra* note 9, at 546-48.

Measure--[1] and [3] in Figure 19(c). As such, they are "so far posited only as immediate, *merely different* qualities." (344)¹⁴³ They do not have the continuous nature of their quantitative side and indeed have a meaning of their own quite divorced from the ratio in which they participate. In short, [1] is space and [3] is time, if we consider velocity. Each can be seen to operate independent of the other.

If [1] and [3] are immediate qualities, [2] must be the quantitative side of Measure. But [2] is just as immediate--qualitative--as [1] and [3] are. Simultaneously, [2] is just as much a part of [1, 2] and [2, 3] as [1] and [3] are respectively. Hence, the immediate quality is just as much an immediate quantum.

The quantitative aspect of the Ratio of Measures is what can be altered externally. Consequently, the Ratio of Measures is in part beyond itself--subject to outside control. That is, [4, 5] of the Ratio is just as much [1] because [4, 5] participates in the externality of [1, 2, 4, 5]; likewise [4, 6] is just as much [3]. Accordingly, "[q]uality and quantum as thus also appearing outside the specific measure [or Ratio of Measures] are at the same time correlated with it." (344)¹⁴⁴

External Quantum, then, is part of the Ratio of Measures, but it is "externally given." (345)¹⁴⁵ This givenness by an external measurer (who now replaces the external mathematician in the Quantity chapters) is "the negation of the qualitative determination of measure." (345)¹⁴⁶

This negation of the qualitative aspect of the Ratio of Measures is nevertheless *inside* the Ratio of Measures--on the law of sublation. Hence the qualitative heart of the Ratio of Measures is its quantitative promiscuity toward outside manipulation. This negativity at the heart of the Ratio of Measures is the Being-for-self of that entity. For this reason, Hegel says that "[t]he qualitative element thus masks itself, specifying not itself but the quantitative

¹⁴³ "[D]ie Qualitäten nur erst noch als unmittelbare, nur verschiedene gesetzt." [I:354]

¹⁴⁴ "Qualität und Quantum auch so außer dem spezifischen Maße auftretend, sind zugleich in der Beziehung auf dieses." [I:355]

¹⁴⁵ "[Ä]ußerlich gegebenes." [I:355]

¹⁴⁶ "[D]ie Negation der qualitativen Maßbestimmung." [I:355]

determinateness." (344)¹⁴⁷ In short, the Ratio of Measures is telling us what it is *not*. It is *not* independent from outside manipulation, and this susceptibility is precisely its quality.¹⁴⁸

Specified Measure is still specified. It is the qualitative "unit appearing as empirical, in the quantitative side of measure." (345)¹⁴⁹ But, even if its empirical unit is given to it, its true Being-for-self is hidden and still implicit. Its freedom from Specifying Measures is not yet truly "for-itself." For now, it is still a Determinate Being--"the quotient or exponent of a direct ratio between the sides of the measure." (345)¹⁵⁰

Falling Bodies. Hegel returns to the falling body, which moves according to $s = at^2$. This is a Ratio of Powers--a qualitative "natural" feature of all bodies that fall. As a mere mathematical expression, however, it is merely a Direct Ratio, in which space and time are indifferently brought together.

The velocity of an accelerating body is an expression of space traversed in the very first Unit of time.¹⁵¹ That is, the accelerating body has an *average* velocity, which is never its true speed. In the statement of velocity (for example, 25 MPH)--space is Amount as "determined by the specifying measure." (345)¹⁵² That is, the falling object does not demand that it must fall 25 miles. This criterion is imposed upon it. Yet, since we are considering the law of falling bodies as a Direct Ratio, space is just as much exponent as Amount. The velocity found by the measurer is therefore "the merely formal

¹⁴⁷ "Das Qualitative verhüllt sich so, als nicht sich selbst, sondern die Größbestimmtheit spezifizierend." [I:354]

¹⁴⁸ Writing of the passage just explicated, Cinzia Ferrini writes, "It is clear that for Hegel the empirical numbers of nature are now '*an sich*' captured by the conceptual net . . . which reveals something basic to them: namely, their qualitative aspect." Ferrini, *Framing*, *supra* note 4, at 299.

¹⁴⁹ "[Empirisch erscheinende Einheit in dem Quantitativen des Maßes." [I:356]

¹⁵⁰ "Quotient oder Exponent als eines Verhältnisses der Seiten des Maßes, dies Verhältnis als ein direktes genommen." [I:356]

¹⁵¹ Why is time Unit? According to one commentator, "the qualitative moment of time constitutes a being-for-self, time being negatively related to itself in a manner which is still entirely abstract. It is because of this that it qualifies as the relational unit and therefore as a denominator." Stefan Bütner, *supra* note 141, at 338.

¹⁵² "[A]ls der Exponent Maß bestimmte Anzahl." [I:356]

velocity which is not specifically determined by the Notion." (345)¹⁵³
 The velocity at the first unit of time does not actually exist, nor does
 the velocity at the last unit of time. Velocity is merely an average
 parading as the true velocity at any given unit of time.¹⁵⁴ "[T]his so-
 called unit of time is itself only an assumed unit and has as such
 atomic point no real being." (345-46)¹⁵⁵

The real Being-for-self in velocity is the constant a . "The same
 co-efficient a remains in all the following units of time," Hegel notes.
 (345)¹⁵⁶ Here is what is really internal to velocity. Space and time are
 externally imposed on the Measure. Yet it is Being-for-self "only in
 so far as this moment is *unexplicated* [*an sich*] and hence an
 immediacy." (346)¹⁵⁷ In short, the Being-for-self of the Specified
 Measure is precisely *not* its empirical measure.

Hegel concludes the first chapter of Measure by stating,
 "Measure has now acquired the character of a specified quantitative
 relation which, as qualitative, has in it the ordinary external
 quantum." (346)¹⁵⁸ But Measure is not just this Quantum. It is "a
 fixed exponent." (346)¹⁵⁹ As such, Measure has an integrity against
 the measurer. This qualitative aspect of the Measure in fact belies
 the quantitative expression. No quantum can ever state the true

¹⁵³ "[F]ormellen, nicht durch den den Begriff spezifisch bestimmten
 Geschwindigkeit." [I:356]

¹⁵⁴ "Fall, therefore, would be only a truly uniformly accelerated motion if the radius
 of the Earth were infinite, or, as Popper realized, if the height of the fall were zero.
 Paradoxically enough, only if the movement it involves were not a fall, would the law
 governing it be realized as a uniformly accelerated motion." Bütner, *supra* note ---, at
 336 (footnote omitted), citing KARL R. POPPER, *THE LOGIC OF SCIENTIFIC DISCOVERY*
 (1986).

¹⁵⁵ "[A]ber dieser sogenannte Zeitmoment ist eine selbst nur angenommene Einheit
 und hat als solcher atomer Punkt kein Dasein." [I:356] According to the *Science of*
Logic's translator, "This certainly indicates that he thought that the concrete sciences
 systematized in the *Philosophy of Nature* are dealing only with a sort of outer
 appearance, that the inner reality of the measurements and calculations by means of
 which they make their subject matter intelligible has to be sought here in the *Logic* .
 . ." Arnold Vincent Miller, *Defending Hegel's Philosophy of Nature*, in *HEGEL AND*
NEWTONIANISM, *supra* note 4, at 103, 112.

¹⁵⁶ "[D]ieselbe Koeffizient a bleibt in ersten Zeitmoment sein." [I:356]

¹⁵⁷ "[I]nsofern dasselbe an sich und daher als unmittelbares ist." [I:357]

¹⁵⁸ "Das Maß hat sich dahin bestimmt, ein spezifiziertes Größverhältnis zu sein, das
 als qualitativ das gewöhnliche äußerliche Quantum an ihm hat." [I:357]

¹⁵⁹ "[E]in unveränderlicher Exponent." [I:357]

speed of the falling body at any given moment. Thus, Measure has two sides--each of which is a Measure. One side is "immediate and external, and the other immanently specified." That these two moments are unified in Figure 19(c) "means that measure is now . . . *realised*." (347)¹⁶⁰ In this realization, however, "[t]he self-determination of the relation is thus *negated*." (347)¹⁶¹ Its explicit determinateness comes from its external other. Measure was supposed to be qualitative in its own self, "but possesses in truth such qualitative determinateness only in the other side of the relation." (347)¹⁶²

Measure is thus merely a negative unity--"a *real being-for-self*, the category of a *something* as a unity of qualities which are related as measures." (347)¹⁶³ Although the Specifying Measures are external and given to the Specified Measure, the Specified Measure nevertheless is "a complete *self-subsistent* something." (347)¹⁶⁴ Meanwhile, the two extremes of this something are each repulsed "into *distinct self-subsistent* somethings whose qualitative nature and subsistence (materiality) lies in their measure determinateness." (347)¹⁶⁵

II. Real Measure

Specified Measure (indifferently called the Ratio of Measures or Realized Measure) is by now "a correlation of measures," (348)¹⁶⁶ and it was precisely this correlation that constituted the quality of the empirical something. The fate of this correlation now occupies our attention. Thus, whereas the first chapter in Measure was propositional (*i.e.*, the province of the Understanding), the current

¹⁶⁰ "[D]as Maß nun auf diese Weise realisiert ist." [I:357]

¹⁶¹ "[S]eine Selbstbestimmung ist darin negiert." [I:358]

¹⁶² "[A]n jenem erst in Wahrheit die qualitative Bestimmtheit." [I:358]

¹⁶³ "[R]eales Fürsichsein, die Kategorie eines Etwas, als Einheit von Qualitäten, die im Maßverhältnisse sind." [I:358]

¹⁶⁴ "[E]ine volle Selbständigkeit." [I:358]

¹⁶⁵ "[I]n unterschiedene Selbständige, deren qualitative Natur und Bestehen (Materialität) in ihrer Maßbestimmtheit liegt." [I:358]

¹⁶⁶ "Beziehung von Maßes." [I:358]

chapter is dialectic in nature.¹⁶⁷

In Specified Measure, relations concerned "abstract qualities like space and time." (348)¹⁶⁸ These were earlier said to be inseparable. (342) Now concepts like specific gravity¹⁶⁹ and chemical properties take the stage.¹⁷⁰ These are "determinations characteristic of *material* existence." (348)¹⁷¹ Because the Ratio of Measures is the

¹⁶⁷ Harris and Mure frankly proclaim the second chapter of Measure in the *Science of Logic* to be incomprehensible and announce that they will analyze the simpler discussion of the *Lesser Logic* only. HARRIS, *supra* note 5, at 145; MURE, *supra* note 1, at 121-22. Another commentator suggests Hegel's contributions to natural science have not been well received:

On the one hand, natural scientists considered Hegel's *Philosophy of Nature* to be hocus-pocus, drastically contradicted by the progress in chemistry and physics, and discredited all passages of Hegel's *Science of Logic* in which models from the *Philosophy of Nature* played a role. On the other hand, philosophers tried to keep the *Science of Logic* independent of every specific material that had become obsolete by scientific progress.

Ulrich Ruschig, *Logic and Chemistry in Hegel's Philosophy*, 7 INT'L J. PHIL. CHEMISTRY 5, 6 (2001). John Burbidge, however, provides a lengthy and sympathetic account of this chapter. He reports that the chapter was substantially revised in the 1831 edition of the *Science of Logic*, to account for new developments in chemistry since 1813. JOHN W. BURBIDGE, REAL PROCESS, *supra* note 12, at 56-58.

¹⁶⁸ "[A]bstrakten Qualität wie dem Raume und der Zeit." [I:358]

¹⁶⁹ Specific gravity, it will be recalled, is the ratio of (a) the density of a substance to (b) the density of some other substance, when both densities are obtained by weighing the substances in air. See *supra* text accompanying notes 127-28.

¹⁷⁰ Clark Butler suggests that the first chapter of Measure concerned physics, while the second chapter deals with chemistry. He puts it this way:

The *Logic* distinguishes between ideal measurement by stipulated units of a universal physical variable (such as force) and real measurement by natural units of a particular element of compound (such as water or salt). Ideal measures are found in physics, real measures in chemistry. Chemistry distinguishes particular material compounds, while physics (mechanics) distinguishes universal properties of matter everywhere.

BUTLER, *supra* note 63, at 112. It must be added, however, that "real measures" are also ideal. On the law of sublation, we have been in the realm of the ideal ever since True Infinity arrived upon the scene. As for "natural units" in chemistry, Butler has in mind atoms--a dangerous claim, since Hegel was vociferously anti-atomic, even in chemistry. See *infra* text accompanying note 248.

¹⁷¹ "[W]elche als Bestimmungen materieller Existenzen sind." [I:358] Hegel finished the first chapter of Measure by defining materiality as "qualitative nature and

puck over which two resilient Measures face off, the Measures can now be considered separable and, eventually, entirely dispensable from the middle term.

Hegel begins by summarizing the crosses to be borne and the perils to ensue. Real Measure is first "a self-subsistent measure of a material thing which is related to others." (348)¹⁷² The Real Measure specifies these others as well as being specified by them.¹⁷³ These Specifying Measures are in turn specified, and so an entire series of Measures is always invoked. "[S]pecific self-subsistence does not continue as a single direct relation but passes over into a specific

subsistence." (347) ("qualitative Natur und Bestehen").

Space and time are not now divorced from these considerations. They are still moments, "but their relationship no longer depends simply on their own nature because they are now subordinated to further determinations." (348) ("die aber nun, weitem Bestimmungen untergeordnet, nicht mehr nur nach ihrer eigenen Begriffsbestimmung sich zueinander verhalten"). Hegel gives the example of sound. In sound, there is the time in which vibrations occur and the spatial element of the length and thickness of the thing that vibrates. Any magnitude these considerations enjoy is determined externally. That is, fortune's finger must sound a stop on the pipe if we are to hear a note of music.

¹⁷² "[E]in selbständige Materialität einer Kotherrperlichkeit, das sich zu andern verhält." [I:359] Ulrich Ruschig complains that the materiality to which Real Measure is applied is simply assumed *sub silentio*, neither derived nor derivable from prior categories, such as Pure Being. Ruschig, *supra* note 167, at 7. But this overlooks the fact that Pure Being *is* material. This material is rendered ideal at the end of Deterrminate Being. We now have merely the thought of materiality to which the thought of Measure is applied. Not merely assumed, materiality is the residue of Pure Being and hence is derived. To be sure, there is the "givenness" of the beginning of the Logic, which Hegel concedes and carefully discusses. See David Gray Carlson, *The Antepenultimacy of the Beginning in Hegel's Science of Logic* (2003) (unpublished manuscript). Ruschig means something different in his criticism, which cannot be judged as well taken.

¹⁷³ What makes the Measure "real"? Professor Butler suggests that the chemicals dictate their own proportions and therefore can be considered "natural units." BUTLER, *supra* note 63, at 113. In physics, which involved inseparable time and space, there were no natural units. "Since force and other physical variables vary continuously in quantity, there is no objective unit of force." *Id.* Butler implies here that time or space are infinitely divisible, so that the unit of time--hour or second--is conventionally chosen. Hegel did say in general, however, that space "is an external, real whole as such--hence amount--whereas time, like volume, is the ideal, negative factor, the side of unity." (342) ("äußerliches, eales Ganzes überhaupt, somit Anzahl, die Zeit hingegen, wie das Volumen, ist fas Ideale, das Negative, die Seite der Einheit") [I:352] On what this means, see *supra* text accompanying notes 129-32.

determinateness which is a series of measures." (348)¹⁷⁴

A direct relation nevertheless exists. These unique, exclusive measures are "Elective Affinities," which will be discussed later.¹⁷⁵ When opposing Measures are each viewed as Elective Affinities, each Measure can sustain a certain amount of quantitative change without undergoing qualitative change. But eventually, qualitative change ensues. Hegel calls this face-off of quantitative properties, as limited by qualitative change, the Nodal Line. The Nodal Line yields the Measureless and "the *infinity* of measure. In this, the self-exclusive and self-subsistent measures are one with each other." (349)¹⁷⁶ In other words, Measure escapes its servitude to externality, "and the self-subsistent measure enters into a negative relation with itself." (349)¹⁷⁷

A. The Relation of Self-Subsistent Measures

The Measures have become self-subsistent. This is a sign that Quantity has recaptured its Quality. We are on the verge of checking out from the transient hotel of Being altogether, in order to take up a permanent self-subsistence in the realm of Essence, where "things" endure over time.

Measures are actually relations of Measures, which are themselves relations of Measures. They are "physical somethings" and "material things." (349)¹⁷⁸ In this first section of Real Measure, the relation undergoes three changes. (a) At first, the relation is immediate. It is separate from its extremes (the Specifying Measures). (b) These separate Measures, however, are also quantitative, which means they continue on into the relation which

¹⁷⁴ "[D]ie spezifische Selbständigkeit bleibt nicht in einem direkten Verhältnisse bestehen, sondern geht in spezifische Bestimmtheit, die eine Reihe von Maßen ist, über." [I:359]

¹⁷⁵ Elective Affinity will stand for the neutral "third" Measure that two diverse Measures produce when brought into juxtaposition. *See infra* text accompanying notes 229-36.

¹⁷⁶ "[D]ie Unendlichkeit des Maßes ein, in welcher die sich ausschließenden Selbständigkeiten Eins miteinander sind." [I:359]

¹⁷⁷ "[U]nd das Selbständige in negative Beziehung zu sich selbst tritt." [I:359]

¹⁷⁸ "[E]twas, physikalische . . . materielle Dinge." [I:359]

is their middle term. (c) The quantitative aspect of these Measures represents the range of quantitative change each Measure can undergo without suffering a qualitative change. Thus, each Measure is a series facing another series in a determinate way. Hegel calls this Elective Affinity. Here Measure's indifferent willingness to be externally applied to other Measures becomes exclusive to certain others and hence a qualitative Being-for-self.

(a) Combination of Two Measures

The ensuing section on combination of measures is exceptionally mysterious. It stands for the externality inherent in the idea of combination. Thus, the measurer combines substances, which, like school children at a cotillion, are indifferent to the choice of a partner. In the preview just prior to this section, Hegel writes of the combined measures that each is self-subsistent. Each "exists apart in particular things and their *combination* is effected *externally*." (349)¹⁷⁹ Hence, as this section stands for the move of Understanding, we will draw Figure 20(a) as follows:

[All Figures can be found in an Appendix at the end of this article]

Figure 20(a) Combination of Measures

I am interpreting the lesson here to be that, at first, Measure is always a compound of other Measures. At first, it is alienated from the true nature of the thing measured.

Hegel begins by reminding us that a thing is both a relation of Measures and itself a Measure. As a Measure, it is a unity between what is internal and what is external. Inwardness (or being-within-self) is exemplified by weight, if weight is taken intensively. Meanwhile, if the thing has multiple parts, this multiplicity is

¹⁷⁹ "[B]estimmt sind, außereinander an besondern Dingen bestehend, und werden äußerlich in Verbindung gesetzt." [I:359-60]

extensive--or "for other."

The internal, intensive side is joined to an external appearance--"the abstract, ideal element of space." (349)¹⁸⁰ The external appearance is quantitatively determined (and space, it will be recalled, is Pure Quantity itself).¹⁸¹ The relation of these external qualities--their negative unity--"constitutes the qualitative nature of the material something." (349-50)¹⁸² This appears to mean that the measurer, who joins the external qualities together in a quantitative way, puts them together in a Measure, but a unity transcending the Measure constitutes the true quality of the thing. Hegel aims here, I think, at the negative constitution of things that will be emphasized in the doctrine of Essence.¹⁸³

Specific gravity--the ratio between weight and volume--is given as an example of Figure 20(a). Weight is portrayed as more authentic to the thing than volume. As proof, Hegel points out that, when two indifferent substances--say, gold and silver--are mixed together, the weight of the combination is the sum of the weights of each substance. Thus, the mixture of one pound of gold and one

¹⁸⁰ "[D]as Abstrakte, Idee, der Raum." [I:360]

¹⁸¹ See Carlson, *Quantity*, *supra* note 4, at 2030-31.

¹⁸² "[M]acht die qualitative Natur des materiellen Etwas aus." [I:360]

¹⁸³ Ulrich Ruschig draws a different conclusion. He thinks that Hegel is claiming that specific weight (or density) is more "real" than the Ratio of Measures in Figure 19(c). Ruschig criticizes this position:

Yet it is doubtful if the transition to the "real" and allegedly more intrinsic measure can be regarded as a step in the logic of measuring without referring to a particular material. It is also doubtful if there is a merely logical reason that the direct ratio of mass and volume is the correct one for such a measuring.

Ruschig, *supra* note 167, at 10. Ruschig suggests, to the contrary, that density fails to characterize the complete truth of a substance. "[C]haracterization by external comparison turns out to be superficial," he writes. *Id.* I think this is precisely Hegel's point. I don't think Hegel is saying that density is *closer* to measuring the real thing than Rule was, which produced the Ratio of Measures in Figure 19(c). Rather, in density (used by Hegel as a mere example of Real Measure) an external force is necessary to accomplish the measuring, but there is some unique quantity in the measured material which is truly essential to the thing. The thing is not *totally* open to outside manipulation. Hegel is working on bringing out into the open this "measureless" essence of the thing. He is not trying to measure the measureless, as Ruschig implies.

pound of silver weighs two pounds.

This is not so with volume. Volume is spatial, and Hegel names this the ideal aspect of the thing. Why ideal? It will be recalled that ideality stands for reduction to thought. An ideality was thus defined at the end of Determinate Being as, in effect, the mere memory of a moment that has passed away through sublation.¹⁸⁴

If we consider a physical object as constructed of molecules whizzing about but somehow held together by Attraction in a shape--this object is mostly space (or Repulsion) and very little "substance." The space infused between the molecules of a thing cannot be perceived. It is negative, and negative things are deduced, not perceived. Space is simply a thought and hence ideal, not "real."

To prove that space is ideal, Hegel invokes again the admixture of two indifferent substances. Perhaps if we add a pound of gold to a pound of silver, we have an alloy that weighs two pounds. But if we add a *cup* of gold to a *cup* of silver, we get less than two cups. The joint volume of a compound may be less than the sum of the individual substances. This is true because the substance is a mixture of material and non-material--or empty and filled space. Hence, when liquid gold is added to liquid silver, some of the silver atoms slip into the space that pure gold would have preserved, so that the joint volume is less than the sum of the individual volumes.¹⁸⁵

Not only is space-volume taken as ideal, it is also to be taken as Unit. Why is this so? Recall that, in the early career of Quantity, the part of Number that was Amount and the part that was Unit was arbitrarily designated by the mathematician. Apparently measurers have no such discretion accorded to them.

I think space's status as Unit reflects the negative constitution of things. Hegel has just said that the negative unity of qualities composed by the measurer was the qualitative nature of the thing.

¹⁸⁴ Carlson, *Quality*, *supra* note 9, at 546-48.

¹⁸⁵ Later, Hegel will criticize such naive descriptions as I have provided for assuming the existence of atoms without metaphysical proof. (360) I am undoubtedly guilty as charged. My point simply is that solid objects are made up mostly of empty space.

"Unit" stands for Discreteness, content, being, etc. All these concepts tended to the right of the page early in Quantity. Now the thing is conceived as Ratio--a negative unity of independent Measures. This negativity is to be equated with space--and with the ideality of things in general. Volume-space is therefore the "being" of the material thing. It is to be taken as leaning to the left of the page. Thus, Hegel remarks that "it is space itself which constitutes the subsistence of matter in its external separated existence." (351)¹⁸⁶

If volume is Unit because it is spatial, extensive, external, and subjective, then weight (in specific gravity) is Amount. This is the intensive aspect of the thing, "which manifests [the thing] quantitatively." (350)¹⁸⁷ For instance, a cubic inch of gold weighs 19.3 times as much as one cubic inch of water, when water is at its maximum density at 4E C, and when the densities of both gold and water are obtained by weighing the substances in air. Hence, we can say that for every unit (i.e., cubic inch of water), gold manifests itself by the unique amount of 19.3. Quantity is therefore intrinsic to the physical object. Nevertheless, this Amount, although intrinsic, is negative, because negativity is the constitution of all things. Gold is *not* inherently 19.3, but is so only under very specified conditions to which gold itself is indifferent. Hence, Amount leans to the right of the page.

Here we have no Ratio of Powers, however. Ratio of Powers stood for the relation that is immune from manipulation of the mathematician. So long as the exponent 16 stayed fixed in $x^2 = 16$, x determined itself as {4, -4}.

This cannot be said of specific gravity. Nothing inherent in gold requires its comparison to a cubic inch of water at 4E C. Hegel says of Measures like specific gravity that

with the self-subsistence of the material thing immediacy has returned and in this the specific magnitude is an ordinary quantum whose relation to the other side is likewise determined as the

¹⁸⁶ "[D]er Raum selbst macht das Bestehen der außereinanderseienden Materie aus." [I:362]

¹⁸⁷ "[D]as in quantitativer Bestimmtheit." [I:360]

ordinary exponent of a direct ratio. (350)¹⁸⁸

Why has immediacy returned? I think this means that the Measure of the thing is a negative unity of diverse Measures brought together externally to define the thing. Of course, the Measures are diverse and subjectively chosen, but the fact that the unity of them *is* the thing suggests that the thing is immediate. That is, if the Measures are stripped away and the mediating unity alone is considered, this unity is an immediacy. Yet in any such immediacy, the thing is at the mercy of the measurer. For that reason, we do not have the Ratio of Powers before us but highly manipulated quanta of the sort that we witnessed in Direct Ratio.

The intrinsic Quantum of gold, if I may continue with that example, "is an immediate quantum," (350)¹⁸⁹ and it is specific to the thing. But it is likewise determined "only in the *comparison* with other exponents of such ratios." (350)¹⁹⁰ Here Hegel apparently emphasizes the conventionality of Measure. Earlier, Hegel remarked that it is "foolish to speak of a *natural* standard of things." (334)¹⁹¹ Universal standards of measure are merely conventional--"a matter of complete indifference." (334)¹⁹² Here, Hegel seems to be saying that specific gravity is conventional, but it likewise captures *the actual thing* which *actually* manifests itself quantitatively. Thus:

The exponent constitutes the specific intrinsic determinedness, the inner characteristic measure of something; but because this its measure rests on a quantum, it too is only an external, indifferent determinateness. (350)¹⁹³

¹⁸⁸ "[D]aß in der Selbständigkeit des Fürsichseins (materiellen Seins) die Unmittelbarkeit zurückgekehrt ist, an welcher die Größebestimmtheit ein Quantum als solches, und das Verhältnis eines solchen zu der andern Seite ebenfalls in dem gewöhnlichen Exponenten eines direkten Verhältnisses bestimmt ist." [I:360]

¹⁸⁹ "[U]nmittelbares Quantum." [I:360]

¹⁹⁰ "[I]st nur in der Vergleichung mit andern Exponenten solcher Verhältnisse bestimmt." [I:360]

¹⁹¹ "Es ist daher töricht, von einem natürlichen Maßstabe der Dinge zu Sprechen." [I:344]

¹⁹² "[I]st es völlig gleichgültig." [I:344]

¹⁹³ "Er macht das spezifische Ansichbestimmten, das innere eigentümliche Maß von etwas aus; aber indem dieses sein Maß auf dem Quantum beruht, ist es auch nur als äußerliche, gleichgültige Bestimmtheit." [I:360-61]

Hence, gold's unique weight of 19.3 becomes something entirely different if comparison of gold is to another metal (*i. e.*, mercury) rather than water at 4E C. Accordingly, the intrinsic magnitude of the thing is *alterable*.

As the section heading indicates, specific gravity is "The Combination of Two Measures" (349)¹⁹⁴ A cubic inch of water at 4E C (Unit) with the weight of 1 (Amount) is one Measure that faces off against gold, the second Measure, which has the same Unit (cubic inch) but a different Amount (19.3). In this encounter, "each of the two measures, just because it is a measure, preserves itself in the alteration which it ought to suffer through the externality of the quantum." (350)¹⁹⁵ Thus, self-preservation is "an alteration of the measure itself" and nevertheless "a reciprocal specification." (350)¹⁹⁶ Yet "this self-preservation is itself a negative relation toward this quantum." (350)¹⁹⁷ In other words, there is some quantitative aspect of gold which is *not* 19.3. Whatever this unnameable Quantity is, it is quite alienated from 19.3. Yet this Quantity likewise specifies 19.3, when gold and water are compared. Measure, then, is simultaneously a liar *and* a truth-teller about things.

Hegel has not finished with weight and volume (the sides of the ratio known as specific gravity). If a substance were only quantitatively determined, the admixture of two equal units of two different substances should double their weight and volume. Weight is indeed doubled but volume is not.

That weight is doubled is evidence that weight is "a real being-for-self" and "fixed determinate being" of the substance. (351)¹⁹⁸ But even weight's exponent is subject to alteration, since the exponent expresses the qualitative aspect of the compound. Hegel has already said that the qualitative aspect of material things is the

¹⁹⁴ "Verbindung zweier Maße." [I:360]

¹⁹⁵ "Einerseits erhält sich nun jedes der beiden Maße in der Veränderung, die an dasselbe durch die Äußerlichkeit des Quantums kommen sollte, weil es Maß ist." [I:361]

¹⁹⁶ "[E]ine Veränderung des Maßes selbst und zwar eine gegenseitige Spezifikation." [I:361]

¹⁹⁷ "[A]ndererseits aber ist dieses Sicherhalten selbst ein negatives Verhalten zu diesem Quantum."

¹⁹⁸ "[D]ie fürsichseiende zum festen Dasein." [I:361]

unity of their external parts. This appears to mean that the substance can undergo quantitative change *without* undergoing qualitative change. The quality of a substance is therefore its indifference toward its outward quantitative measure. Accordingly, Hegel writes, "The exponents, however, are subject to alteration since they are the expression of the qualitative aspect of the compound." (351)¹⁹⁹

Weight, then, does not, after all, represent the immanent determining of the quantitative element of the thing. Immanence is in fact on display with regard to volume, even though the volume of the compound is exempt from the rigor of addition. Its indifference to addition suggests that volume is not the "real being-for-self"²⁰⁰ of the substances. Nevertheless, Being-for-self is precisely the *non-immanence* of a thing's content.²⁰¹ Volume represents immanence because "it is space itself which constitutes the subsistence of matter in its external separated existence." (351)²⁰² In other words, what subsists in a Measure is its negativity to outward Measure--negative space.

Being negative, subsistence "lacks intrinsic being." (351)²⁰³ Evidence of this is that the quantitative volume of the compound is "subject to alteration." (351)²⁰⁴ The upshot of "this immanent determining of the quantitative element" in volume is that "space is posited as what it truly is, an ideal being." (351)²⁰⁵ That is, space is not a *real* being but simply the thought of a past moment of the substance. That it is merely an absence is why addition does not

¹⁹⁹ "Aber in die Exponenten fällt die Veränderung, indem sie der Ausdruck der qualitativen Bestimmtheit, des Fürsichseins als Maßverhältnisse sind." [I:361] Hegel also says that weight is "the number or amount of material parts," from the quantitative point of view. (351) ("[D]ie Menge der materiellen Teile." [I:361]) Perhaps this likewise means that the *perceived* number of pounds or grams that a substance yields is external to the thing that is being weighed.

²⁰⁰ See Figure 8(a).

²⁰¹ Carlson, *Quality*, *supra* note 9, at 570-89.

²⁰² "[D]er Raum selbst macht das Bestehen der außereinanderseienden Materie aus." [I:362]

²⁰³ "[I]st das nicht an sich Seiende." [I:362]

²⁰⁴ "[D]as Veränderliche." [I:362]

²⁰⁵ "[D]er Raum wird auf diese Weise als das, was er ahrhaft ist, als das Ideeale gesetzt." [I:362]

apply.

Volume and weight are the qualitative sides of material things. Volume is inherently alterable, and so addition does not apply to it. But even weight is alterable. Things on earth weigh something different when they are transported to the moon. "[M]easure itself--and so too the qualitative nature of the something based on it--has shown that it is unstable in its own self." (351)²⁰⁶ Measure "has its determinateness in other measure relations." (351)²⁰⁷

The lesson to be drawn from "The Combination of Two Measures," I think, is that all things have a Measureless aspect that escapes merely external Measure. But Hegel does not wish to concede that there is an unknowable thing-in-itself in the manner of Kant. Measure says something true about the thing as well, which will be the contribution of Dialectical Reason in the next section.

(b) Measure as a Series of Measure Relations

Metonymy is the theme of this new section's tongue. Metonymy is the inability to name the thing directly, but only the context of the thing. In metonymy, if the entire context is described, the unnameable thing becomes a ghostly space the existence of which is simply inferred from context.²⁰⁸ Or, as Slavoj Žižek puts it:

The oneness of a thing is grounded not in its properties, but in the negative synthesis of a pure 'One' which excludes (relates negatively to) all positive properties: this 'one' which guarantees the identity of a thing does not reside in its properties, since it is ultimately its signifier.²⁰⁹

²⁰⁶ "[S]ondern das Maß selbst und damit die darauf gegründete qualitative Bestimmtheit." [I:362]

²⁰⁷ "[S]eine Bestimmtheit in andern Maßverhältnissen zu haben." [I:362]

²⁰⁸ See Michel Rosenfeld, *The Identity of the Constitutional Subject*, in *LAW AND THE POSTMODERN MIND: ESSAYS ON PSYCHANALYSIS AND JURISPRUDENCE* 157-65 (Peter Goodrich & David Gray Carlson eds., 1998); Jeanne L. Schroeder, *The Midas Touch: The Lethal Effect of Wealth Maximization*, 1999 W IS. L. REV. 687, 762 ("[I]n metonymy, the signified always remains hidden, and negative . . .").

²⁰⁹ SLAVOJ ŽIŽEK, *THE FRAGILE ABSOLUTE--OR, WHY IS THE CHRISTIAN LEGACY WORTH FIGHTING FOR?* 51-52 (2000).

In the current section, Hegel suggests that a thing is ultimately the series of quanta produced when the thing is measured by all the other things that surround it. The thing is therefore a vacant place that is beyond direct, unmediated knowledge, but nevertheless indirectly knowable. Although Hegel's translators do not invoke the word metonymy, I hazard the view that metonymy is now our theme. Figure 20(b) becomes:

[All Figures can be found in an Appendix at the end of this article]

Figure 20(b) **Measure as a Series of Measure Relations**

Shakespeare's Ulysses, in praise of degree, says: "Take but degree away, untune that string, And, hark, what discord follows! each thing meets In mere oppugnancy."²¹⁰ Hegel²¹¹ confirms this insight:

If two things forming a compound body owed their respective specific natures only to a simple qualitative determination, they would only destroy each other when combined. (351)²¹²

It is the quantitative element that permits a thing to survive combination. The quantitative element is therefore key to self-subsistence.

Yet self-subsistence is immanent to the thing. Therefore, self-subsistence requires that the thing be combinable with another thing. That is, the one Measure is affected quantitatively by the other Measure and yet remains what it is qualitatively. In addition,

²¹⁰ WILLIAM SHAKESPEARE, *TROILUS AND CRESSIDA*.

²¹¹ An ardent admirer of Shakespeare, incidentally. WALTER KAUFMANN, *HEGEL: A REINTERPRETATION* 253 (1978); T.M. KNOX, *The Puzzle of Hegel's Aesthetics*, in *ART AND LOGIC IN HEGEL'S PHILOSOPHY* 1, 4 (Warren Steinkraus & Kenneth I. Schmitz eds., 1980); *but see* HORST ALTHAUS, *HEGEL: AN INTELLECTUAL BIOGRAPHY* 210 (Michael Tarsh trans. 2000) (Hegel thought Shakespeare was artistically confused).

²¹² "Wenn etwas, das mit anderm vereint wird, und evenso dies Andere, nur durch die einfache Qualität bestimmt, das wäre, was es ist, so würden sie in dieser Verbindung nur sich aufheben." [I:362]

its quantitative manifestation is unique to the thing. Hence, Hegel writes, the thing's "quality is masked in the quantitative element and is thus also indifferent towards the other measure, continuing itself in it and in the newly formed measure." (352)²¹³ The thing, then, both contributes to and escapes detection of its Measure.

Hegel speaks of a Specified Measure being taken by a measurer who imposes yet another (Specifying) Measure on it. The result is a predictable Quantum which is nevertheless external to the "true" Measureless thing.

The exponent of the new measure is itself only some quantum or other, an external determinateness, and its indifference finds expression in the fact that the specifically determined thing effects, in association with other such measures, precisely similar neutralizations of the reciprocal measure relations. (352)²¹⁴

Here, Hegel is denying that Measure is an arbitrary Quantum, as Figure 20(a) insisted. Rather, it contributes to a unique middle term between the two Measures which nevertheless fails to express the true being of the Specified Measure completely.²¹⁵

Hegel in this section emphasizes that it takes two sub-Measures to produce a third externally observable Measure. Yet neither constitutive sub-Measure is entirely reflected in the observable third Measure. Nevertheless, the observed Quantum is

²¹³ "Seine Qualität ist eingehüllt in das quantitative; damit ist sie ebenso gleichgültig gegen das andere Maß, kontinuiert sich in dasselbe und in das neue gebildete Maß hinein." [I:362]

²¹⁴ "[D]er Exponent des neuen Maßes ist selbst nur irgendein Quantum, äußerliche Bestimmtheit, stellt sich als Gleichgültigkeit darin da, daß das spezifisch bestimmte Etwas mit andern abensolchen Maßen ebendergleichen Neutralisierungen der beiderseitigen Maßverhältnisse eingeht." [I:362]

²¹⁵ There is a mysterious sentence in the Miller translation that is more clearly expressed in the Johnson-Struthers translation. Immediately after the most recent quote in the text, the Miller translation states: "[I]t is only one measure relation formed by itself and another specifically determined thing that its specific peculiarity is not expressed." (352) Johnston and Struthers put it this way: the "specific peculiarity [of a thing] fails to express itself when it and another form *One* only." 1 HEGEL'S SCIENCE OF LOGIC 371 (W.H. Johnston & L.G. Struthers trans., 1929) ("in nur Einem, von ihm und einem andern Gebildeten drückt sich seine spezifische Eigentümlichkeit nicht aus" [I:362]).

a true statement of the Ratio of Measures.²¹⁶ And, further, every Measure has a series of unique quanta that relates it to any given Measure the measurer cares to bring forth.

Hegel now speaks about the Series of Measures that define a thing's relation to other Measures: "This combination with a number of others which are likewise measures within themselves, yields different ratios which therefore have different exponents." (352)²¹⁷ Only when a self-subsistent Measure is compared to some other Measure does its unique exponent make itself apparent. This exponent, however, is a "neutrality," not a direct expression of the *real* exponent. The thing (or its qualitative exponent) is, in effect, a *series* of neutral exponents. The qualitative exponent, Hegel says, is to be taken as the Unit of the series--its true qualitative being.

Hegel now warns against a misimpression: a self-subsistent Specified Measure (x) forms a series of exponents with a series of other Measures. Suppose this series is defined as X , with members X_{xj} . Now imagine one of the Specifying Measures (y), which contributes one exponent (X_{xy}) to the set of X . The misimpression is that, just as X defines the Specified Measure, X also defines the *Specifying* Measure (y). This is not so, Hegel says. Rather, y has a series Y such that $Y_{xy} = X_{xy}$. x and y have $Y_{xy} = X_{xy}$ in common. "It is this alone . . . which makes it possible to compare the two self-subsistent measures." (353)²¹⁸

²¹⁶ The truth, of course, is merely one-sided. Nevertheless, as Andrew Haas points out, "being is a result of measurement; that is, 'to be' means 'to already have a measure'--forbeing is merely an abstraction from concrete measurement, or a reduction and fixing of immeasurable singularity." ANDREW HAAS, *HEGEL AND THE PROBLEM OF MULTIPLICITY* 139 (2000). In short, things *are* only to the extent they are measured by consciousness.

It does not follow, however, as Ulrich Ruschig suggests, that "the quality of a substance can be characterized more precisely by comparing its initial density with the densities of its combinations with substances." Ruschig, *supra* note 167, at 11. Hegel is not aiming to define *precise measurement*. Rather, he is trying to show that, no matter how precise the measurement, there is a measureless aspect of a thing that escapes.

²¹⁷ "Diese Verbindung mit Mehrern, die gleichfalls Maße an ihnen sind, gibt verschiedene Verhältnisse, die also verschiedene Exponent haben." [I:362-63]

²¹⁸ "In ihr also liegt allein die Vergleichbarkeit der beiden Selbständigen, die also sich nicht neutralisierend, sondern als gleichgültig gegeneinander angenommen wurden." [I:363-64]

Furthermore, Hegel continues, x , as Specified Measure, is Unit and the series X (including X_{xy}) is Amount. But from y 's perspective as Specified Measure, y is Unit and the series Y_{xy} is Amount. Furthermore, X and Y are each to be considered Units in and of themselves. Hence, x and y are "Amounts" in the Units X and Y .

If the series X , for instance, is a Unit, then X itself refers to some other series X'_{xj} , which is Amount to X -as-Unit but likewise Unit to some further Amount. Hence, there is an infinite regress--a Spurious Infinity--in "Measure as a Series of Measure Relations." As we are in a dialectic mode, we see our traditional modulation back and forth between the extremes of Unit and Amount and also within each of the extremes in Figure 20(b).

In this infinite regress, Hegel sees a return to Degree. The Specified Measure and also the series it generates are "simple or unitary." (354)²¹⁹ But, just as the 100th Degree was defined by the Extensive Magnitude outside it (1-99, 101-4), so the Specified Measure, as Unit, is defined by all the Measures outside such a Specified Measure. The Unit is surrounded by "a circle of quanta," (354)²²⁰ and each quantum is itself surrounded by a circle of quanta. In other words, the Specified Measure is a metonym. It cannot be known directly, but only by what it is not. Within these wheels-within-wheels "the self-determinedness of measure lies." (354)²²¹

Of these metonyms, Hegel writes, "Its self-relation is in the

²¹⁹ "[E]infach zu sein." [I:364]

²²⁰ "Kreis von Quantis." [I:364]

²²¹ "[W]orin das Fürsichbetimmtheitsein des Maßes liegt." [I:364] In effect, I have interpreted "Combination of Two Measures" as standing for the indifference of Specified to Specifying Measure, whereas "Measure as a Series of Measure Relations" stands for the dependence of a thing on Measure in general. The middle term will stand for the unity of indifference and dependence of things to their Measure. In contrast, Ruschig thinks that "Combination of Two Measures" stands for density of unchanged substances, while "Measure as a Series" stands for neutralized (hence changed) substances. "Only if we refer to the chemical content, the logical transition is comprehensible as well as conclusive." Ruschig, *supra* note 167, at 7. Obviously, I disagree. Hegel is aiming for the metaphysics of Measure, for which density and stoichiometry are simply examples. Hegel may shift from examples pertaining to density to examples pertaining to stoichiometry, but this does not affect the integrity of his logic.

first place an *immediate* relation and therefore its indifference to an other consists only in the quantum." (354)²²² In other words, the quality of the thing is quantitative. Like a Quantity, its content is supplied by the circle of Measures that surrounds it. Nevertheless, Measure as Series is too advanced to be simply a Quantity indifferent to its own integrity:

But this relation in which two specific measures specify themselves in a third something, the exponent, also implies that the one has not passed into the other; that therefore there is not *only one* negation, but that *both* are posited as negative in the relation. (354)²²³

The Specified Measure, being a True Infinite, stays what it is even as it yields an appearance--the series that it generates.²²⁴ In this guise, the Specified Measure announces, "I am not any one of the quanta in the series." Yet the Specifying Measure which generates the quantum in the Series is saying the same thing. It likewise says, "Neither am I the quantum in the Series that the Specified Measure generated."

At this point, Speculative Reason intervenes to point out that each of the Measures--[1] and [3]--claims not to be the Series [2]. Yet [2] is authentically each of the Measures. Hence, [1] and [3] have something in common. This commonality Hegel names Elective Affinity.

[All Figures can be found in an Appendix at the end of this article]

Figure 20(c) **Elective Affinity**

²²² "Seine Beziehung auf sich ist zunächst als unmittelbares Verhältnis, und damit besteht sogleich seine Gleichgültigkeit gegen Anders nur in dem Quantum." [I:364-65]

²²³ "Aber diese Beziehung, in welcher sich zwei Spezifische zu etwas, zu einem Dritten, dem Exponenten, spezifizieren, enthält ferner dies, daß das eine darin nicht in das andere übergegangen, also nicht nur eine Negation überhaupt, sondern beide darin negativ gesetzt sind." [I:365]

²²⁴ Enduring externality is this very feature that separates ordinary chemistry, which is a theme of Measure, from the super-advanced category of Chemism at the end of the Logic. See John W. Burbidge, *Chemistry and Hegel's Logic*, in *HEGEL AND NEWTONIANISM*, *supra* note 4, at 609, 610-11.

Of Figure 20(c), Hegel writes: "This their qualitative unity [2, 4] is thus a self-subsistent *exclusive* unit [7]." (354)²²⁵ This [7], which Hegel calls "the neutral relationship,"²²⁶ proves that the exponents in the Series have a qualitative nature, reflecting the truth of the thing. Obviously, [7] is a Measure; Measure is quantitative as well as qualitative, and so [7] reflects that the difference between [1] and [3] is quantitative. Of this quantitative basis, Hegel says that the self-subsistent Measure--[1] or [3]--is indifferent to [7]. This indifference is the very quantitative basis that permits [1] or [3] to go outside itself and into [7].

To summarize, then, [1, 2] and [2, 3] turned out to be the opposite of what they were supposed to be. The extremes renounced this middle term and held themselves aloof. But these extremes likewise have an *affinity*, because, without its other, Specified Measure could not manifest what it is.

Although Hegel is very "chemical" in his discussion, his comments apply to love.²²⁷ A human being stands aloof from others but only manifests herself in the world in the eyes of others. Human personality is very much a Measure, which is why people alternate rivalry and aloofness with great affinity towards their true Measure.²²⁸

(c) Elective Affinity

Affinity and neutrality refer to chemical relationships.²²⁹ "For

²²⁵ "Diese ihre qualitative Einheit ist somit für sich seiende ausschließende Einheit." [I:365]

²²⁶ "[N]eutrale Beziehung." [I:365] This will relate to chemical reactions in the next section. Thus, acids and alkali are mutually attractive, and their relation is "neutral" and "stoichiometric." See *infra* text accompanying notes 259-81.

²²⁷ The connection between Elective Affinity and love was not lost on the Greeks. "Empedocles was of the opinion that the particles of the four elements--earth water, air, and fire, passed to and from one another by means of love and hatred." Cees de Pater, *Newton and Eighteenth-Century Conceptions of Chemical Affinity*, in *HEGEL AND NEWTONIANISM*, *supra* note 4, at 619.

²²⁸ I give this concept a more rigorous treatment in David Gray Carlson, *How to Do Things With Hegel*, 77 *TEX. L. REV.* 1377 (2000).

²²⁹ Goethe, Hegel's patron, also had a popular novel in 1809 entitled *The Elective Affinities*. See JOHANN WOLFGANG VON GOETHE, *ELECTIVE AFFINITIES* (R.J. Hllingdale trans., 1971). For a review, see H.A.M. Snelders, *The Significance of Hegel's*

a chemical substance has its specific determinateness in its relation to its other and exists only as this difference from it." (355)²³⁰ In other words, a substance is metonymic. It is nothing but a series of Measures, none of which captures the reality of the stuff.

Accordingly, Affinity, as introduced in the last section, was not just affinity to some other substance but generally to the entire series of all substances.²³¹ The series was nothing but the common quanta that the Specified Measure holds with each and every other Measure. Hence, the Specified Measure was *indifferent* amongst the many Measures to which it is compared. Simultaneously, each member of the series was itself an *exclusive* Measure between the Specified and Specifying Measure.²³²

Elective affinity (*Wahlverwandtschaft*), however, singles out these exclusive Measures and proclaims some "better" than (or at least qualitatively different from) some of the others. "In elective affinity as an exclusive, qualitative correlation [7]," Hegel writes, "the relationship is rid of [its] quantitative difference." (355)²³³ In this series of exclusive relations, numbers have lost their continuity with each other. These relations are therefore qualitative (yet not entirely qualitative).

How does Hegel derive this qualitative preference for one Measure over another? The derivation has to do with the "*extensive*

Treatment of Chemical Affinity, in HEGEL AND NEWTONIANISM, *supra* note 4, at 631.

²³⁰ "Denn in der chemischen Sphäre hat wesentlich das Materielle seine spezifische Bestimmtheit in der Beziehung auf sein Anderes; es existiert nur als diese Differenz." [I:365]

²³¹ Hegel will later say that the Elective Affinities identify "a self-subsistent measure [that] relates itself to self-subsistent measures of a different quality and to a series as such." (367) ("ein Selbständiges sich zu Selbständigen anderer Qualität und zu einer Reihe solcher verhält, verschieden" [I:380])

²³² Elective Affinity applies not only to chemistry but to music. Each musical note has meaning only in combination with the series of notes. The circle of notes is the composition itself. Any given note belongs to that composition but is likewise a "member in the system of every other key." (355) ("Glied im Systeme jedes andern Grundtons" [I:366]). The composition and the harmonies within it are Elective Affinity. The character of the composition, however, is dissolved if the "merely quantitative progression" (355) ("bloß quantitativen Fortgehens" [I:366]) is exalted over the qualitative "group being" of the whole.

²³³ "In der Wahlverwandtschaft als ausschließender, qualitativer Beziehung entnimmt das Verhalten sich diesem quantitativen Unterschiede." [I:366]

magnitude of the substances" in the series of Measures that define the metonymic thing. (355)²³⁴ Extensive Magnitude, it will be recalled, stood over against Degree. If Degree was, for instance, the 100th degree, Extensive Magnitude stood for 1-99 and 101 through infinity--the external numbers implicitly excluded by the 100th degree and by which Degree is defined. But Extensive Magnitude and Degree ended up being the same thing. The 100th Degree had its Extensive Magnitude within it as well as without it. That followed because Degree was a True Infinite. All this was established in Figure 14(c) (the Quality of the Quantum).²³⁵

Intensity suggests that, of the series of neutralizing Measures that define the metonymic Specified Measure, the opposing Measures can be arranged according to the intensity with which they "neutralize" the Specified Measure. The Specifying Measures therefore differ in the quantity needed to neutralize, and this ends up being the very quality of the Specified Measure.

The relation of a unique Specifying and Specified Measure is exclusive and hence qualitative. Now the thing graduates to "the relationship . . . of *more* or *less*." (356)²³⁶ But there is still a sense in which the Specified Measure is indifferent whether it is neutralized by one rather than another Specifying Measure (even though the quantity necessary to neutralize differs). The qualitative relation of Elective Affinity is therefore still external and hence quantitative.

**Remark: Berthollet on Chemical Affinity
 and Berzelius's Theory of it²³⁷**

Hegel now commences a long comment on theories of

²³⁴ "[D]er extensiven Größe, der unter den Gliedern." [I:366]

²³⁵ Carlson, *Quantity*, *supra* note 4, at 2072.

²³⁶ "[D]as Mehr oder Weniger." [I:367]

²³⁷ This Remark was added in the 1831 revision of the *Science of Logic*. BURBIDGE, REAL PROCESS, *supra* note 12, at 65.

affinity from chemistry.²³⁸ As with his calculus commentaries,²³⁹ the fault he finds is that chemistry inadequately distinguishes Quantity and Quality.

Certain chemical substances are attracted more strongly to certain substances than to others. This is evidence that the substance is incomplete. Such substances "strictly speaking do not exist for themselves but only as a tendency to get rid of their isolatedness by combining with another constituent." (357)²⁴⁰ Such chemical substances have a "quantitative mode of relationship" (367)²⁴¹ which determines how much of one substance is needed to neutralize another. This quantitative aspect identifies the qualitative aspect of the substance. "[I]t makes it what it is on its own account and the number which expresses this is essentially one of several exponents" that could have been cited. (357)²⁴² Such substances have a measurable affinity for each other.

The quantitative nature of these substances is what allows them to coexist. If their connection had been purely qualitative (as is the case of positive and negative electrical charges), the one side would be nothing *but* the negative of the other. The two sides could not then exhibit any indifference to or self-subsistence apart from the other. The quantitative aspect allows one substance to neutralize *more than one* other substance. Thus, an acid will neutralize many different alkali. In fact, one difference between acids is the quantity needed to neutralize a given alkali. If comparatively little of an acid is needed for the task, then we say that acid has a *closer* affinity than another which requires more. That acids can neutralize many alkali is proof that the acids have self-subsistence, which is founded on the

²³⁸ According to one commentary, for Hegel, "elective affinity is the cause of the origin of chemical substances." H.A.M. Snelders, *The Significance of Hegel's Treatment of Chemical Affinity*, in *HEGEL AND NEWTONIANISM*, *supra* note 4, at 631, 637.

²³⁹ See Carlson, *Quantity*, *supra* note 7, at 2093-2138.

²⁴⁰ "[E]igentlich nicht für sich existieren, sondern nur diese Existenz haben, ihr isoliertes Bestehen aufzuheben und sich mit einem andern zu verbinden." [I:368]

²⁴¹ "[D]er quantitativen Art und Weise des Verhaltens." [I:368]

²⁴² "[S]ie macht ihn zu dem, was er für sich ist, und die Zahl, die dies ausdrückt, ist wesentlich einer von mehreren Exponenten." [I:368]

quantitative side of Measure.²⁴³

Hegel considers various discoveries of chemistry. Thus, "if two neutral solutions are mixed resulting in dissociation followed by two new compounds, these products, too, are neutral." (357-58)²⁴⁴ Another law, which is supposed to "follow" from the one just stated is this: if it takes twice as much Alkali A to neutralize Acid A as it takes Alkali B to neutralize Acid A, then, this ratio of two-to-one will hold for Acid B.²⁴⁵

Claude Louis Berthollet, a generation older than Hegel, worked on laws such as these; he had a theory of "chemical mass," which Hegel criticizes for eliminating the qualitative moment of exclusive elective affinity. (358)²⁴⁶ A contemporary textbook in chemistry by Jöns Jakob, Baron von Berzelius,²⁴⁷ is immortalized for its uncritical acceptance of Berthollet's theory, and for assuming the existence of atoms. In analyzing saturation, what matters is not atoms but comparative quantities. If there is to be any talk of atoms, then the existence of atoms must be proved, or at least corroborated, by metaphysics, "but this cannot confirm them any more than experience can--on the contrary!"²⁴⁸

²⁴³ Why quantitative, when, in general, self-subsistence has been associated with the qualitative aspect? In the previous section, Hegel emphasized that the enduring feature of a thing--what exceeds the infinite set of measures--is its negativity. This negativity is quantitative.

²⁴⁴ "[W]enn zwei neutrale Solutionen gemischt werden, wodurch eine Scheidung und daraus zwei neue verbindungen entstehen, diese Produkte gleichfalls neutral sind." [I:369] This theory was discovered in 1792 by Jeremias Benjamin Richter. Snelders, *supra* note 238, at 639.

²⁴⁵ See Ruschig, *supra* note 167, at 7. Hegel credits a Berlin colleague, Ernst Gottfried Fischer, for this discovery. (358)

²⁴⁶ "[C]hemischen Masse." [I:370] Berthollet also favored "phlogiston" over Lavoisier's oxygen. Dietrich Von Engelhardt, *Hegel on Chemistry and the Organic Sciences*, in *HEGEL AND NEWTONIANISM*, *supra* note 4, at 657.

²⁴⁷ Berzelius was a Swedish chemist nine years Hegel's junior. Snelders, *supra* note 238, at 640.

²⁴⁸ Hegel was a harsh critic of atomism in both natural and ethical philosophy. See Carlson, *Quality*, *supra* note 9, at 564-66. In chemistry, Hegel, in the *Philosophy of Nature*, protests that atoms, as self-identities, are inconsistent with continuity, which will be emphasized in Figure 21(a). Burbidge, *supra* note 244, at 609. According to Burbidge:

Although [atomism] reduces chemical bodies into elements and distinguishes elements according to their atomic weight, it leaves

The fault of the chemists that Hegel criticizes is that elective affinity, which is qualitative, is reduced to quantitative difference. Meanwhile, when exclusive Elective Affinities are observed, these are ascribed to circumstance--"to determinations which appear as something external to the affinity." (361)²⁴⁹

Chemical affinity has been distinguished from Elective Affinity. The latter is qualitative "whose behavior in no way coincides with the order of that series." (362)²⁵⁰ A confusion, however, arises with regard to electrical action and chemical action. Hegel chooses not to dwell on the matter because this confusion is not relevant to Measure as such.²⁵¹ Nevertheless the confusion "must be dubbed shallow, for shallowness consists in omitting the

the chemical process unexplained . . . The theory has moved from a sense of totality to its discrete moments, but it does not reconstitute the totality with which it began. It is, therefore, incomplete.

Id. at 614; see also BURBIDGE, REAL PROCESS, *supra* note 12, at 71 (once atoms were seen as "minute fields of energy . . . they ceased to be atoms in the traditional sense of indivisible spheres of matter, and fitted more closely to the Hegelian perspective in which relations are as important as distinctions"). Hegel's contemporary, John Dalton, would produce a chemical theory involving atoms that was much different from the eighteenth century atomism that Hegel was criticizing. Wolfgang Bonispian, *Newtonian Atomism and Eighteenth-Century Chemistry*, in HEGEL AND NEWTONIANISM, *supra* note 4, at 595, 599, 608. Nevertheless, Burbidge comments that Hegel's "conceptual problem with atomism . . . blinded [him] to the way the simple progression of determinate propositions justified the belief in basic chemical units." BURBIDGE, REAL PROCESS, *supra*, at 71.

²⁴⁹ "[A]uf Bestimmungen, welche als etwas der Verwandtschaft Äußerliche." [I:373] A comparison is made between the quantification of Elective Affinities and the analysis of pendulums. Gravity causes the pendulum to pass into a state of rest. But this is treated as caused by air resistance rather than gravity--again an external or circumstantial attribution. (362) The point here, according to one commentator, is that one should abstract from those physical factors with an ancillary effect on the motion of the pendulum and consider the pendulum as a mechanism directly dependent on gravity. Michael John Petry, *Classifying the Motion: Hegel on the Pendulum*, in HEGEL AND NEWTONIANISM, *supra* note 4, at 291, 311.

²⁵⁰ "[D]eren Verhalten mit jener Ordnung keineswegs zusammenfällt." [I:374]

²⁵¹ Hegel has already said that positive and negative electrical charges are purely qualitative, whereas chemical attraction is qualitative and quantitative--a Measure. For this reason, electrical charges have no subsistence in the absence of its opposite, but chemicals do. (357-58) Only after 1800 are "the so-called imponderable substances--light, heat, magnetism and electricity . . . dropped from chemistry." Engelhart, *supra* note 246, at 657.

difference between distinct terms and then treating them as identical." (362)²⁵² Hegel pronounces Berzelius's equation of the two "almost comical." (362)²⁵³ In this description, electricity is said to be the cause of chemical action, "but about the specifically chemical nature of the chemical process, electricity tells us nothing." (363)²⁵⁴ Hegel's basic assessment of the confusion is that electricity "is *transient* and remains *external* to the quality of substances." (363)²⁵⁵ Chemical action "embraces and alters the entire qualitative nature of substances." (363)²⁵⁶

Chemicals have affinities, but, as Real Measures, they also have an independent existence. Certain Measures, however, "are inseparable and cannot be displayed in a separate and distinct

²⁵² "Für sich selbst ist sie seicht zu nennen, weil die Seichtigkeit darin besteht, das Verschiedene mit Weglassung der Verschiedenheit identisch zu nehmen." [I:374]

²⁵³ "[B]einahe komisch." [I:374] Hegel pauses to denounce the practice of deferring to the great prestige of scientists as a reason *not* to subject their theories to criticism:

The merit and fame which Berzelius has earned by his theory of proportions, which has been extended to all chemical relations, ought not as such to be made a reason for not setting forth the weaknesses of this theory; but a more particular reason for doing so must be the circumstance that such merit in one aspect of a science, as with Newton, tends to become an *authority* for a baseless structure of spurious categories which is attached to it and that it is just this kind of metaphysics which is proclaimed and echoed too with the greatest pretension. (365)

Das Verdienst und der Ruhm von Berzelius wegen der auf alle chemischen Verhältnisse ausgedehnten Proportionenlehre durfte für sich kein Abhaltungsgrund sein, die Blöße der angeführten Theorie auseinanderzusetzen; ein näherer Grund aber, dies zu tun, muß der Umstand sein, daß solches Verdienst in einer Seite der Wissenschaft, wie bei Newton, Autorität für ein damit in Zusammenhang gesetztes grundloses Gebäude von schlechten Kategorien zu werden pflegt, und daß gerade solche Metaphysik dasjenige ist, was mit der größten Prätension ausgegeben und ebenso nachgesprochen wird. [I:377]

²⁵⁴ "[D]aß die Elektrizität die Ursache des chemischen Verhaltens sei, daß aber die Elektrizität über das, was im chemischen Prozesse chemisch ist, keinen Aufschluß gebe." [I:375]

²⁵⁵ "[F]lüchtig ist und der Qualität der Körper äußerlich bleibt." [I:375]

²⁵⁶ "[D]ie ganze qualitative Natur der Körper in Anspruch nimmt und alteriert." [I:375]

existence of their own." (365)²⁵⁷ In specific gravity, weight and volume cannot be separated. To be sure, specific gravity involves external comparison--of some chemical to a cubic inch of water at 4E C. Hegel proposes, however, the project of finding the series of specific gravities of one substance against, not just water, but all the other substances.²⁵⁸

B. Nodal Line of Measure-Relations

In Elective Affinity (or neutrality), the exclusive and hence qualitative nature of the Specified Measure's relation to a Specifying Measure was emphasized. Yet the Specified Measure had a series of Elective Affinities. How shall these separate moments be distinguished? They can be distinguished only quantitatively.²⁵⁹ The amounts needed to neutralize the Specified Measure vary between the Elective Affinities.

Because Elective Affinity (or neutrality) is quantitative, affinity continues into the other neutralities. Hence we have:

[All Figures can be found in an Appendix at the end of this article]

Figure 21(a) Continuity of Affinity

Thus, to the extent we can arrange the Affinities quantitatively, this arrangement is externally imposed on them. Yet externality "in the

²⁵⁷ "[U]ntrennbar sind und nicht in einer eigenen, voneinander verschiedenen Existenz dargestellt werden können." [I:378]

²⁵⁸ "The problem would be to recognize the exponents of the ratios of the series of specific gravities as a *system* based on a *rule* which would specify a merely arithmetical plurality into a series of harmonic nodes." (365) ("Es wäre die Aufgabe vorhanden, die Verhältnisexponenten der Reihe der spezifischen Schweren als ein System aus einer Tegel zu erkenne, welche eine bloß arithmetische Vielheit zu einer Reihe harmonischer Knoten spezifizierte" [I:378]) Burbidge claims that these remarks look forward to Dimitri Mendeleev's periodic table later in the nineteenth century. BURBIDGE, REAL PROCESS, *supra* note 12, at 72.

²⁵⁹ Hence, eighteenth century chemistry made tables of Elective Affinities a major research project. Snelders, *supra* note 238, at 640.

form of comparison" is not their only moment. (366)²⁶⁰ Neutrality is "separable into the moments which united to produce it." (366)²⁶¹ Affinity may be continuous, but

it is as self-subsistent somethings that these [two Measures] enter into relation indifferently with one or the other of the opposite series, although combining in different, specifically determined amounts. (366-67)²⁶²

Hence, says Dialectical Reason, not only is Affinity continuous, but it is "infected with its own indifference; it is in its own self something external and alterable in its relation to itself." (367)²⁶³ We thus have a unity of Continuity and Indifference.

[All Figures can be found in an Appendix at the end of this article]

Figure 21(b) Indifference of Affinity (Substrate)

Indifference represents the "relation *to itself* of the measure relation." (367)²⁶⁴ As such, it is qualitative, and it is important to note that this self-relation begins to appear at this stage on the right (*i.e.*, negative) side of the page. This was already implicit when Measure as Series was placed on the right side. Measure as Series was likewise implicitly a metonym--an indifference to any given Measure but nevertheless the sum total of them all. Now we have an indifference to Measure that is *posited*, or, as Hegel says "affirmatively present." (367)²⁶⁵ Furthermore, what is posited is what Being is *not*. This will be the quintessential character of Essence, which technically exceeds

²⁶⁰ "[A]ls eine Vergleichung." [I:379]

²⁶¹ "[A]ls solche eine Trennbarkeit in ihr." [I:379]

²⁶² "[A]ls slebständige Etwas, jedes als gleichgültig, mit diesem oder mit andern der gegenüberstehenden Reihe, obzwar in verschiedenen spezifisch betimmten Mengen sich zu verbinden, in Beziehung treten." [I:379]

²⁶³ "[I]n ihm selbst beruht, mit eigener Gleichhültigkeit behaftet; es ist ein an ihm selbst Äußerliches und in siener Beziehung auf sich ein Veränderliches." [I:379]

²⁶⁴ "Die Beziehung des Verhältnismaßes auf sich." [I:379]

²⁶⁵ "[S]eiende." [I:379]

the scope of Measure but is already beginning to show itself here.²⁶⁶

This indifference is given an important new name. Hegel calls Indifference "a permanent, material substrate." (367)²⁶⁷ The Substrate is a qualitative continuity, even as the outward appearance of a substance changes. To borrow one of Hegel's favorite examples,²⁶⁸ water becomes ice if its quantitative temperature falls too low, and it becomes steam if the temperature becomes too high. But, in all these quantitatively different states, it remains H₂O. H₂O may be considered the Substrate of all the various appearances of water in its liquid, solid or gaseous forms.

The Substrate, however, is not unconnected with its Measure. It is "continuous" with it, as Figure 21(b) indicates. The Substrate "must contain in its quality the principle of the specification of this externality" in a Measure. (367)²⁶⁹

We are now in the dialectical mode, so we may expect that each of the extremes--[1] and [3]--denies [2] and thereby confirms [2] as its true being.²⁷⁰ Hegel confirms this:

[T]he exclusive measure [1] as thus more precisely determined is external to itself in its being-for-self [2] and hence repels itself from itself, positing itself both as another measure relation and also as another, merely quantitative, relation; it is determined as in itself [2] a specifying unity which produces measure relations within itself. (367)²⁷¹

²⁶⁶ In Essence, I will change our convention. In the realm of Being, the Understanding dragged the middle term over to the left the page--the side of being. But in the realm of Essence, the Understanding will drag the middle term over to the right--the side of Nothing. Reflection always signals what a thing is *not* (thereby showing what it *is*).

²⁶⁷ "[B]leibendes, materielles Substrat." [I:379]

²⁶⁸ LESSER LOGIC, *supra* note 6, § 140 Remark.

²⁶⁹ "[I]n seiner Qualität jenes Prinzip der Spezifikation diese Äußerlichkeit enthalten müßte." [I:379]

²⁷⁰ See HAAS, *supra* note 216, at 155 (Measure "shows itself as the between of that which it seeks to exclude").

²⁷¹ "Das ausschließende Maß nach dieser nähern Betstimmung nun, in seinem Fürsichsein sich äußerlich, stößt sich von sich selbst ab, setzt sich sowohl als ein anderes, nur quantitatives, als auch als ein soches anderes Verhältnis, das zugleich ein anderes Maß ist,--ist als an sich selbst spezifizierende Einheit bestimmt, welche an ihr Maßverhältnisse produziert." [I:380]

This isolation of [2] as the essence of the extremes is our typical move of Speculative Reason. We therefore have:

[All Figures can be found in an Appendix at the end of this article]

Figure 21(c) Nodal Line

Figure 21(c) differs from Elective Affinity. The Elective Affinity of Figure 20(c) identified "a self-subsistent measure relat[ing] itself to self-subsistent measures of a different quality and to a series of such." (367)²⁷² At that point, the concept of Substrate had not yet been developed.²⁷³ Now the series in Figure 21(c) is recognized as taking place "in *one and the same* substrate within the same moments of the neutrality." (367)²⁷⁴ Measure has become a self-repelling, and it has exiled its quantitative Measures to the extremes, from which it is merely quantitatively different. The Substrate, then, organizes the series of Measures into "a nodal line of measures on a scale of more or less." (367)²⁷⁵

The Substrate is a being-for-self, which needs external quanta to express what it is. Because of this need, the Measure is "open to externality and to quantitative alteration." (367)²⁷⁶ Furthermore, it has inherited from the earlier stage of Rule the character that "it has a range within which it remains indifferent to [quantitative]

²⁷² "[E]in Selbständiges sich zu Selbständigen anderer Qualität und zu einer Reihe solcher verhält, verschieden" [I:380])

²⁷³ Bonispien, *supra* note 248, at 607 ("In his theory of elective affinity, [Hegel] seems to be operating without any presupposed substances. Since there is no chemical substratum, simply a variety of chemical reactions, the chemical elements are regarded as being completely determined by means of their mutual inter-relationships.").

²⁷⁴ "[A]n einem und demselben Substrate innerhalb derselben Momente der Neutralität statt." [I:380] This justifies Andrew Haas's remark: "If 'exclusion' marks the elective affinities of self-sufficient measures, then 'inclusion' marks them when they take on the form of a knotted line . . ." HAAS, *supra* note 216, at 155.

²⁷⁵ "[E]ine Knotenlinie von Maßen auf einer Skale des Mehr und Weinger." [I:380]

²⁷⁶ "[D]er Äußerlichkeit und der Quantumsveränderung offen." [I:380]

alteration and does not change its quality." (367)²⁷⁷

Because Measure has a range of quantitative change that invokes no qualitative change,

there enters a point in this quantitative alteration at which the quality is changed and the quantum shows itself as specifying, so that the altered quantitative relation is converted into a measure, and thus into a new quality, a new something. (367)²⁷⁸

Quantitative change, then, leads to qualitative change. Nevertheless, underneath the qualitative change lies an indifferent Substrate. In qualitative change, the two qualities, Hegel says, have no connection. One is *not* the limit to the other. Each is completely external to the other. But a Substrate underlies all the changes. "The new something has therefore not emerged from or developed out of its predecessor but directly from itself." (367-68)²⁷⁹ The decisive point is that, "in this 'infinite progress' of a self-continuing nodal line one *unity* remains nonetheless, one 'self-sameness' constitutes itself."²⁸⁰

Meanwhile, the relation between the qualities is quantitative. This means that "the progress from one quality [to another] is in an uninterrupted continuity of the quality." (368)²⁸¹ Yet, at some dramatic moment, nature *leaps* from one quality to another, even if the quantitative change is reassuringly gradual. Gradualness, however, is the opposite of qualitative change. In gradualness, the quality of the thing is indifferent to the quantitative change.

Remark: Examples of Such Nodal Lines; the Maxim, 'Nature Does not Make Leaps'

²⁷⁷ "[E]s hat eine Weite, innerhalb deren es gegen diese Veränderung gleichgültig bleibt und seine Qualität nicht ändert." [I:380]

²⁷⁸ "Aber es tritt ein Punkt dieser Änderung der Quantitativen ein, auf welchem die Qualität geändert wird, das Quantum sich als spezifizierend erweist, so daß das veränderte quantitative Verhältnis in ein Maß und damit in eine neue Qualität, ein neues Etwas umgeschlagen ist." [I:380]

²⁷⁹ "Es ist also nicht aus dem Vorhergehenden, sondern unmittelbar aus sich hervorgetreten." [I:380]

²⁸⁰ HERBERT MARCUSE, *HEGEL'S ONTOLOGY AND THE THEORY OF HISTORICITY* 66 (Seyla Benhabib trans. 1987).

²⁸¹ "[D]er Fortgang von einer Qualität in stetiger Kontinuität der Quantität ist." [I:380]

A nodal line is like a knotted string. Between the knots is quantitative difference, to which quality is indifferent. Each knot represents a qualitative change. "The system of natural numbers already shows a nodal line of qualitative moments which emerge in a merely external succession," Hegel writes. (368)²⁸² Each number in the line bears a quantitative relation to the one before or after it. But these numbers likewise have specific relations with specific numbers when the question is power or root. (This specific relation would be an Elective Affinity).

The musical scale is a nodal line. A note is indifferent to the one before or after it, but, in harmony, the notes have specific relations with other notes, analogous to the specific relations between roots and powers. Thus, as one plays notes on the piano, each successive one seems unrelated to the one before, when "there suddenly emerges a *return*, a surprising accord, of which no hint was given by the quality of what immediately preceded it." (369)²⁸³ The harmony constitutes "a sudden interruption of the succession of merely indifferent relations which do not alter the preceding specific reality [A] specific relation breaks in *per saltum*." (369)²⁸⁴

Qualitative leaps occur in chemical combinations. Water is a clear example of this. Water instantly freezes when it reaches 0°C It "does not gradually harden as if thickened like porridge, gradually solidifying until it reach the consistency of ice." (370)²⁸⁵ "Every birth and death, far from being a progressive gradualness,

²⁸² "Das natürliche Zahlensystem zeigt schon eine solche Knotenlinie von qualitativen Momenten, die sich in dem bloß quantitativen Vor- und Zurückgehen." [I:381]

²⁸³ "[T]ut sich vielmehr auf einmal eine Rückkehr, eine überraschende Übereinstimmung hervor, die nicht durch das unmittelbar Vorhergehende qualitativ vorbereitet war." [I:382]

²⁸⁴ "[D]er Fortgang an bloß gleichgültigen Verhältnissen, welche die vorhergehende spezifische Realität nicht ändern oder auch überhaupt keine solche bilden, unterbricht sich auf einmal, und indem er in quantitativen Rücksicht auf dieselbe Weise fortgesetzt ist, bricht somit durch einen Sprung ein spezifische Verhältnis ein." [I:382] This material on harmony was added in the 1831 edition of the *Science of Logic*. BURBIDGE, REAL PROCESS, *supra* note 12, at 57.

²⁸⁵ "Das Wasser wird durch die Erkältung nicht nach und nach hart, so daß es breiartig würde und allmählich bis zur Konsistenz des Eises sich verhärtete, sondern ist auf einmal hart." [I:383] The rendering of "breiartig" (pasty or viscous) into "like porridge" reveals more of Miller's poetic side more than it does Hegel's.

is an interruption of it and is the leap from a quantitative to a qualitative alteration." (369-70)²⁸⁶

This Remark ends with a blast at gradualness which is seemingly at odds with the early chapters on Being but, on further reflection, is not. It will be recalled that, in the Ought, Being ceases to be--a cessation which is the in-itself of Being. That is, the Finite *ought* to cease to be. This led efficiently to the True Infinite, which ceases to be what it was and yet remains what it was.²⁸⁷ Now, with regard to gradualness, Hegel complains it is based on the assumption that what comes to be is already actually in existence, but not yet perceptible because of its smallness. Under the rule of gradualness, "coming-to-be and ceasing-to-be lose all meaning." (370)²⁸⁸ The complaint seems to be that Being-in-itself is quantified in gradualist discourse, and quantification is, in Measure, the externalist position. Rather than denying the True Infinite here, Hegel is merely complaining that, in gradualism, the True Infinite undergoes change *externally*, not immanently.

In the moral sphere, Hegel complains, this is harmful. Gradualness is a threat to morality. Stealing starts off being wrong, but perhaps the filching of bus fare is not a crime, and so on. "It is through a more and less that the measure of frivolity or thoughtlessness is exceeded and something quite different comes about, namely crime, and thus right becomes wrong and virtue vice." (371)²⁸⁹ The point here is that, since gradualness represents the external position (not the immanent one), gradual change in morality subjectivizes the process. The reality of the situation--the radical change from the legal to the criminal--becomes obscured in quantitative measures.

In the political sphere, Hegel suggests that nations too change quantitatively in terms of population. At a certain point, a

²⁸⁶ "Alle Geburt und Tod sind, statt eine fortgesetzte Allmählichkeit zu sein, vielmehr ein Abbrechen derselben und der Sprung aus quantitativer Veränderung in qualitative." [I:383]

²⁸⁷ See Carlson, *Quality*, *supra* note 9, at 541.

²⁸⁸ "[E]s wird damit das Entstehen und Vergehen überhaupt aufgehoben." [I:383]

²⁸⁹ "Es ist ein Mehr und Weniger, wodurch das Maß des Leichtsinns überschritten wird, und etwas ganz anderes, Verbrechen, hervortritt, wodurch Recht in Unrecht, Tugend in Laster übergeht." [I:384]

constitution no longer suits the state. The state has undergone qualitative change which "renders it liable to instability and disruption under the same constitution which was its good fortune and its strength before expansion." (371)²⁹⁰

C. The Measureless

In the Nodal Line, some relations to some Measures are exclusive and qualitative. Some are quantitative and inessential. To the extent it is subject to quantitative manipulation, the underlying quality of the measure is indifferent. Yet quantitative change is potentially lethal. "Magnitude is that side of determinate being through which it can be caught up in a seemingly harmless entanglement which can destroy it." (371)²⁹¹

The Understanding seizes upon this harmlessness of quantitative change and brings it front and center:

[All Figures can be found in an Appendix at the end of this article]

Figure 22(a) The Abstract Measureless

"The abstract measureless is the quantum as such which lacks an inner significance and is only an indifferent determinateness which does not alter the measure." (371)²⁹² Here, in the realm of the Understanding, the abstract measureless "raises itself into a qualitative determinateness." (371)²⁹³ That *quantitative* change has no further bite is what makes the Measure measureless. But the Abstract Measureless "is equally a quality on its own account."

²⁹⁰ "[Ü]ber welches hinausgetrieben er haltungslos in sich zerfällt unter derselben Verfassung, welche bei nur anderem Umfange sein Glück und Seine Stärke ausmachte." [I:384]

²⁹¹ "Die Größe ist die Beschaffenheit, an der ein Dasein mit dem Scheine von Unverfänglichkeit ergriffen und wodurch es zerstört werden kann." [I:384]

²⁹² "Das abstrakte Maßlose ist das Quantum überhaupt als in sich besinnungslos und als nur gleichgültige Bestimmtheit, durch welche das Maß nicht verändert wird." [I:385]

²⁹³ "[H]ebt sich zur qualitativen Bestimmtheit auf." [I:385]

(371)²⁹⁴ Its quality is that it has no quality, in the sense of that which changes as a result of quantitative pressure.²⁹⁵

The Abstract Measureless is a Specifying Measure, even if the Specified Measure is at first indifferent to it. "Thus there is posited the alternation of specific existences with one another and of these equally with relations remaining merely quantitative--and so on *ad infinitum*." (371)²⁹⁶ Palpably this describes the dialectical moment.

[All Figures can be found in an Appendix at the end of this article]

Figure 22(b) **Quality of the Abstract Measureless**

Hegel gives this new step no name other than the qualitative aspect of the Abstract Measureless. Once again, quality appears on the rightward side of the page--the side of nothingness.

In this alternation, [1] proclaims itself not qualitative. As such, [1] is immune to change from quantitative pressure. And by

²⁹⁴ "[E]benso eine für sich seiende Qualität." [I:385]

²⁹⁵ John Burbidge's account is far different. He seems to view the Nodal Line as giving rise to absolutely discontinuous qualities, conceived as distinct neutral compounds. BURBIDGE, REAL PROCESS, *supra* note 12, at 47. But this leaves out the whole notion of Substrate, which is the very point of the Nodal Line. Professor Burbidge then writes:

Since there is no qualitative boundary the two [neutral compounds] share--at least to the extent that thought can anticipate it--they are simply external to each other. So we are far removed from even a minimal account that would enable us to understand the relation. From this perspective no explanation is possible. We cannot conceive what is involved; it is immeasurable.

Id. (footnote omitted). Thus, for Burbidge, what is immeasurable is qualitative change. *Id.* at 48 ("The transformation of one quality into another is defined as immeasurable").

This seems off base. There is nothing inconceivable about the Measureless. It represents the substantial Substrate which is immune from qualitative change through quantitative manipulation. It does not represent a property of qualitative transformations.

²⁹⁶ "[S]o ist die Abwechslung von spezifischen Existenzmzren miteinander und derselben ebenso mit bloß quantitativ bleibenden Verhältnissen gesetzt--so fort ins Unendliche." [I:385]

announcing what it is *not*, it shows what it is. [3] announces that it is not quantitative. Both of them export what they are not to [2]. Now Speculative Reason intervenes to name this activity. [2] is the Measureless (in its concrete form). This version of the Measureless is *beyond* Quality and Quantity. We are on the verge of bringing to a close the entire saga of Being.

The name Hegel assigns to this speculative step is the Infinite For Itself:

[All Figures can be found in an Appendix at the end of this article]

Figure 22(c) **Infinite For Itself**

In and For Self. Hegel compares this new Infinite to the earlier versions. "The *qualitative* infinite, as simply a Determinate Being, was the eruption of the infinite in the finite as an *immediate transition* and vanishing of the latter in its beyond." (371-72)²⁹⁷ What the Spurious Infinite in Quality lacked was continuity. In Figure 7(b), the Spurious Infinite went out of existence and became Another Finite.²⁹⁸ The True Infinite, in contrast, continued on: it stayed what it was and became something different.²⁹⁹

The Quantitative Infinite was more advanced. It had continuity. It expelled itself from itself, as did the Spurious Infinite. But, as it was by now a True Infinite, the Quantitative Infinite remained what it was while becoming something else.³⁰⁰ The Spurious Infinite was really the qualitative Finite, but it *became* the True Infinite. The Quantitative Infinite was already "in its own self its beyond and *points beyond itself.*" (372)³⁰¹ As a True Infinite, it was both inside and outside of itself.

The Infinite For Itself, in contrast, "*posits* both the qualitative

²⁹⁷ "Die quantitative unendlichkeit, wie sie am Dasein ist, war das Hervoirbrechen des Unendlichen am Endlichen, als unmittelbarer Übergang and Verschwinden des Diesseits in seinem Jenseits." [I:385]

²⁹⁸ Carlson, *Quality*, *supra* note 9, at 535-36.

²⁹⁹ *Id.* at 541.

³⁰⁰ Carlson, *Quantity*, *supra* note 5, at 2079-80.

³⁰¹ "[S]ein Jenseits in ihm selbts und weist über sich hinaus." [I:385]

and quantitative as *sublating* themselves in each other." (372)³⁰² In short, the Infinite For Itself represents Measure returned to itself, and, in this reflection-into-self, the Infinite For Itself shows itself to be *dehors* the realm of Being.

The Infinite For Itself is beyond the concept of qualitative change. Qualitative change depended upon quantitative change, which was in the realm of the external. So long as Measure is open to quantitative and hence to qualitative change, it is slave to something external--not yet free. Yet the Abstract Measureless, as pure externality, sublated itself. It converted itself into Quality, and then into "that which is determined in and for itself." (372)³⁰³

Here for the very first time is the concept of "in and for self." This concept will become the very essence of the Doctrine of Essence on whose doorstep we now tentatively hesitate. Being-in-itself was mere implicitness. The job of the in-itself was to become for itself. Being-for-self as such expelled its content and became Quantity. Quantity had to recapture its Quality in order to have true subsistence. But the spectre of qualitative change still portended an inability to subsist.³⁰⁴ Only when Quality and Quantity are both sublated can the thing have self-subsistence. The state that is beyond quantitative and qualitative transition is being-in-and-for-self. "This unity which thus continues itself into itself in its alternating measures is the truly persisting self-subsistent material substance or thing." (372)³⁰⁵

Positing. Hegel now makes three propositions about the

³⁰² "[S]etzt ebensowohl des Qualitative wie das Quantitative als sich ineinander aufbehend." [I:385]

³⁰³ "[D]as an und für sich Bestimmtein." [I:385]

³⁰⁴ This moment of Measure is described by one commentator as follows:

The precise nature of "measure" is shown to be that of superseded externality which constitutes totality in that it reinstates the sublated being-for-self. [M]easure has still to be regarded as an externality, a more or less, the determination of the concrete truth of finite being.

Ferrini, *supra* note 27, at 34.

³⁰⁵ "Diese so sich in ihrem Wechselder Maße in sich selbst kontinuierende Einheit ist die warhaft bestehen bleibende, selbständige Materie, Sache." [I:385]

Infinite For Itself. The first is qualitative. The second is quantitative. The third is the beyond of these concepts.

(a) There is now posited a "perennial substrate" that underlies all qualitative change. (372)³⁰⁶ This is a "severance of being from its determinateness." (372)³⁰⁷ This severance began "in quantum as such." (372)³⁰⁸ In Quantity, "a thing is indifferent to its affirmative determinateness." (372)³⁰⁹ It cares not what content is attributed to it by the will of the mathematician. This was the Qualitative Something of the Quantum.³¹⁰ In Measure, this Substrate is in unity with its Quantity and Quality--as [4, 5, 6] in Figure 22(c) illustrates. Each of these moments is the beyond of the other. Their middle term is the Substrate which is the beyond of them both. The Substrate is thus a True Infinity. It goes out of itself and gets externally measured. But in doing so, it remains within itself and hence beyond all Measure [7].

(B) The Measures in which the Substrate manifests itself are "qualitative self-subsistent measures." (372)³¹¹ Nevertheless the difference between the Substrate and these Measures is quantitative only. That is, the Substrate is continuous with them.

(?) The Substrate negates both its qualitative and its quantitative moments. Now the qualitative is quantitative in so far as the Substrate is concerned. The Substrate [7] is the name for the constant modulation between Quantity and Quality, "and the meaning of this process is only to *show* or to *posit* the *determinate being*" of the Substrate. (373)³¹²

Consequently, the measures and the self-subsistent things posited with them are reduced to *states*. The alteration is only change of a *state*, and the *subject* of the transition is posited as remaining the

³⁰⁶ "[A]ls Grundlage in ihren Unterscheidungen und als perenniert gesetzt ist." [I:385]

³⁰⁷ "[D]ies Abtrennen des Sins von seiner Bestimmtheit." [I:385]

³⁰⁸ Schon im Quantum überhaupt." [I:385]

³⁰⁹ "[G]roß ist etwas als gleichgültig gegen seine seiende Bestimmtheit." [I:385]

³¹⁰ Carlson, *Quantity*, *supra* note 4, at 2075.

³¹¹ [D]ie qualitativen Selbständigkeiten." [I:386]

³¹² "[U]nd der Sinn dieses Prozesses ist nur das Dasein, das Zeigen oder Setzen, daß demselben ein solches Substrat zugrunde liegt." [I:386]

same in the process. (373)³¹³

Let us pause to note a transition in the meaning of the crucial word "positing." We saw that, in the realm of Quality, things "were posited" by an external consciousness.³¹⁴ By and large, concepts did not posit themselves. In Repulsion, however, we saw for the first time that the concept did the work. There, the Many Ones were repulsed, but the external consciousness still in charge of the Understanding forged the Many Ones together and therefore constituted the force of Attraction.³¹⁵ Now, the Infinite For Itself manifests itself in its Determinate Being, but remains beyond it. Here is positing as such. It represents the concept announcing what it is *not*. And by announcing this, it announces what it *is*.

This appearance of true positing will generate a change in our standard convention. In the realm of Being, the Understanding focused on what *is*. The focus was always leftward--the side of being. In Essence, the shift will be rightward. Now it is posited that Essence *is* what is *not*. It is *not* what appears externally.

Summary. Hegel now summarizes the progress in across Real Measure. At first, in Specific Quantity, the extremes were not yet self-sufficient Measures. Only the middle term was a Measure. Then, in Ratio of Measures, the extremes became overt Measures in themselves.

In Elective Affinity, Measure was revealed to be a series of Measures. The thing was metonymic. The thing "shows itself to be an immanent specifying unity of a self-subsistent measure distinguished from its specifications." (372)³¹⁶ But it is still a slave to externality.

[I]t is not yet the free Notion which alone gives its differences an immanent determination: it is as yet only a substrate, a material, and

³¹³ "Damit sind die Maße und die damit gesetzten Selbständigkeiten zu Zuständen herabgesetzt. Die Veränderung ist nur Änderung eines Zustandes, und das Übergehende ist als darin dasselbe bleibend gesetzt." [I:386]

³¹⁴ Carlson, *Quality*, *supra* note 9, at 483-84.

³¹⁵ *See id.* at 570-75.

³¹⁶ "[Z]eigt sich zwar als immanente spezifizierende Einheit eines fürsichseienden Maßes unterscheidenvon seinen Spezifikationen." [I:387]

for its differentiation into totalities, i.e., into difference embodying the nature of the unchanged substrate, it is dependent solely on the external, quantitative determination which shows itself at the same time as a difference of quality. (373-74)³¹⁷

What the Measureless must now do is escape this dependence on externality altogether. We then will have arrived at the postern gate of Essence.

III. The Becoming of Essence

The inside is out!
The outside is in!³¹⁸

Although Logic has by now posited a substrate that is beyond Quality and Quantity, we are not yet ready to slam shut the book of Being. There is first the very short third chapter of Measure which previews the nature of the inquiry in the Doctrine of Essence. The point of this chapter is to show that external Measure is now internal to the Substrate.³¹⁹ For this reason, "measure is always the measure of a thing . . . , of a persistent, self-sufficient material."³²⁰

A. Absolute Indifference

³¹⁷ "[N]och nicht der freie Begriff, welcher allein seinen Unterschieden immanente Bestimmung gibt, sondern das Prinzip ist zunächst nur Substrat, eine Materie, für deren unterschiede, um als Totalitäten zu sein, d.i. die Natur des sich selbst gleichbleibenden Substrats in sich zu haben, nur die äußerliche quantitative Bestimmung vorhanden ist, die sich als Verschiedenheit der Qualität zugleich zeigt." [I:387]

³¹⁸ The Beatles, *Everybody's Got Something to Hide, 'Cept for Me and My Monkey*, in *THE WHITE ALBUM* (1969).

³¹⁹ According to another summary of this chapter:

everything manifests itself externally, it being of its very essence to do so. Its indifference to this external self-manifestation, is therefore, only opposed in a relative manner to its identity with it. The distinction of quantity and quality constitutes a relative opposition which expresses an absolute identity.

Fleischhacker, *supra* note 4, at 221.

³²⁰ HAAS, *supra* note 216, at 158.

The Understanding makes the first move. It contemplates the Infinite For Itself and proclaims its principle to be Absolute Indifference:

[All Figures can be found in an Appendix at the end of this article]

Figure 23(a) **Absolute Indifference**

Hegel begins the discussion of Absolute Indifference by characterizing some aspects of Being and Pure Quantity. Being, Hegel says, is "abstract equivalence . . . in which there is supposed to be as yet no determinateness of any kind." (375)³²¹ This would appear to refer to Pure Being, before otherness was invoked to establish Determinate Being. "Abstract equivalence" therefore refers to self-identity, of which Hegel was a huge critic. The self-identical being that "is" is "indifferent" to otherness. But ironically, that same entity was "not different" *from* otherness.

In Quantity, the thing is indifferent in both senses of "indifferent to" and "indifferent from." Thus, "pure quantity is indifference as open to all determinations provided that these are external to it and that quantity has no immanent connection with them." (375)³²²

Absolute Indifference, however, is of a different sort. It is "the indifference which, *through the negation* of every determinateness of being, i.e., of quality, quantity, and their at first immediate unity, measure, is a process of *self-mediation* resulting in a simple unity."

³²¹ "[A]bstrakte Gleichgültigkeit--wofür, da sie für sich als Sein gedacht werden soll, der Ausdruck Indifferenz gebraucht worden ist,--an der noch keine Art von Bestimmtheit sein soll." [I:387-88]

³²² "[D]ie reine Quantität ist die Indifferenz als aller Bestimmungen fähig, so aber, daß diese ihr äußerlich [sind] und sie aus sich keinen Zusammenhang mit denselben hat." [I:38]

(375)³²³ That is, the substrate is now posited as immune from external manipulation. Its external manifestations are merely its "state," which Hegel defines as "something qualitative and external which has the indifference for a *substrate*." (375)³²⁴

The *state* of the Substrate is qualitative, external, and "a vanishing determinateness." (375)³²⁵ Heretofore, Quality has been the internal integrity of the thing against quantitative manipulation. But now Quality has been externalized. An externalized internality is a contradiction. "State" proclaims, therefore, that it is *not* the essence of Measure. Outward determinateness is now posited as "an empty differentiation." (375)³²⁶ The *other*--the inner life--is the true thing. Nevertheless the inner is nothing without this outer. Therefore, "each of the two sides is posited as having to be itself *in principle* . . . this whole." (376)³²⁷

Absolute Indifference is to be taken as "concrete, a mediation-with-self through the negation of every determination of being." (375)³²⁸ "Concrete" implies a mediation between being and nothing.³²⁹ It is the opposite of "abstract," and abstraction implies no indwelling Spirit. Now, the mediation between being and nothing, or between Quality and Quantity, is entirely within the selfhood of the thing. Externalities no longer work any effect on the thing. The thing is beginning to taste freedom. Thus, "[a]s this mediation [the thing] contains negation and relation, and what was called state is its immanent, self-related differentiation." (375)³³⁰ "Contains" here must be read in the double sense of having it within *and* preventing it from escaping. Thus, the external is not truly external but is the

³²³ "[D]ie durch die Negation aller Bestimmtheiten des Seins, der Qualität und Quantität und deren zunächst unmittelbarer Einheit, des Maßes, sich mit zur einfachen Einheit vermittelt." [I:388]

³²⁴ "[E]in qualitatives Äußerliches, das die Indifferenz zum Substrate hat." [I:388]

³²⁵ "[V]erschwindendes." [I:388]

³²⁶ "[E]in leeres Unterscheiden." [I:388]

³²⁷ "[J]ede der beiden Seiten gesetzt ist, selbst an sich dies Ganze sein zu sollen." [I:389]

³²⁸ "[D]as Konkrete, das in ihm selbst durch die Negation aller Bestimmungen des Seins mit sich Vermittelte." [I:388]

³²⁹ Carlson, *Quality*, *supra* note 9, at 457.

³³⁰ "Als diese Vermittlung enthält sie die Negation und Verhältnis, und was Zustand hieß, ist ihr immanentes, sich auf sich beziehendes Unterscheiden." [I:388]

very manifestation of the Substrate. Because of this containment of external Measure, the thing "ceases to be only a substrate and *in its own self* only abstract." (375)³³¹

B. Indifference as Inverse Ratio of Its Factors

In Figure 22(c), the Infinite For Itself reduced measure relations to a Measureless Substrate. There, each extreme denied that it was either the qualitative *or* the quantitative. Speculative Reason made of this negative activity "the indivisible self-subsistent measure" [7], which is "*wholly* present in its differentiations [4, 5, 6]." (376)³³²

The Understanding then discerned Absolute Indifference in Figure 23(a), or [7] 6 [1]. Now it is the turn of Dialectical Reason to remind the Understanding of its history. It brings forth the ideal moment of mediation between Quantity and Quality, which is posited as being "within the indifference itself" [2]. (375)³³³ Accomplishment of this task, Hegel says, establishes the Being-for-self of the Substrate--or Essence.

[All Figures can be found in an Appendix at the end of this article]

Figure 23(b) Inverse Ratio of Its Factors

Dialectical Reason at first identifies the now-internal ratio [2] as the mediated truth of Absolute Indifference [1], and of course the very identification of [2] implies its difference from [1], and its isolation as [3]. If [2] is both sides of the suppressed Ratio of Measures, [3] at first views the sides as quantitative only. [3] stands over against [2], which is a "fixed measure." (376)³³⁴ This fixed measure represents the qualitative limit to the quantitative Measures

³³¹ "[A]ufhört, nur Substrat und an ihr selbst, nur abstrakt zu sein." [I:388]

³³² "[I]n seinen Unterschieden ganz vorhanden ist." [I:388]

³³³ "[A]n ihr selbst und sie damit als fürsichseiend gesetzt ist." [I:388]

³³⁴ "[F]este maß." [I:389]

in the ratio. Together, the limit [3] and the ratio [2] are called the Inverse Ratio of Its Factors. And, incidentally, the fact that [3] limits [2] ends up being the very flaw in Absolute Indifference that prevents it from entering the heavenly kingdom of Essence. "Limit" stands for salvery to externally imposed difference.

Inverse Ratio is a term developed in at the end of Quantity.³³⁵ An example of Inverse Ratio was $xy = 16$. In this expression, an increase in x led to a decrease in y . The variables x and y were quite open to external manipulation by the mathematician. But there was a limit to the mathematician's power over x and y . The mathematician could not make either x or y into zero. This resistance was important in re-establishing quality as integral to Quantum.³³⁶

An aspect of Inverse Ratio was that the exponent--16--stayed fixed--through the will of the mathematician. Now, the fixed measure has become Absolute Indifference to Measure and hence immunity from the external will of any mathematician or measurer. Hegel describes the difference between the primitive and more advanced Inverse Ratios as follows: "here the whole is a real substrate and each of the two sides is posited as having to be itself *in principle* [*an sich*] this whole." (376)³³⁷ In other words, since externality is now sublated, everything happens internally within the Substrate. And, in addition, any given part *is* the Substrate. Hence, [2] is just as much the Substrate as [3] is. Relations are no longer relation between inside and outside. There are now only internal relations.

In the interest of establishing that the Inverse Ratio of the Factors is the internal moment of the Substrate, Hegel presents the ratio as a ratio of quantities. But we are not to think that the Substrate is therefore the *sum* of these quanta. Quantity here stands for the indifference of [3] to [2] and the perfect continuity of [3] with [2], "in such a manner that it [3] would not be in its own self a

³³⁵ Carlson, *Quantity*, *supra* note 7, at 2138-48.

³³⁶ *See id.* at 2142-45.

³³⁷ "[D]as hier das Ganze ein reales Substrat, und jede der beiden Seiten gesetzt ist, selbst an sich dies Ganze sein zu sollen." [I:389]

quantum or opposed in any way, either as a sum or even as an exponent, to other quanta." (376)³³⁸ In other words, Quantity stands for the externality of the Ratio of Measures [3], whose "abstract determinateness . . . falls into indifference." (376)³³⁹ The point is to establish the Ratio of Measures as "posited in [the Substrate] as moments." (376)³⁴⁰

In the original Inverse Ratio of Figure 17(b), x and y were inversely proportional. As x shrank in size, y grew. Is the Inverse Ratio of Its Factors likewise inversely proportional? Here Hegel wishes only to say that the Measures have a negative relationship to each other. Perhaps one way of restating Hegel's point is as follows: (1) a "thing" is a negative unity of its Measures with the unity being on the side of Essence and the Measures on the side of Being. (2) Since the the totality of Measures imply a metonymic thing, any externally imposed quantitative increase of one Measure implies the quantitative decrease of some other Measure. Otherwise, the thing does not remain the thing it was but becomes some "different" thing. Yet, since we are holding the Inverse Ratio of Its Factors constant (just as we held 16 constant in the more primitive Inverse Ratio), the thing is not permitted to become a different thing. In short, Being is "limited" by the measureless thing. It is in a zero sum situation at this point. In this sense, then, the Inverse ratio of Its Factors is *inverse*. Any growth in the Logic now occurs beyond the realm of mere Being.

Hegel at first presents the Inverse Ratio of the Factors as a quantitative ratio, but, as the sides of the ratio are Measures, they are likewise qualities. Suppose one of these qualities puts itself forth as a *quality*. Hegel suggests that the other side must surrender its quality and be merely quantitative. Apparently the point is that two qualities meet each other as "mere oppugnancies," in Shakespearean terms.³⁴¹ One must strike the other down. Thus, of the two qualities,

³³⁸ "[S]o, daß sie nicht an ihr selbst Quantum wäre und in irgendeiner Weise als Summe oder auch Exponent ändern . . . gegenüberträte." [I:389]

³³⁹ "[A]bstrakte Bestimmtheit, welche in die Indifferenz fällt." [I:389]

³⁴⁰ "[U]m als Momente an ihr gesetzt zu sein." [I:389]

³⁴¹ WILLIAM SHAKESPEARE, TROILUS AND CRESSIDA.

Hegel says that "one of [them] is sublated by the other." (376)³⁴² But they are unified in a ratio nevertheless. And, Hegel further says, "neither is separable from the other." (376)³⁴³

This mysterious proposition will be illustrated by centripetal and centrifugal force, in the Remark that follows. There, we will learn that if, say, centripetal force is predominant, then the planet must fly into the sun, because centripetal force has bested centrifugal force and has sublated it as a quality. (The fact that this does not happen, Hegel says, testifies to the wrongness of the theory.) Yet if centripetal predominates, it must likewise sublimate itself. Once the planet flies into the sun, there can *be* no further centripetal force. Rather, centripetal and centrifugal force are obviously engaged in a zero sum relationship. Something internal to planetary movement--not measurable by these forces--keeps the planet from flying into or away from the sun.³⁴⁴

Externality by now is defeated, and everything is in everything else. "[T]herefore each side of the relation, too, contains both sides within itself and is distinguished from the other side only by a more of the one quality and a less of the other, and *vice versa*." (376)³⁴⁵ Nevertheless, because of universal interpenetration, the Specifying Measures "are thus at the same time posited as self-subsistent relatively to each other." (377)³⁴⁶ This self-subsistence of

³⁴² "[A]ls in deren durch die andere aufgehoben." [I:389]

³⁴³ "[V]on der andern untrennbar ist." [I:389]

³⁴⁴ There is a *Twilight Zone* episode on this. At first, the earth seems to be flying into the sun (centripetal force). The rich doctor abandons his dying patients and flies to northern Canada to preserve his life. The patients faint and are revived by the doctor. It appears the earth is now flying away from the sun. Everyone is freezing and the doctor is flying to Florida, which is rumored to be warmer. The lesson of the episode is that, when isolated centripetal and centrifugal force obliterate the entire earth. Some measureless thing must be preserving the earth from destruction.

As a child, watching this episode in true horror, it rather bothered me that no explanation is given why the earth hurtling toward the sun, should so perversely and all of a sudden, insist on hurtling away from the sun. But this is precisely Hegel's critique of the theories of planetary movement that depend on centripetal and centrifugal force.

³⁴⁵ "[J]ede der Seiten des Verhältnisses enthält daher ebenso sie beide in sich und ist nur durch ein Mehr der einen Qualität und das Weniger der andern und umgekehrt unterschieden." [I:389]

³⁴⁶ "[S]ind so gegeneinander zugleich als selbständig gesetzt." [I:390]

the sides is a fault, however, that cannot carry over into the Doctrine of Essence.

Hegel next emphasizes that the *immediate* reign of Specifying Measures over their other is terminated. The Inverse Ratio of the Factors is now mediated by Absolute Indifference, and the whole is now the ultimate most advanced Determinate Being. This Determinate Being, Hegel says, is a *totality*. It is both the outward appearance *and* the inner Essence of the thing.

But the unity of the ratio is only an indifference. The Substrate is not *expressly* the unity that holds together the external outward appearances. Furthermore, the moments of the ratio "are not yet explicitly *self-determined*, i.e. are not yet determined as sublating themselves into a unity *within themselves* and *through one another*." (377)³⁴⁷ So far, the indifference of the unity is also indifferent toward itself. (This is progressive, but, as Hegel, will say in the next section, we must also see posited an indifference toward indifference--a negation of the negation.)

Hegel now makes three propositions about the Substrate-- "[t]his self-subsistent measure as thus indivisible." (377)³⁴⁸ These three points are three defects that are, respectively, qualitative (but in-itself), quantitative and contradictory in nature.³⁴⁹ (a) Because the Substrate is only *implicitly* the totality, it possesses the determinatenesses which are sublated in it, only as groundlessly *emerging* in it." (377)³⁵⁰ That is to say, the implicit being of the Substrate and the real being of the Ratio of Measures are unconnected. The problem is that we do not have before us "the self-repulsion of the indifference." (377)³⁵¹ This will be identified by Speculative Reason in the next section. So far, "the indifference is not posited as self-determining but as being determinate and

³⁴⁷ "[N]och nicht fürsichseiend, d.i. noch nicht ihnen selbst und durcheinander sich zur Einheit aufhebend sind." [I:390]

³⁴⁸ "Dies so untrennbare Selbständige ist nun näher zu betrachten." [I:390]

³⁴⁹ These three remarks parallel the qualitative, quantitative and contradictory observations made at the end of Real Measure. *See supra* text accompanying notes 306-15.

³⁵⁰ "[A]n sich die Totalität, bleibend die Bestimmtheiten, welche in ihr aufgehoben sind, nur grundlos an ihr hervortretend."

³⁵¹ "[A]ls das Abstoßen ihrer von sich selbst." [I:390]

determined only *externally*." (377)³⁵² (β) At this point, the Inverse Ratio of Its Factors is "in an inverted quantitative relation." (377)³⁵³ The Measures are involved in "a to and fro in the scale of magnitude." (377)³⁵⁴ It is not, however, Absolute Indifference that generates this modulation. The external measurer is at work in generating this activity. That is to say, *given* the substrate and *given* the stableness of the *state* or outward measure of the substrate, and further *given* a change in one of the infinite outward measures of the substrate, the substrate stays what it is only if, externally, some *other* measure is adjusted to prevent qualitative change in the substrate. "The principle of determination resides not in the indifference, but in something lying outside it." (378)³⁵⁵ Or, in other words, the alteration is "for us" and therefore the result of mere external reflection.³⁵⁶ This is not good enough. (t) The sides of the Inverse Ratio of Its Factors, as well as the Absolute Indifference that unifies them, are each subsistent. Because each side is indifferent to the other side, "their determinate being is freed from the transition of the qualitative sphere." (378)³⁵⁷ In short, each side is immune from external control. Because this is so, and because each side also perfectly continues itself in the other side, we have a contradiction. How can each side be simultaneously continuous with (Quantity) and immune from (Quality) the other side?

The Substrate, Hegel says, is dependent on the continuity of Quality into each side of the Inverse Ratio of Its Factors. "If the two qualities are self-subsistent--taken, say, as if they were sensuous things independent of each other--then the whole determinateness of indifference falls asunder." (378)³⁵⁸ Interpenetration must be

³⁵² "[S]ie nicht als selbstbestimmend, nur als äußerlich betimmtseind und bestimmtwerdend." [I:390]

³⁵³ "[I]n umgekehrtem quantitativen Verhältnisse." [I:390]

³⁵⁴ "[E]in Hin- und Hergehen an der Größe." [I:390]

³⁵⁵ "Es wird auf ein Anderes hingewiesen, das außerhalb ihrer ist und in welchem das Bestimmen liegt." [I:390]

³⁵⁶ On the concept of "for us" and external reflection, see Carlson, *Quality*, *supra* note 9, at 434-45.

³⁵⁷ "[I]hr Dasein ist durch diese Gleichgültigkeit dem Übergehen des Qualitativen entnommen." [I:391]

³⁵⁸ "Sind beide Qualitäten selbständig--etwa genommen wie voneinander unabhängige, sinnliche Materien--so fällt die ganze Bestimmtheit der Indifferenz

complete, and, for this reason, the qualitative nature of each factor is precisely its quantitative continuity. If the qualities were *only* quanta, they would be external and "would reach beyond the other and would have in its *more* an indifferent determinate being which the other would not have." (378-79)³⁵⁹ But such externality has been sublated. "From this," Hegel says, "it follows that [the factors] are in *equilibrium*: that by as much as the one increases or decreases, the other likewise would increase or decrease and in the same proportion." (379)³⁶⁰ These last two remarks relate to the zero sum quality of Being at this stage. There can be no quantitative surplus because this would also be a *qualitative* (or self-identical) surplus. Yet the qualitative surplus cannot exist separate and apart from its quantitative relation to other qualities.³⁶¹

There can be no question of quantitative surplus. "The more by which *one* of the correlated moments would exceed the *other* would only be a baseless determination." (379)³⁶² In other words, since the "thing" is metonymic, a quantitative surplus of any given measure is inconsistent with the truth of the thing and therefore impossible and meaningless. Being is logically in a zero sum situation at this point and therefore limited in the face of the "fixed measure."

In the penultimate paragraph of this section, Hegel tries for a very subtle point. The Determinate Being of the factors (in their zero-sum mode) requires a distinct difference between Quality and Quantity. The complete interpenetration suggests that the Determinate Being of the factors vanishes. This point presupposes his Remark on centripetal and centrifugal force. This point will therefore be deferred until a description of Hegel's critique of these

auseinander." [I:391] This fault is laid at Spinoza's doorstep in the Remark that follows.

³⁵⁹ "[G]inge die eine über die andere hinaus und hätte in ihrem Mehr ein gleichgültiges Dasein, welches die andere nicht hätte." [I:391]

³⁶⁰ "Hieraus folgt dies, daß sie im Gleichgewicht sind; daß um soviel die eine vermehrte oder verminderte, die andere gleichfalls zu-oder abnahme und in demselben Verhältnisse zu-oder abnahme." [I:391-92]

³⁶¹ It will be recalled that Quality as isolated ceased to be. See Carlson, *Quality*, *supra* note 9, at 531-34.

³⁶² "Das Mehr, um welches das eine der in Beziehung stehenden Momente über das andere hinaus wäre, wäre nur eine haltunglose Bestimmung." [I:392]

countervailing forces is provided.

Meanwhile, Hegel concludes by saying that the dialectic unity in Figure 23(b) is "a contradiction in every respect." (379)³⁶³ Figure 23(b) "therefore has to be *posited* as sublating this its contradictory nature and acquiring the character of a self-determined, self-subsistent being which has for its result and truth not the unity which is merely indifferent, but that immanently negative and absolute unity which is called essence." (379)³⁶⁴

Remark: Centripetal and Centrifugal Force

Hegel pauses to comment on centripetal and centrifugal force in planetary orbits. The point, as usual, is that science has insufficiently distinguished between qualities and quantities.

The last section described the "relationship of a whole which is supposed to have its determinateness in the quantitative difference of two factors determined qualitatively against each other." (379)³⁶⁵ This relation is supposedly exhibited by the elliptical movement of the planets. Centripetal force is what draws the planets toward the center. Centrifugal force drives the planets away from the center. Their equilibrium is the elliptical orbit of the planet.

These forces, Hegel implies, are *not* an example of Inverse Ratio of the Factors. Such a ratio is constituted by Specifying Measures which are complete unto themselves, indifferent to each other, yet diffused with Substrate. Instead, Hegel says, centripetal and centrifugal force are "only two qualities in inverse relation to each other." (379)³⁶⁶

The inverse relation of centripetal and centrifugal force is supported by empirical fact, but, Hegel claims, the theory of

³⁶³ "[D]er allseitige Widerspruch." [I:392]

³⁶⁴ "[S]ie ist so zu setzen, als dieser sich selbst aufhebende Widerspruch zur fürsichseienden Selbständigkeit bestimmt zu sein, welche die nicht mehr nur indifferente, sondern die in ihr selbst immanent negative absolute Einheit, welche das Wesen ist." [I:392]

³⁶⁵ "Das Verhältnis eines Ganzen, das seine Bestimmtheit in dem Größenunterschiede quantitativ gegeneinander bestimmter Faktoren haben soll." [I:392]

³⁶⁶ "[N]ur zwei Qualitäten im umgekehrten Verhältnisse zueinander." [I:392]

centripetal and centrifugal force destroys the basic facts of astronomy. "Or if, as is proper," Hegel writes, "the fact is retained it escapes notice that the theory proves to be meaningless in face of the fact." (379-80)³⁶⁷

Hegel refers to a well-known astronomic fact that planets in an elliptical orbit sweep equal areas with every increment of time.³⁶⁸ Because the orbit is elliptical, this fact implies that "velocity is accelerated as they approach perihelion and retarded as they approach aphelion." (380)³⁶⁹ Of this fact, Hegel writes:

[t]he quantitative side . . . has been accurately ascertained by the untiring diligence of observation, and further, it has been reduced to its simple law and formula. Hence all that can properly be required of a theory has been accomplished. (380)³⁷⁰

But for Hegel this is not enough. Theory assumes centripetal and centrifugal force are qualitative, opposed moments. Quantitatively, however, one increases and the other decreases, as the planets, in their evil mixture, pursue their orbits. At some point, the forces reverse themselves in their dominance, until the next tipping point is reached.

"[T]his way of representing the matter," Hegel writes, "is contradicted by the essentially qualitative relation between their respective determinatenesses which makes their separation from each other completely out of the question." (380)³⁷¹ Each of the forces only has meaning in relation to the other. Neither can exist on

³⁶⁷ "[A]uf welche die in diesselbe gebrachte Theorie führt, nämlich das zugrunde liegende Faktum zu zerstören oder, indem dieses, wie gehörig, festgehalten wird, die Leerheit der Theorie gegen dasselbe darzutun." [I:392-93]

³⁶⁸ James W. Garrison, *Metaphysics and Scientific Proof: Newton and Hegel*, in *HEGEL AND NEWTONIANISM*, *supra* note 4, at 3, 8.

³⁶⁹ "Geschwindigkeit beschleunigt, indem sich dem Perihelium, und sich vermindert, indem sie sich dem Aphelion nähern." [I:393] Perihelion is the closest distance from the sun. Aphelion is the farthest.

³⁷⁰ "Das Qualitative . . . ist durch den uermülichen Fleiß des Beobachtens genau bestimmt und dasselbe weiter auf sein einfaches Gesetz und Formel Zurückgeführt, somit alles geleistet, was wahrhaft an die Theorie zu fordern ist." [I:393]

³⁷¹ "Dieser Vorstellung widerspricht aber das Verhältnis ihrer wesentlich qualitativen Bestimmtheiten gegeneinander. Durch diese sind sie schlechthin nicht auseinanderzubringen." [I:393]

its own.³⁷² To say, then, that one of the forces preponderates over its fellow is to say that the preponderant force is out of relation with its fellow to the extent of the surplus. But this is to say that the surplus does not exist.³⁷³

Hegel drives this point home:

It requires but little consideration to see that if, for example, as is alleged, the body's centripetal force increases as it approaches perihelion, while the centrifugal force is supposed to decrease proportionately, the [centrifugal force] *would no longer be able* to tear the body away from the former and to set it again at a distance from its central body; on the contrary, for once the former has gained the preponderance, the other is overpowered and the body is carried towards its central body with accelerated velocity. (380-81)³⁷⁴

Only an alien force could save centrifugal force from being overwhelmed. And this is tantamount to saying that the force that guides the planets *sans check* cannot be explained.³⁷⁵

The transformation from weakness to strength of one or the other forces implies that "each side of the inverse relation is in its own self the whole inverse relation." (381)³⁷⁶ The predominant force

³⁷² This recalls Hegel's critique of calculus, where dy or dx were qualitative and meaningless outside the ratio dy/dx . See Carlson, *Quantity*, *supra* note 4, at 2082-138.

³⁷³ This point is related to Hegel's general point that force can only be observed if opposed by another force. See generally David Gray Carlson, *How to Do Things With Hegel*, 78 TEX. L. REV. 1377 (2000).

³⁷⁴ "Es ist eine sehr einfache Betrachtung, daß, wenn z.B. wie vorgegeben wird, die Zentripetalkraft des Körpers, indem er sich dem Perihelium nähert, zunehmen, die Zentrifugalkraft hingegen en even soviel abnehmen soll, die letztere nicht mehr vermöchte, ihn der erstern zu entreißen und von seinem Zentralkörper wieder zu entfernen; im Gegenteil, da die erstere einmal das Übergewicht haben soll, so ist die andere überwältigt, und der Körper wird mit beschleunigter Geschwindigkeit seinem Zentralkörper zugeführt." [I:394]

³⁷⁵ Of the planets, Shakespeare's Ulysses says:

And therefore is the glorious planet Sol
In noble eminence enthroned and sphered
Amidst the other; whose med'cinable eye
Corrects the ill aspects of planets evil,
And posts, like the commandment of a king,
Sans check, to good and bad . . .

WILLIAM SHAKESPEARE, *TROILUS AND CRESSIDA*.

³⁷⁶ "[D]aß jede der Seiten des umgekehrten Verhältnisses an ihr selbst dies ganze umgekehrten Verhältnis ist." [I:394]

implies its opposite, servient force. The servient force has not vanished. "All that recurs then on either side is the defect characteristic of this inverse relation." (381)³⁷⁷ Either each force is wrongly attributed a self-identical existence free and clear of the other, "the pair being merely *externally* associated in a motion (as in the parallelogram of forces)." (381)³⁷⁸ Or neither side can achieve "an indifferent, independent subsistence in the face of the other, a subsistence supposedly imparted to it by a *more*." (382)³⁷⁹

The idea of intensity cannot help. "[T]his too has its determinateness in quantum and consequently can express only as much force (which is the measure of its existence) as is opposed to it by the opposite force." (382)³⁸⁰ In other words, intensity is just a way of smuggling in the idea of the quantitative surplus, which is precisely not allowed because the Measures are in a zero sum relation at this point. In any case, the sudden shift from predominant to servient implies qualitative change. The increase in one implies the decrease of the other.

The biological sciences had a like dilemma in the opposed forces of sensibility and irritability,³⁸¹ but, Hegel writes:

the confused hotchpotch of nonsense in which it became entangled through the uncritical use of these determinations of the Notion soon led to the abandonment in these spheres of this formalism which, however, is practiced without restraint . . . in physical astronomy. (382)³⁸²

³⁷⁷ "Es rekurriert damit nur an jeder Seite das, was der Mangel an diesem umgekehrten Verhältnis ist." [I:395]

³⁷⁸ "[U]nd mit dem bloß äußerlichen Zusammentreffen derselben zu einer Bewegung, wie im Parallelogramm der Kräfte." [I:395] The parallelogram of forces describes the phenomenon that if two forces exist as vectors, their average vector forms a parallelogram with the original vectors, provided one of the original vectors is multiplied by the imaginary number, $-i$.

³⁷⁹ "[K]eine ein gleichgültiges, selbständiges Bestehen gegen die andere erhalten kann, was ihr durch ein Mehr zugeteilt werden sollte." [I:395]

³⁸⁰ "[D]a es selbst in dem Quantum seine Bestimmtheit hat und damit ebenso nur so viel Kraft äußern kann, d.h. nur insoweit existiert, als es an der entgegengesetzten Kraft gegenüberstehen hat." [I:395]

³⁸¹ These refer to an organic thing's attraction to and repulsion from another thing.

³⁸² "[I]n dem unkritischen Gebrauche, dieser Begriffsbestimmung verwickelte, hat hier zur Folge gehabt, daß dieser Formalismus bald wieder aufgegeben worden ist, der . . . besonders der physikalischen Astronomie in seiner ganzen Ausdehnung fortgeführt wird." [I:396]

Vanishing. Just prior to this Remark, Hegel makes an argument that can now be more conveniently apprehended. Hegel has said in the Remark that, if centripetal force were predominant, nothing can explain why this force would not sublimate centrifugal force once and for all, causing the planet to fly moth-like into the sun. Hegel indicates in the penultimate paragraph of the prior section that, in Measure generally, this sublation must logically occur. Furthermore, since the qualities in the Inverse Ratio of the Factors cannot exist separate and apart from each other, this necessary sublation implies that Quality and Quantity sublimate themselves, so that Measure implies the realm of Essence. "Each of these hypothetical factors vanishes, whether it is supposed to be *beyond* or *equal* to the other." (379)³⁸³ Since Quality and Quantity there must be, the mere isolation of these, even in a perfect equilibrium, implies their sublation in general. This self-abolition of Quality and Quantity, Hegel comments paradoxically, "constitutes itself [as] the sole self-subsistent quality." (379)³⁸⁴ This argument, if valid, establishes [2, 3] in Figure 23(b) as an "inherent incompatibility with itself, a repelling of itself from itself." (384)³⁸⁵ This self-repulsion is the step that Speculative Reason identifies.

But is the argument valid? My conclusion is yes. At the point where the argument is hazarded, the thing was metonymic. It was a negative unity of *all* the Measure relations that the thing has with all the other things in the world. The thing, being fixed, does not permit quantitative disequilibrium of the Measures. The mere attempt of any such surplus to manifest itself is self-destructive. Any such manifestation puts the surplus--a qualitative proposition--in a lethal isolation. This self-identity is thus radically incommensurate with any other thing, including itself. Such an entity destroys itself by its very logic. What is left is the beyond of the realm of Being--Essence.

Spinoza. Hegel concludes his Remark by returning to Spinozan substance. Absolute Indifference is its "fundamental

³⁸³ "Jeder dieser sein sollenden Faktoren verschindet ebenso, indem er über den andern hinaus, als indem er ihm gleich sein soll." [I:392]

³⁸⁴ "[D]ieser also sich zum einzigen Selbständigen macht." [I:392]

³⁸⁵ "[D]ie Unverträglichkeit mit sich selbst, Abstoßen ihrer von sich selbsts." [I:397]

determination," Hegel says. (382)³⁸⁶ Every determination is posited as vanished before substance. Difference is introduced empirically, and the source of difference is the intellect.³⁸⁷ Being external, Spinozan difference is, in Hegelian terms, quantitative. "[T]he difference is *not* immanent in the indifference, for as quantitative it is rather the opposite of immanence." (383)³⁸⁸ Contrary to Spinoza, difference must be grasped qualitatively. Spinozan Substance, Hegel says, echoing a theme from the Subjective Logic, is not yet subject.³⁸⁹ In Spinoza's philosophy, "quantitative or qualitative determination falls apart . . . it is the *dissolution of measure*, in which both moments [should be] directly posited as one." (383)³⁹⁰

C. Transition into Essence

The final move in the Doctrine of Being is the move to Essence.

[All Figures can be found in an Appendix at the end of this article]

Figure 23(c) Essence

"Absolute Indifference," Hegel says, "is the final determination of *being* before it becomes essence." (382)³⁹¹ This must be read in the technical sense. The Understanding determines propositions. Dialectical Reason negates them by pointing out a

³⁸⁶ "[D]ie Grundbestimmung." [I:396]

³⁸⁷ For Spinoza, as interpreted by Hegel, intellect is "modal"--i.e., external to substance. See *supra* text accompanying notes 46-49.

³⁸⁸ "[D]er Unterschied ist nicht ihr immanent, als quantitativer ist er vielmehr das Gegenteil der Immanenz." [I:396]

³⁸⁹ That substance is subject is a key Hegelian slogan from the *Phenomenology*. See PHENOMENOLOGY, *supra* note 34, at 10.

³⁹⁰ "[Q]uantitativer oder qualitativer Betimmung auseinanderfällt . . . sie ist die Auflösung des Maßes, in welchem beide Moment unmittelbar als eins gesetzt waren." [I:397]

³⁹¹ "Die absolute Indifferenz ist die letzte Bestimmung des Seins, ehe dieses zum Wesen wird." [I:397]

contradiction between the determination and its history. Speculative Reason shows the unity between the two. Absolute Indifference is the final move of the *Understanding*--the final attempt by the Understanding to state what *is*. In our conventional mode of depicting the *Science of Logic*, the Understanding shifted the middle term over to the left side of the page. This is the last such move. In the Doctrine of Essence the Understanding shifts the middle term over to the right, to explain what is *not*.

Why is Absolute Indifference not yet Essence? Because "it still contains difference as an *external*, quantitative determination; this is its *determinate being*." (383)³⁹² Absolute Indifference is "only *implicitly* the absolute, not the absolute grasped as *actuality*." (383)³⁹³ Actuality, Hegel says, requires that the differences be posited as indifferent. The further step that is needed

is to grasp that the reflection of the differences into their unity is not merely the product of the *external* reflection of the subjective thinker, but that it is the very nature of the differences of this unity to sublimate themselves. (384)³⁹⁴

As will be shown in some future installment, actuality is precisely the self-sublation of appearances. Essence is *actual*--it manifests itself--when it fades away.

Hegel identifies the unity (or Essence) of the existential differences as "absolute negativity." (384)³⁹⁵ This negativity is a truly radical indifference. It is an indifference to Being, which is therefore an indifference to itself, and even an indifference "to its own indifference." (384)³⁹⁶ What we have is a truly indeterminate indifference, in the nature of Pure Quantity. Indeed, at the beginning of Essence, Hegel will confirm that, "[i]n the *whole* of

³⁹² "[D]en Unterschied als äußerlichen, quantitativen an ihr hat. Dies ist ihr Dasein." [I:397]

³⁹³ "[N]ur das ansichseiende bestimmt, nicht als das fürsichseiende Absolute gedacht zu sein." [I:397]

³⁹⁴ "Was hier mocht fehlt, besteht darin, daß diese Reflexion nicht die äußere Reflexion des denkenden, subjektiven Bewußtseins, sondern die eigene Bestimmung der Unterschiede jener Einheit sei, sich aufzuheben." [I:397]

³⁹⁵ "[A]bsolute Negativität." [I:397]

³⁹⁶ "[G]egen ihre eigene Gleichgültigkeit." [I:397]

logic, essence occupies the same place as quantity does in the sphere of being; absolute indifference to limit." (391)³⁹⁷ Essence is therefore a return to Quantity, but in an enriched form.

The determination of Absolute Indifference was "from every aspect a contradiction." (384)³⁹⁸ First, it is "*in itself* the totality in which every aspect is sublated and contained." (384)³⁹⁹ Yet it asserts the Inverse Ratio of the Factors as an externality.

As thus the contradiction of itself and its determinedness, it is the negative totality whose determinatenesses have sublated themselves in themselves and in so doing have sublated this fundamental one-sidedness of theirs The result is that indifference is now posited as what it in fact is, namely a simple and infinite, negative relation-to-self. (384)⁴⁰⁰

That Essence is simple is portrayed in [7]. That it is infinite is to say that Essence goes outside of itself but remains what it is (though, now that externality has been abolished, "outside" must be understood as really inside).⁴⁰¹ That Essence is negative will be

³⁹⁷ "Das Wesen ist im Ganzen das, was die Quantität in der Sphäre des Seins war; die absolute Gleichgültigkeit gegen die Grenze." [II:5]

³⁹⁸ "[N]ach allen Seiten als der Widerspruch gezeigt." [I:397]

³⁹⁹ "Sie ist an sich die Totalität, in der alle Bestimmungen des Seins aufgehoben und entalten sind." [I:397]

⁴⁰⁰ "So der Widerspruch ihrer selbst und ihres Bestimmtheits, ihrer an sich stehenden Bestimmung und ihrer gegesetzten Bestimmtheit, ist sie die negative Totalität, deren Bestimmtheiten sich an ihnen selbst und damit diese ihre Grundeinseitigkeit . . . aufgehoben haben. Gesetzt hiemit als das, was die Indifferenz in der Tat ist, ist sie einfache und unendliche negative Beziehung auf sich." [I:397]

⁴⁰¹ Hegel says in the *Lesser Logic*:

In the sphere of Essence one category does not pass into another, but refers to another merely. In Being, the form of reference is purely due to our reflection on what takes place: but it is the special and proper characteristic of Essence. In the sphere of Being, when some[thing] becomes another, the some[thing] has vanished. Not so in Essence: here there is no real other, but only diversity, reference of the one to *its* other. The transition of Essence is therefore at the same time no transition: for in the passage of different into different, the different does not vanish: the different terms remain in their relation. When we speak of Being and Nought, Being is independent, so is Nought. The case is otherwise with the Positive and the Negative. No doubt these possess the characteristic of Being and Nought. But the positive by itself has

consistently shown by the Understanding, which from now on says only what things are *not*. That it is a relation and a relation to self is apparent in [4, 5, 6, 7] of Figure 23(c).

What is the fate of expelled Being? These *dejecta* "do not emerge as self-subsistent or external determinations." (384)⁴⁰² They are borne by and retained as ideal moments of the essential thing. Furthermore, these materials "are only through their repulsion from themselves." (384)⁴⁰³ In other words, appearances are authentic to the Essence of the thing. But they are not what they are affirmatively. This is the now superseded error of the Understanding. Rather, these beings are "sheer *positedness*." (384)⁴⁰⁴ A positedness, in Essence, will be what determinateness was in the realm of Being. It is a relation between the affirmative and the negative, with the understanding that affirmations are really negations of the negation invoked by Essence.

Being has now abolished itself. It has, to paraphrase Romeo, cut off its own head with a golden axe and exiled itself to a negative beyond. And in this self-banishment, Hegel states that the presupposition, with which the entire Logic began, has sublated itself. Being turns out to be "only a moment of [Essence's] repelling." (385)⁴⁰⁵ The self-identity for which being strived so assiduously "is only as the *resulting coming together with itself*." (385)⁴⁰⁶ Being is now Essence, "a simple *being-with-self*." (385)⁴⁰⁷

Conclusion

no sense: it is wholly in reference to the negative . . . In the sphere of Being the reference of one term to another is only implicit: in Essence . . . it is explicit. And this in general is the distinction between the forms of Being and Essence: in Being everything is immediate, in Essence everything is relative.

LESSER LOGIC, *supra* note 6, § 108 Remark.

⁴⁰² "Die Bestimmungen als solche abgestoßene gehören aber nun nicht sich selbst an, treten nicht in Selbständigkeit oder Äußerlichkeit hervor." [I:398]

⁴⁰³ "[N]ur durch deren Abstoßen von sich sind." [I:398]

⁴⁰⁴ "Gesetzte, schlechthin." [I:398]

⁴⁰⁵ "[N]ur ein Moment ihres Abstoßens ist." [I:398]

⁴⁰⁶ "[N]ur ist als das resultierende, unendliche Zusammengehen mit sich." [I:398]

⁴⁰⁷ "[E]infaches Sein mit sich." [I:398]

Hegel's theory of measure differs starkly from that which emanates from analytic philosophy, in that Hegel identifies Quality as a constituent part of Measure. Thus, according to one recent example, provided by Henry Kyburg:

Most scientific theories--if one is willing to translate predicates into characteristic functions [*i.e.*, universal truths] one could say *all* scientific theories--express relations among quantities. To test a theory or to apply it therefore requires measurement.⁴⁰⁸

Kyburg's account reveals a sensitivity to the fact that empirical judgments might contradict mathematical maxims, yet the justification of these maxims is dogmatically asserted. There is, however, no definitional work on what quantity or quality is.⁴⁰⁹ Kyburg concerns himself with a theory of error to describe the gap between observation and axiomatic truth. But to put the problem in this way is to reinscribe the dogma of axiomatic truth as the ultimate criterion after all.

For Hegel, the gap between judgment and background truth is constitutional. In the background is the very gap that analytic philosophy would subjectivize by attributing it to the observer. For Hegel, measurements cannot *possibly* be accurate, because any "thing" is, at its core, Measureless. There can be no question of correcting, once and for all, the errors of measurement.

⁴⁰⁸ HENRY E. KYBURG, *THEORY AND MEASUREMENT* 9 (1984).

⁴⁰⁹ Kyburg seems to equate "quantity" with Hegelian Measure. Thus there are "kinds of quantities." *Id.* at 19. In general, the concept of "quantity" is treated as self-evident. Quantity at times seems to be nothing other than language stripped of its connotative penumbra. *Id.* at 20 ("*if it were* the case that we could speak without a background fund of information and convention concerning the application of language, then it *would* be possible for us to develop notions of quantity analogous to those with which we actually operate").

Appendix

This appendix contains the first 96 steps in the *Science of Logic*. These steps are grouped in triads. The first triad--bearing the label (a)--represents the simple, immediate proposition of the Understanding. The Understanding states what *is*. The left side of the drawing represents *being* and the right side of the page represents *nothingness*. Because Measure is overtly the unity of Quality and Quantity, the Understanding begins to see dialectically when Measure is finally reached. Nevertheless, it has an immediate view of this mediation.

The second member of a triad--bearing the label (b)--is the dialectical step. It opposes what is *not* to what *is*. The portion of the circle marked [2] is contrasted with [1]--the Understanding's immediate proposition. Although [2] is always internal to [1, 2], Dialectical Reason generates [3]--itself an isolated, immediate, and hence defective claim.

The final member of the triad--bearing the label (c)--is the speculative step in which being and nothing are thought together. Within the speculative sphere [4-7]. [7] represents a static immediate account of a dynamic process [4-6].

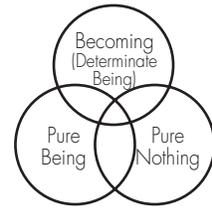
After the speculative step, the Understanding makes a one-sided proposition about the prior step. This is shown as the Understanding's dragging the prior figure over to the left side of the page--the side of affirmative being.



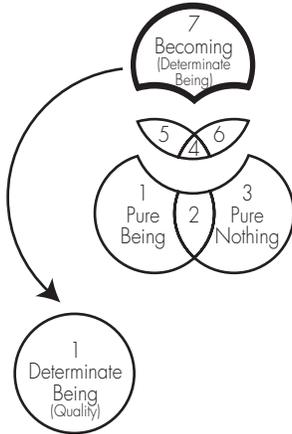
**Figure 1(a)
Pure Being**



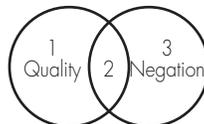
**Figure 1(b)
Pure Nothing**



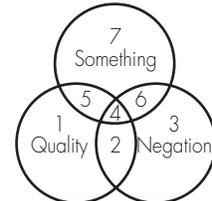
**Figure 1(c)
Becoming**



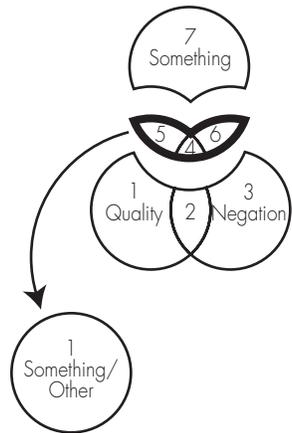
**Figure 2(a)
The Move to Determinate Being**



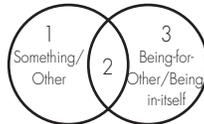
**Figure 2(b)
Quality and Negation**



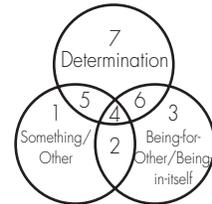
**Figure 2(c)
Something**



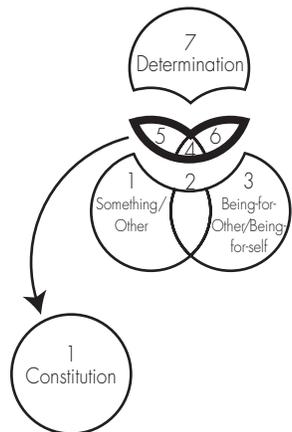
**Figure 3(a)
Something/Other**



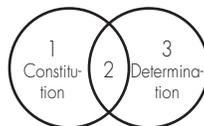
**Figure 3(b)
Being-for-Other and Being-in-Itself**



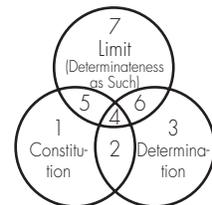
**Figure 3(c)
Determination of the In-Itself**



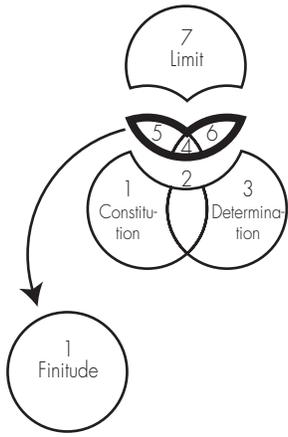
**Figure 4(a)
Constitution**



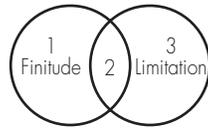
**Figure 4(b)
Constitution vs Determination**



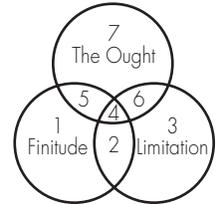
**Figure 4(c)
Limit (Determinateness as Such)**



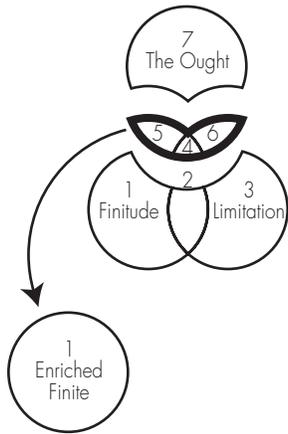
**Figure 5 (a)
Finitude**



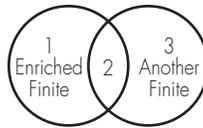
**Figure 5 (b)
Limitation**



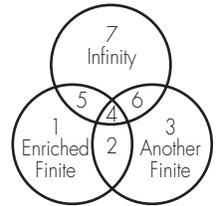
**Figure 5 (c)
The Ought**



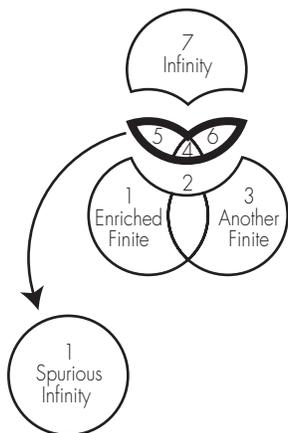
**Figure 6 (a)
Enriched Finite**



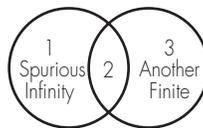
**Figure 6 (b)
Another Finite**



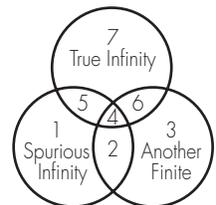
**Figure 6 (c)
Infinity**



**Figure 7 (a)
Spurious Infinity**



**Figure 7 (b)
Spurious Infinity and its Other**



**Figure 7 (c)
True Infinity**

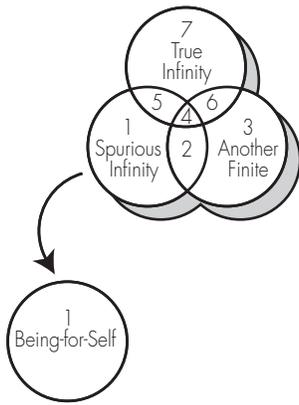


Figure 8 (a)
Being-For-Self



Figure 8 (b)
Being-For-One

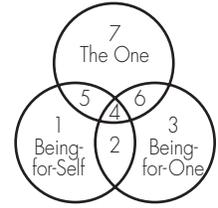


Figure 8 (c)
The One

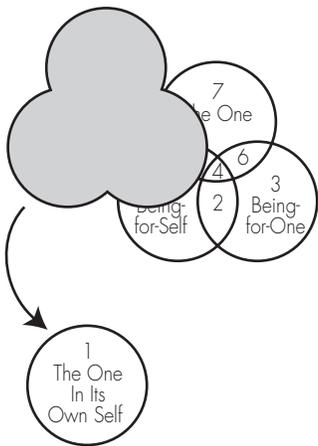


Figure 9 (a)
The One In Its Own Self

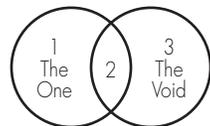


Figure 9 (b)
The One and the Void

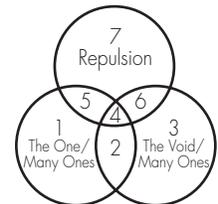


Figure 9 (c)
Repulsion

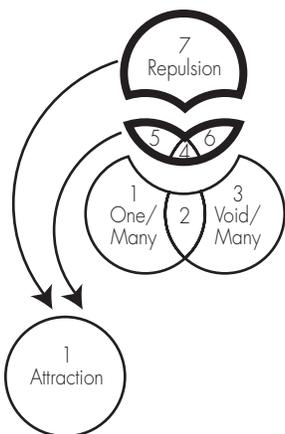


Figure 10 (a)
Attraction

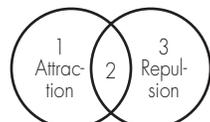


Figure 10 (b)
Attraction and Repulsion

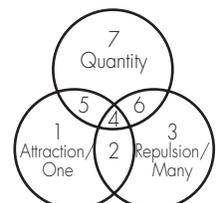
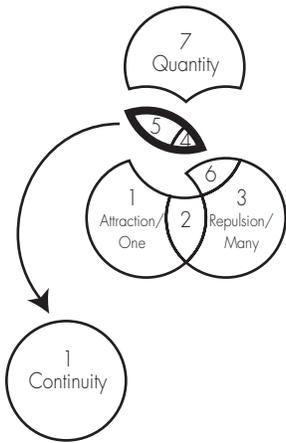
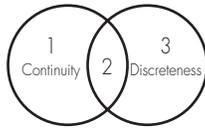


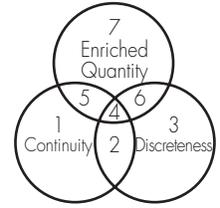
Figure 10 (c)
Quantity



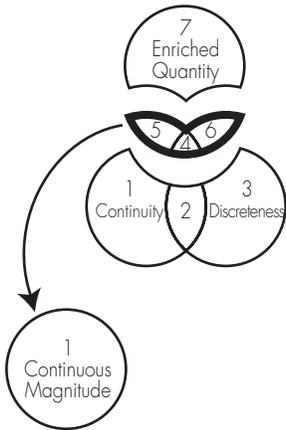
**Figure 11 (a)
Continuity**



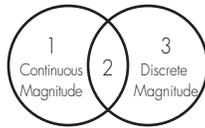
**Figure 11 (b)
Discreteness**



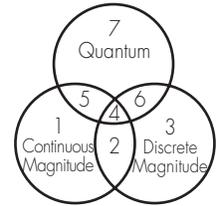
**Figure 11 (c)
Enriched Quantity**



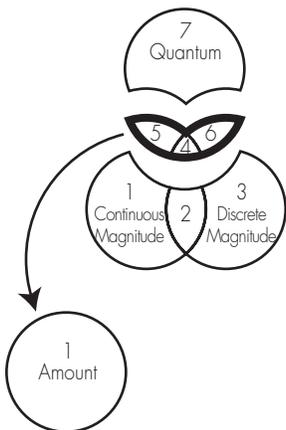
**Figure 12 (a)
Continuous Magnitude**



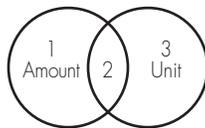
**Figure 12 (b)
Discrete Magnitude**



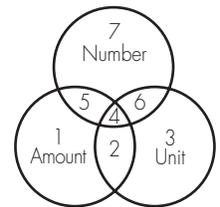
**Figure 12 (c)
Quantum**



**Figure 13 (a)
Amount**



**Figure 13 (b)
Unit**



**Figure 13 (c)
Number**

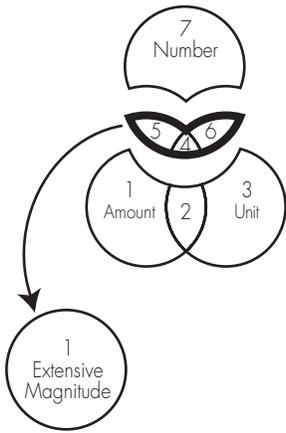


Figure 14 (a)
Extensive Magnitude
(Extensive Quantum)

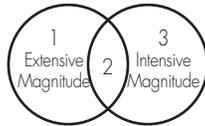


Figure 14 (b)
Intensive Magnitude (Degree)

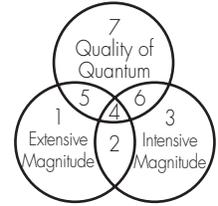


Figure 14 (c)
The Quality of Quantum

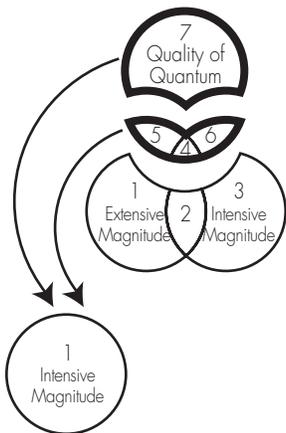


Figure 15 (a)
Intensive Magnitude (Degree)

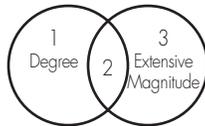


Figure 15 (b)
Extensive Magnitude

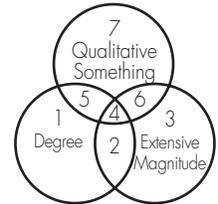


Figure 15 (c)
Qualitative Something

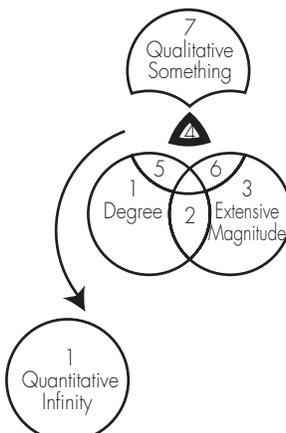


Figure 16 (a)
Quantitative Infinity

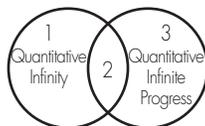
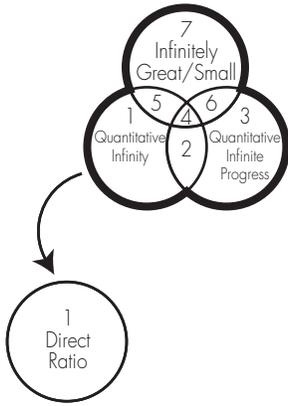


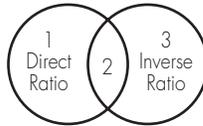
Figure 16 (b)
Quantitative Infinite Progress



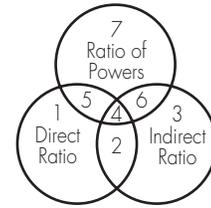
Figure 16 (c)
Infinitely Great and Infinitely Small



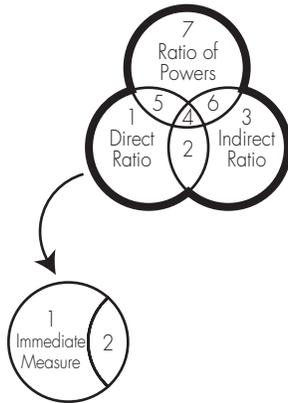
**Figure 17 (a)
Direct Ratio**



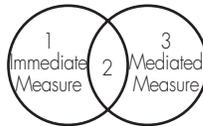
**Figure 17 (b)
Inverse Ratio**



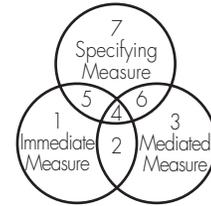
**Figure 17 (c)
Ratio of Powers**



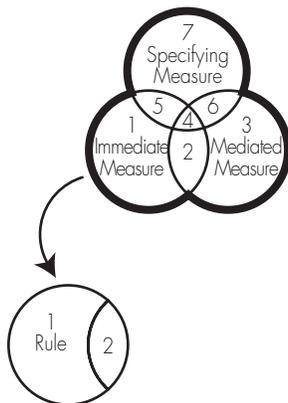
**Figure 18 (a)
Immediate Measure**



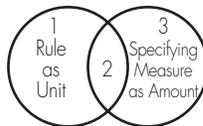
**Figure 18 (b)
Mediated Immediate Measure**



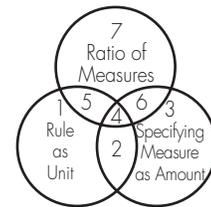
**Figure 18 (c)
Specifying Measure**



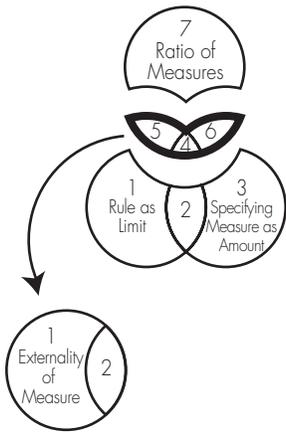
**Figure 19 (a)
Rule**



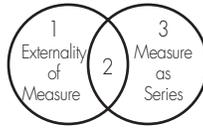
**Figure 19 (b)
Rule Measuring its Other**



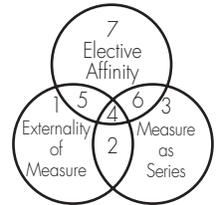
**Figure 19 (c)
Ratio of Measures
[Realized or Specified Measure]**



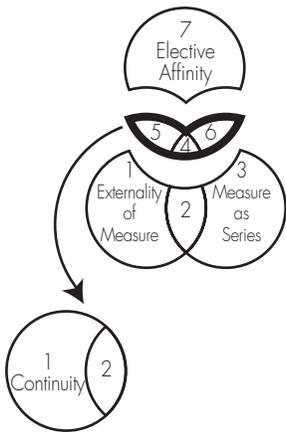
**Figure 20 (a)
Combination of Measures**



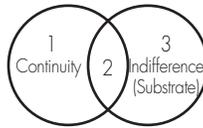
**Figure 20 (b)
Measure as a
Series of Measure Relations**



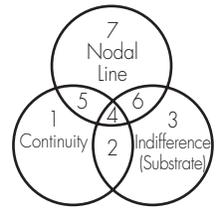
**Figure 20 (c)
Elective Affinity**



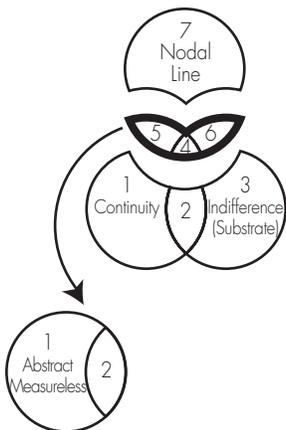
**Figure 21 (a)
Continuity of Affinity**



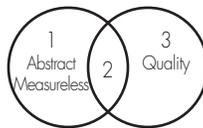
**Figure 21 (b)
Indifference of Affinity (Substrate)**



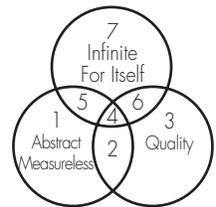
**Figure 21 (c)
Nodal Line**



**Figure 22 (a)
Abstract Measureless**



**Figure 22 (b)
Quality of the Abstract Measureless**



**Figure 22 (c)
Infinite For Itself**

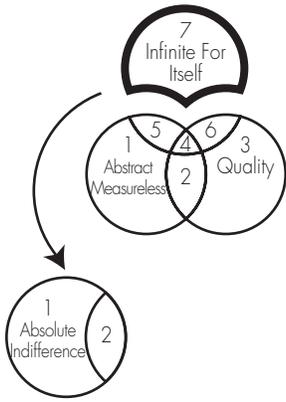


Figure 23 (a)
Absolute Indifference

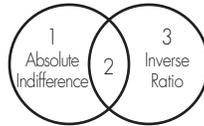


Figure 23 (b)
Inverse Ratio of the Factors

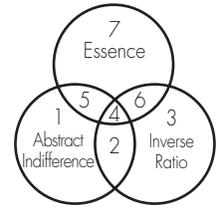


Figure 23 (c)
Essence

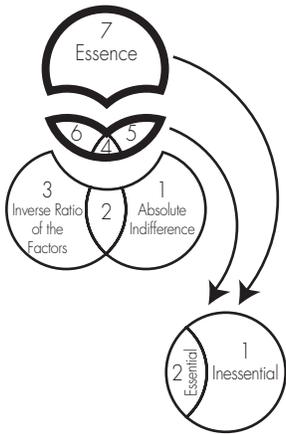


Figure 24 (a)
The Essential and the Unessential

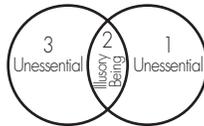


Figure 24 (b)

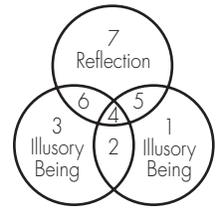


Figure 24 (c)
Reflection

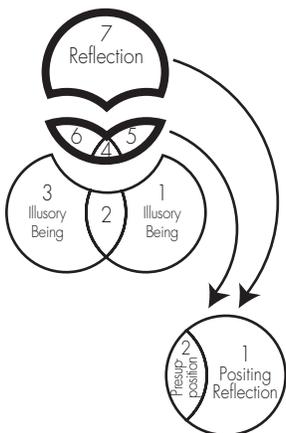


Figure 25 (a)
Positing (Absolute) Reflection

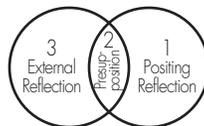


Figure 25 (b)
External Reflection

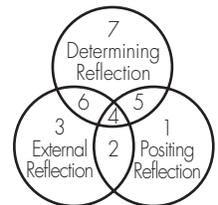


Figure 25 (c)
Determining Reflection