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Immeasurable Value? An Essay on Marx's Legacy

Dedicated to Sol Yurick

Introduction: A Bleak House legacy?

“The Lawyers have twisted it into such a state of bedevilment that the original merits of the case have long disappeared from the face of the earth. It's about a Will, and the trusts under a Will—or it was, once. It's about nothing but Costs, now. We are always appearing, and disappearing, and swearing,, and interrogating, and filing, and cross-filing, and arguing, and sealing, and motioning, and referring, and reporting, and revolving about the Lord Chancellor and all his satellites, and equitably waltzing ourselves off to dusty death, about Costs. That's the big Question. All the rest, by some extraordinary means, has melted away.”

“But it was, sir,” said I, to bring him back, for he began to rub his head, “about a Will?”

—Charles Dickens, *Bleak House* (1853)

Opposition to capitalism was not invented by Marx. Anti-capitalist movements had an enormous presence before his time and they continue to “change the world” long after the collapse of the governments run by self-defined Marxist parties in the former Soviet Union and Eastern Europe.¹ Surely, reading and accepting Marx's work was never a necessary condition for opposing capitalism, but is it still sufficient?

Whatever the answer to that question, surely Marx's textual legacy stimulates tremendous ambivalence in the anti-capitalist movement. For it is hard to imagine a serious analysis and critique of capitalism that would not use at least some of this mountainous legacy, but there is an anxiety in approaching it due to its alleged associations with Stalinism, 19th-century capitalism and its political economy,

totalitarianism, secular humanism, or any of a thousand other contemporary phantoms haunting one or another person's imagination. Is Marx's textual mountain something of a cursed (though tantalizingly huge) legacy like the one in Dickens' *Bleak House* which literally drives a number of characters insane in their futile efforts to appropriate it through endless legal procedures in a hellish "Court of Chancery"?

The ambivalence expressed in this question cries out for a criterion that would neatly separate the useful parts of Marx's work from the out-dated or even reactionary. There have been a variety of efforts in the past to provide such a criterion. For example, the famous "early" versus "late" Marx debates from the 1950s to the 1970s provided simple temporal dichotomies between acceptable and unacceptable texts—before or after 1848, before or after 1858, before or after 1867 (cf., the *locus classicus* of this effort being (Althusser 1996)). But they have proven as interminable and indecisive as the "Jarndyce and Jarndyce" case of *Bleak House*.

In this essay, I will investigate whether there is an appropriate criterion to distinguish the useful from eliminable works of Marx. I will do this indirectly via an analysis and critique of Antonio Negri's and his collaborator Michael Hardt's work on these issues, since Negri, to his credit, has enthusiastically addressed the "Marx ambivalence" syndrome thoroughly, positively, and often unseasonably for decades while Michael Hardt has joined him in the last decade in presenting a widely discussed and conceptually simple answer to the "Is there Marx after Marx?" questions. They claim that though much of Marx's work is still vital to the anti-capitalist movement, the part of Marx's work that logically depends upon the Law of Value should be rejected while that part that is not dependent on the Law could be usefully introduced into the anti-capitalist philosophy of the future. I will call this dichotomy of Marxist texts, Negri and Hardt's "*criterion of viability*." They justify this criterion on two counts:

(i) the Law of Value is obsolete, i.e., it was applicable, at best, to 19th century capitalism, but it has lost all grip on the reality of contemporary postmodern capitalism [e.g., (Hardt and Negri 1994: 9, 175), (Hardt and Negri 2000: 209, 355-359);

(ii) the Law forms the ideological basis of unacceptable socialist and Stalinist reactions to capitalism.

Surely Negri and Hardt are not alone in trying to rid the anti-capitalist movement of Marx's rather embarrassing continuity with the "classical tradition" in political economy which is presumably typified by Marx's presumed adherence to the Law of Value. Marx's Labor Theory of Value with its Law of Value corollary, is continually attacked as being either empirically passé or conceptually incoherent. Sraffians like

Ian Steedman and “analytic Marxists” like G. A. Cohen and Jon Elster argue that the key question for the anti-capitalist movement is simply whether the capitalists can justly divide the productive results of the system [(Steedman 1977), (Cohen 1988), (Elster 1985)]. If the answer is “no,” then that is reason enough to challenge it. Why be saddled with an elaborate and, in the bargain, mythical “value-foundation” for an anti-capitalist ideology, especially in an era when “foundationalism” is out of favor as a philosophical/political attitude (Derrida 1994: 170)?

Negri and Hardt differ from such critics in that they claim to find this rejection of the Law of Value in Marx's own work, especially the “Fragment on Machines” in the *Grundrisse* and in the unpublished Part Seven of *Capital I*, “Results of the Immediate Process of Production”). They claim that Marx—in Cassandra-like moments between 1858 and 1866, especially while writing the midnight notebooks later called the “Grundrisse,” (translated as the “Foundation of a Critique of Political Economy”) and the “Results”—prophesied that the development of capitalism would undermine the Law of Value...*in the future*. Negri and Hardt argue that Marx's “future” is simply now. That is, capitalism came to a point during the late 20th century when:

(i) science and technology which are the products of the “general intellect” and “immaterial labor,” not material labor, dominate the productive metabolism with nature;

(ii) capitalism subsumes under its own control not only the productive process, but all of the allied processes of social reproduction (education, sexuality, communication, demography, etc.), i.e., “biopolitics” in the terminology that Negri and Hardt borrow from Foucault.

They claim that these developments literally “explode” (to use Marx's term in the *Grundrisse's* “Fragment”) the older value form and put the Law of Value in crisis.

In this essay I will show why Negri's and Hardt's criterion of viability based on the rejection of the Law of Value is not the best way to “save” Marx's work for the anti-capitalist movement.²

Part I: Marx on Value and the Law of Value: Prolegomena

A necessary step and, at the same time, an important problem for Negri's and Hardt's criterion of viability is simply that what they refer to as the “Law of Value” is *not explicitly defined* in Marx's work. There are many explicitly stated laws (e.g., the law of the tendency of the falling rate of profit, the general law of capitalist

accumulation) and many explicitly identified values (e.g., use-value, exchange-value, surplus value) in Marx's texts, but there is little evidence of a "Law of Value." Although Engels seems to have used it often, Marx rarely employs the phrase in *Capital I, II, III* or in the letters and unpublished manuscripts, and, when he does, he uses the phrase loosely and in passing. For example, in the 860 pages of *Capital III* attributed to Marx there are only seven uses of the phrase according to the index and it is difficult to "abstract" a law-like statement of the Law of Value from simply putting all these different uses in Marx's texts side-by-side.

This paucity of use might be surprising, since the phrase was often deployed as if its meaning was obvious by many writers after Marx to describe complex relationships among a set of "hidden variables" below the level of overt economic discourse which is normally dominated by prices, wages, profits, interest rates, rents expressed in monetary terms. Perhaps that is why Negri seems to be so nonchalant about the phrase; it was so commonly used during his youth in the pages of Italian Communist and Socialist Parties' newspapers and pamphlets that it didn't need explicit definition.

Certainly, even if it does not have a central role in Marx's writings, "the Law of Value" is a widely used technical phrase in the Marxist tradition. The problem with this traditional use is simply that the Law of Value has been given a wide variety of definitions by Marxist economists and politicians. Thus in Leontyev's Soviet-era textbook on political economy, the Law of Value is narrowly defined as claiming that "the value of a commodity is determined by the amount of socially necessary labour expended on its production" (Leontyev 1974). But Fredrick Haffner in his encyclopedia article on "the Law of Value" provides a maximal definition having four different, but related meanings:

(i) a "price theory" version of the law, similar to Leontyev's definition, which claims that the exchange values and production prices of goods are "established according to the labour socially necessary for their reproduction;"

(ii) the Law explains the market-price mechanism in quantitative terms;

(iii) the Law explains class relations, alienation and impoverishment in capitalism;

(iv) "the laws of development of capitalism in history (concentration, theory of crises, etc.) can be incorporated, too, so that the law of value embraces the economic law of motion of capitalist society" (Haffner 1973: 268-269).

If one accepts the "maximal" definition, then most of Marx's typical tenets would be identified with the Law of Value. Consequently, there would be few Marxian

“phenomena” to “save” once one applies Negri’s and Hardt’s “everything but the Law of Value” criterion of viability!

Does that mean that we should use the “restricted” Leontyev definition for the purposes of our discussion?

The difficulty with making such a decision is simply that the phrase is not in common use outside of the pages of post-Marx Marxist and Soviet-era economists who were dealing with a crisis of planning immediately after the Russian Revolution. The Communist Party had to make good on its claim that a planned economy is not only possible, but it is superior to one based on “the anarchy of production.” The discussions of a “Law of Value” really took off during the debates about the transition from capitalism to socialism and the nature of economic planning.² Questions like, “Is there a law of value that is either fully put into play in socialism [as Leontyev argued] or is capitalism, much less socialism and communism, beyond the law of value [as Stalin insisted]?,” were frequently posed [(Leontyev 1974: 166), (Stalin 1972: 473-475)] However, there is no doubt that these debates, which now appear to many as baroque verbal jousting over the corpses of millions of workers, would fill Negri with contempt or despair, inspiring him to say, “Basta!” But unless we are to practice the *ad hominim* fallacy and find concepts guilty by their historical associations, we are still left with the problem: what is the Law of Value and can its rejection be used to differentiate “the quick from the dead” in Marx’s work?

In order to best decide what meaning “the Law of Value” might have that can give Negri’s and Hardt’s criterion of viability some plausibility, we must briefly consider the value-discourse Marx validates, since that discourse sets the parameters of the Law’s meaning. Marx’s work is certainly replete with value-discourse. The key text of the nineteenth century anti-capitalist revolution, *Capital I*, not only begins with Value, its first chapter is a detailed, scholastic and, some would say, pedantic disquisition on value (in all its forms and their tensions) which eventually leads to a sort of “dialectical deduction” of money (*the language of capitalism*). Why did Marx require his readers to climb this dialectical purgatorial mountain before they could fly to paradise of class struggle? Marx was certainly conscious of the heavy demands on his readers. But he brushed them off by proudly inverting Dante’s *Purgatorio*: “Segui il tuo corso, e lasci dir le genti” (“Follow your path, and let the people talk.”)

It is no accident that Marx begins his major critique of political economy in *Capital I* (1867) with Value. That was the originary axiom of the genre Marx was critiquing, after all. But there are other, contextual reasons as well to account for the attractiveness of

the concept of value, for during *Capital's* composition in the 1850s and 1860s, the concept of value transcended the boundaries of political economy into ethical and mathematical discourse, especially in Germany. On the ethical side, "value" marked out a new terrain of volitions and affective dispositions versus the realm of fact and the norms of pure reason, and on the logical and mathematical side, value marked a shift from a substance-abstraction to a function-relational formation of concepts and mathematical ontology.

Value in the ethical region refers to a forceful vector of desire irreducible to either reason, utility or instinct. But value in this sense is not autonomous, it needs an object to be manifested. Hence, at this time, ethics becomes a field of propositional *attitudes* and a behavioral *dispositions*. In effect, the ontological features of economic value became generalized, but the converse movement prevailed as well and political economy became ethicized.

This interplay between ethics and political economy can be illustrated in the comparison between Marx's and his younger contemporary, Friedrich Nietzsche's critical projects. Whereas Marx identified his project in the 1850s and 1860s as a critique of political economy (and hence a critique of the notion of value as enshrined by that discipline), Nietzsche in the 1870s and 1880s defined a parallel project in the *Genealogy of Morals*: "we need a *critique* of moral values, the value of these values themselves must first be called in question" (Nietzsche 1968: 456, Nietzsche's italics). Just as Marx looked on the "the immense collection of commodities" comprising capitalist society to self-reflexively question the value of exchange value and surplus value and to show that a notion like the "value of labor" is as meaningless as a "yellow logarithm" [(Marx 1976: 125), (Marx 1966: 818)], Nietzsche was able to judge value judgments and evaluate the tables of values generated by the Christian good and evil, simply because the whole field of ethics had been "valorized" by the mid- to late-19th century. Objects and actions lost their inherent moral characters (or "virtues") and became functions, attitudes, or judgments of value.

Nietzsche recognized this logical revolution in ethics (as Marx did in political economy) and saw the inevitable next step: the self-reflection of the ethical function, attitude or judgment. This is the conceptual source of Nietzsche's "tremendous new prospect" and existential "vertigo," not some über-relativism of personal preferences (Nietzsche 1968: 456). For moral and aesthetic values were only gradually being distinguished from economic values, and they still shared a strict objectivity with them in Nietzsche's writings. As Robert John Ackermann pointed out: "Nietzsche's values are still related to these objective economic roots in that they are capable of objective

assessment of their impact on our interactions with the surrounding world" (Ackermann 1990: 90).

The critique of value in ethics and political economy was also deeply involved in a great development in the mathematics and logic of the later nineteenth century: the transformation of substance into function.⁴ The new 19th century model of the universal rejects abstraction from thing-like substances. The mathematician Drobisch in 1875, for example, characterized it as "the mathematical function [that] represents a universal law, which, by virtue of the successive values which the variable can assume, contains within itself all the particular cases from which it holds" (quoted in Cassirer 1923: 21). A value arises therefore from a relation to other values determined by a universal principle of serial order. Values are determined not by increasing abstraction from properties (as in the Aristotelian paradigm), but by being engaged in an increasing density of relations and series. Moreover, values are dependent upon variables, laws, sets and series that can become values of further variables, laws, sets and series, i.e., they are open to being reflexively *transvalued*. This laid the basis for the many revolutionary mathematical insights of the period including Set Theory and Hilbert Space Theory.

The "value" of mid- to late-19th century mathematics and logic and the "value" of political economy (as Marx analyzes it) are not mere homonyms. In Marx's critique of political economy the notion of value arises not through the stripping of the qualities of the commodity to find an "inherent" property, but through its manifold actual and potential exchange relations with other commodities (especially that prime self-reflexive universal commodity, money).⁵ Value discourse, then, allowed Marx to both use the language of the object of his critique, political economy, and to be able to transvalue the values he criticized. In other words, valuation and transvaluation in their political-economic, ethical and logical dimensions were the entrée to a set of conceptual revolutions in his era that Marx could hardly resist.

But Marx not only used, criticized and transvalued value discourse, he employed a specific variant of that discourse, i.e., labor-value, to both analyze capitalism, and its science, political economy, as well as to criticize, overturn and transvalue them. He saw in his use of labor-value discourse a political-philosophical epoché (i.e., a suspension of conceptual capitalist "business as usual") and a scientific invitation to go below the "surface" of capitalist society (to its inferno and pandemonium in the process of production) to solve a number of problems faced by the anti-capitalist movement of the time.

* First (analytic), labor-value discourse allows for an apparently precise and measurable definition of exploitation in capitalist society. This clarity is especially crucial in capitalism because exploitation is formally and legally hidden by the wage form. As Marx frequently points out, it is clear to the serf when s/he is working on his/her land versus on the land of the lord, whereas for the waged worker the moment when the labor-time necessary to create the value of his/her wage is finished and surplus labor-time begins is systematically obscured by the wage form and the general process of valuation.

* Second (critical), labor-value discourse provides a narrative (i.e., the class struggle) that workers' can use in an antagonistic way to describe themselves as fundamental actors in the drama of history and the capitalists and landlords as parasitic upon their labor, anxiety and suffering. It allows the worker to view the totality of capitalist relations from his/her point of view and not from the perspective of the capitalist (Cleaver 2001).⁶ For the capitalist perspective, as expressed in the "illusions" of the Trinity Formula (Marx 1966: 814-831) and the actual increase of the productivity of labor due to application of scientific knowledge to production (and reproduction), inevitably leads to the view that capital (not labor) is productive and is the legitimate force to determine the future of humanity.

* Third (revolutionary), if labor is the ultimate force of value creation (as the Law of Value claims and gives a measure to), then laborers are valuable and creative in themselves. A revolutionary corollary follows: workers are capable of creating non-capitalist "tables of values" and, indeed, an autonomous world beyond capitalism. This conviction is crucial for the development of a revolutionary alternative to capitalism. Without it, the class struggle becomes a form of "bad infinity," always there, always producing the next step, but never the last step.

This discussion establishes the centrality of Marx's value discourse, but it still leaves the question of the meaning of the Law of Value open. In order to proceed in the spirit of charity, I will assume that the best meaning of "the Law of Value" is the most restricted one, i.e., the value of a commodity is determined by the socially necessary labor-time required for its production.

Part II: Negri's critique of Marx (from *Marx Beyond Marx* to *Empire*); a transvaluation of the Law of Value

According to the argument of the last section, there are a number of good scientific and political reasons why Marx developed a labor-value discourse (along with an

occasional mention of a Law of value) in the 1850s and 1860s. Does one need to go beyond labor-value discourse in general and include the notion of a Law of Value in order to answer the basic questions of the anti-capitalist movement today? If the answer is “no,” and there are enough texts in the Marxist canon that could survive the result of excising those that rely on the Law of Value, then Negri’s and Hardt’s criterion of viability would create a useful dichotomy. In this section I shall examine the development of the criterion in Negri’s and Hardt’s writings and in the next I will demonstrate its strengths and weaknesses.

It is important to recognize, however, that Negri first attempted to construct a criterion of viability for Marx’s texts long before he began his collaboration with Michael Hardt. He attempted this in his lectures in the École Normale Supérieure on the *Grundrisse* in 1978 which were published in Italian and French the following year. Negri found that Marx’s decision to “begin” the *Grundrisse* with Money instead of with the Commodity or Value to be a sign that the Law of Value and the other parts of the labor-value apparatus can be excised from Marx’s theoretical writings to create a viable (and revolutionary) Marx *beyond* Marx:

The theory of value, as a theory of categorical synthesis, is a legacy of the classics and of the bourgeois mystification which we can easily do without in order to enter the field of revolution. That was true yesterday for the classics, as the attack of the *Grundrisse* demonstrates; today, one can show in the theory that is still applicable that it is in this way that we must begin, against all the repeaters of the theory of value, from *Diamat* to Sraffa (Negri 1983: 23).

In an amazingly “this sided” fiat of interpretation, Negri claims that “there is no logical way [in the *Grundrisse*] which leads from the analysis of commodities to that of value, to that of surplus value; the middle term does not exist; it is—that, yes—a literary fiction, a mystification pure and simple which contains not an ounce of truth” (Negri 1984: 24). This interpretation clearly distinguishes the *Grundrisse* from Marx’s later work including, by the way, the *Contributions to a Critique of Political Economy* that was published a year after the last *Grundrisse* notebook was completed and which entirely devotes itself to an analysis of the commodity and value, i.e., engages in literary fictions, according to Negri! Negri has even harsher words for *Capital*:

The passage from the money-form to commodity-form, from the *Grundrisse* to *Capital*, only adds abstraction and confusion. Despite all the intentions and declarations to the contrary, that which the attack on the problem of

commodities determines, it is a more idealist, Hegelian method (Negri 1984: 39)

Indeed, the polemic against the “the abstract void of the discourse on value” and the “law of value” is continued throughout the text with Negri drafting a none too enthusiastic “Marxism of the *Grundrisse*” into his crusade against value discourse. In effect, Negri argues that monetary values are adequate for the definition of the most important concepts of Marxism that are still relevant to contemporary anti-capitalist thinking. Though Negri’s argument in *Marx Beyond Marx* is based on a rather peculiar hermeneutical method (clearly rejecting any reading that is sympathetic to Marx’s intentions and his historical context), the result is not too different from the more mathematical and analytic critiques of the Labor Theory of Value in Steedman, Elster and Roemer.

The problem with Negri’s early criterion (which literally banished any role for labor-value discourse in a viable anti-capitalism) is simply that almost all of the Marxist canon would be rejected, if the criterion were to be applied scrupulously. Thus the criterion would not be a criterion at all, but simply a broad negation of Marx’s whole *opus*.

Some time after the publication of *Marx Beyond Marx*, especially with his collaborations with Hardt in the 1990s, Negri ended his hostility to value discourse *per se* (but not to the law of value which presupposes a *measurable* value). In *Empire*, Negri and Hardt welcome the return of value and living labor as “powerful and ubiquitous” components of postmodern capitalism, with a catch: their notions of value and labor are unrecognizable from Marx’s perspective. Negri and Hardt reject Marx’s Labor Theory of Value which is “really a theory of the measure of value” (Hardt and Negri 2000:355). The value they cherish and refer to in one of their many sibylline passages (354-361) is both *immeasurable* and *beyond measure*.

(Economic) value is *immeasurable*, in the context of what Hardt and Negri call Empire, because it cannot be measured by labor-time or any other “fixed scale.” At best, value can be indexed “on the basis of always contingent and purely conventional elements” imposed by “the monopoly of nuclear arms, the control of money, and the colonization of ether” (Hardt and Negri 2000: 355). In other words, there is no “objectivity” to the economic statistics, the stock market indexes, and the commodity prices that stream forth daily. These numbers *measure* nothing, not because they mismeasure, but because the measuring methods are continually open to revision and are imposed by pure power considerations that can change without warning so that

“contingency becomes a necessity and does not descend into disorder” (Hardt and Negri 2000: 356). These numbers and their “enforcers” are the result of “the impossibility of power’s calculating and ordering production at a global level.”⁷

Value also is *beyond measure* according to Hardt and Negri, because though value is created by living labor, that labor is identified with “general social activity” or “a common power to act” which cannot be regimented by clocks or any other economic and/or political measures. In making this identification, Negri and Hardt seem to willfully ignore the well known ontological distinction between labor and action from Aristotle’s day to the present via Marx [cf. (Aristotle 1981: 64-65, 183-185), (Arendt 1998 [1958]), (McCarthy 1990)].

Labor has traditionally been conceptualized as having a beginning-middle-end temporal structure, as being able to be planned, repeated, reproduced and imposed externally while action is spontaneous, creative, unique and cannot be imposed externally. One can force another to labor again and again, but one cannot force another to act even once. In Aristotle’s terminology, a master can compel a slave to labor, but action can not be compelled by masters, for action must be the product of free men participating in the work of the state and constitution. Surely by identifying living labor with action, and communal social action (or *vita activa*, in Hannah Arendt’s parlance) at that, Negri and Hardt can easily demonstrate that the values created by that labor are beyond measure, since (i) the very products of such “labor” could not be foreseen before the action itself and (ii) real action is not reproducible. They seem to justify their blurring of the distinction in the following words:

This leads us to a paradox: in the same moment when theory no longer sees labor, labor has everywhere become the common substance. The theoretical emptying of the problem of labor corresponds to its maximum pregnancy as the substance of human action across the globe. Although it is obvious that in this totality of reference—given the impossibility of considering labor as actually (or even simply conceptually) transcendent—the law of value is blown apart, it is equally obvious that this immersion in labor constitutes the fundamental problem not only of economics and politics but also of philosophy. The world is labor (Hardt and Negri 1994: 11).

Of course, one must question such a notion of labor *cum* action, for it does not seem to refer to what billions of people across the planet do every day under the surveillance of bosses vitally concerned about *how much time* the workers are at their job and *how well they do it again and again*. The world might indeed be labor, but if the bulk of labor in the early 21st century was as Negri and Hardt describe it—“Labor

that has broken open the cages of economic, social, and political discipline and surpassed every regulative dimension of modern capitalism with its state-form now appears as general social activity" (Hardt and Negri 2000: 357)—then surely capitalism, the law of value and much else would have been a thing of the past! But, indeed, capitalism is quite present and seems to have a future.

In order to critically examine Negri's and Hardt's criterion of viability and their substitution of action for labor, it is important to introduce a basic premise of their critique of Marx's Law of Value: 19th century modern capitalism is logically a different entity than post-1968 postmodern capitalism. Capitalism during Marx's time constituted a *formal* subsumption of society, but after 1968 capitalism has finally consummated a *real* subsumption of society. Their idea of periodizing capitalist history is based on an important distinction Marx made between *formal and real subsumption of labor by capital* in the previously mentioned unpublished section of *Capital I*: "The Results of the Immediate Process of Production" (Marx 1976: 1019-1025) Negri and Hardt describe this distinction in the following words:

Marx uses the term "formal subsumption" to name processes whereby capital incorporates under its own relations of production laboring practices that originated outside its domain...Through the real subsumption, the integration of labor into capital becomes more intensive than extensive and society is ever more completely fashioned by capital (Hardt and Negri 2000: 255).

The putting-out system for textile manufacturing or share-cropping are fine examples of formal subsumption of labor by capital whereas the development of "post-Fordist" "just-in-time" techniques of production would be examples of real subsumption. For in the putting-out system merchants would "put out" raw material inputs to cottagers who continued to work with archaic production techniques and collect textile outputs to in turn sell them on the world market. The merchants never tampered with production. Contrast this with "post-Fordist" production that studies all the ways that human psychology (social and individual) can be used to make workers more productive and put the results into practice. Such managers never let the production process rest. Negri and Hardt expand this distinction between formal and real subsumption into one between capital and society and use it to define different phases of capitalist history (Hardt and Negri 1994: 15).

Capitalism, they claim, managed this transformation from formal to real subsumption through the increasing employment of the "General Intellect" and "immaterial labor" in the production process and a regime of control over the

reproduction process. The connection of this historical transformation and the Law of Value is straight-forward: the Law might have been appropriate to a period when capital had only formally subsumed society, but with the real subsumption of society the notion that a commodity's value can be measured by "socially necessary labor time" is worthless. Value, in the period of real subsumption, is now created by living immaterial labor coordinated across continents via informatic planning and is increasingly directed at biopolitical objectives. The notion of a discrete amount of socially necessary labor time "pumped" into and "crystallized" in a commodity is completely inappropriate (Caffentzis 1997).

Negri and Hardt provide a paradigm for understanding both capital's post-Cold War tendency towards constituting a new legitimacy (which they term "Empire") based upon a "global" state and a bio-political regime (released from the constraints of the Law of Value) and the new anti-capitalist movement taking shape in the 1990s and resisting this tendency. Their paradigm challenges both traditional Marxism and postmodernism. The failure of the former is simple, for it is that of "Marx as the author of the old competitive capitalism, incapable of coping with the social capitalism of the present age" (Negri 1984: xv). The Law of Value might have been appropriate for the period of formal subsumption, but it is definitely inoperative in the period of real subsumption. Postmodernism as a theory for anti-capitalists fails because of its mystification of struggle: "In reality, the operation of real subsumption [which Negri identifies with the 'postmodern condition'] does not eliminate the antagonism, but rather displaces it to a social level. Class struggle does not disappear, but it is transformed into all the moments of everyday life."

Certainly, Negri and Hardt seem to dismiss any of Marx's texts that try to explain the whys and hows of the capitalist "surface structure" (since it is those texts employing labor-value discourse and at least the restricted Law of Value that purport to do so). Consequently, they seem to be unconcerned about the loss of explanatory power in any anti-capitalist theory of the future. If value is beyond measure, while the quantities of everyday life (from the prices of basic consumer commodities to stock futures and currency exchange rates) are measured arbitrarily in Humpty-Dumpty style, then either Negri's and Hardt's ideal anti-capitalist theory is a self-proclaimed failure at quantitative explanation or the very task of quantitative explanation is to be rejected because its object, postmodern capitalism, is lacking any feature worth measuring.

Part III: Critique of Negri's and Hardt's criterion

In order to evaluate Negri's and Hardt's criterion of viability, I should begin by noting one of its strengths. It is definitely superior to Negri's *Marx Beyond Marx* criterion of the late 1970s for accepting or rejecting Marxist texts. The latter simply espoused excising the whole value discourse from the "usable" part of the Marx's canon and thus threatened to eliminate nearly everything in it. Negri's and Hardt's criterion of the 1990s is a sharper tool, for the texts in the Marxist canon that referred to labor and value (if they don't presume the law of value) could escape their new textual razor. Labor and value should continue to play an important role in the anti-capitalist movement, according to Negri and Hardt, but the cost of their preservation, however, is that they become something like unmeasurable "things-in-themselves." Much that is qualitative in Marxist theory might survive, but the quantitative aspects should be totally eliminated post-Negri and Hardt.

Is the Negri-Hardt criterion useful? There are at least two reasons why it is not: (1) *quantity* is still a crucial aspect of capitalism, and (2) the notion of *subsumption* has quantitative aspects in the Marx's work that would make it impossible to use the notion while neglecting these aspects.

Quantity

Capitalism imposes an extremely quantified form of life on its constituents. Indeed, early post-Marx thinkers like Simmel and Weber identified capitalism with the domination of quantitative reasoning in social life while early twentieth century "avant garde" artists and writers often pictured the resistance to capitalism as a revolt against the rule of the number. Surely, any anti-capitalist movement must have a quantitative capacity to deal with such an obvious feature of its antagonist. Marx was committed to creating a theory that could explain capital's quantitative character though he was not a professional mathematician. Even with this limitation, he proved to be surprisingly successful in a number of his mathematical efforts. His most impressive achievement was presaging the linear algebraic approach to social reproduction (in *Capital II*). Of course, his lack of formal training (and the horizon of mathematical technique during his lifetime) led to certain lapses (especially in his mathematical effort to solve the "transformation problem" of converting values into prices of production in *Capital III*.) But Marx's work definitely has served as a "core" for a research program that has generated an enormous amount of mathematical

analyses of capitalism and of post-capitalist possibilities (cf., Howard and King 1992a and 1992b).

Marx's assumption of the measurability of value is crucial to the creation of his quantitative analysis of capitalism. The Law of Value, however interpreted, clearly presupposes this measurability as does most of the other quantitative indices Marx uses in *Capital* from surplus value, to the rate of profit, to the rate of exploitation, to organic composition, etc. Negri and Hardt challenge this assumption by claiming that though value exists, it is both outside and beyond measure in contemporary capitalism. By implication then, the quantitative aspects of Marx's work must be rejected by their criterion of viability. Only the qualitative aspects and relations of value and living labor, e.g., the existence of exploitation, in Marx's work would survive Negri's and Hardt's razor.

But how does one prove that something is immeasurable? One thing that the history of mathematics teaches is that such proof claims have often proven false. One might go back to one of the first "discoveries" of immeasurability, the "irrationality of square root of 2," to remember the precariousness of such claims. Indeed, the very notion of an "irrational" number expresses the horror of the *initial* confrontation of this anathema among the Pythagoreans. But as Eudoxus and Euclid, in their theory of proportions, pointed out: the "irrational" is perfectly measurable (a.k.a., rational), the problem is simply that the methods of measurement cannot be limited to ratios of whole number units.⁸

Indeed, one can look at the development of the notion of number as the continual confrontation with the "immeasurable" that is then integrated into a enlarged domain of number. The vocabulary of mathematics is littered with terms like "imaginary number," "complex number," "transcendental number," "a cardinal number of an uncountable set" that are semantic fossils of this transformation of the immeasurable into measurable.

The difficulty in measuring values (including the notion of value based on preferences used in neoclassical economics) is well known and was the source of debate even in the 19th century. There was no doubt that labor value was a "field" quantity and not a "substance" quantity then, to use Philip Mirowski's dichotomy (Mirowski 1989). Marx certainly recognized the field aspect of value in his many efforts to point out that value of a commodity produced at point A might be dramatically reduced (or increased) due to changes in the production process at point B, thousands of miles away. The field aspect of value *qua* socially necessary labor time has only

intensified as capitalism is globalized, biopoliticized and organized according to intricate divisions of labor, it is not new. But “field measures” are just as objective as “substance” ones (e.g., temperature of gases versus velocities of individual particles). They are not “immeasurable” simply because their measurement requires indirect and “conventional” methods.⁹

Negri and Hardt base their claim for the immeasurability of value on two grounds—historical and philosophical. Historically, they point to the arbitrariness and conventionality in the measurement of value in contemporary capitalism brought about, paradigmatically, by the unilateral decoupling of the dollar from gold and abrogation of the Bretton Woods accords by President Nixon in August 17, 1971. This led to the explosion of a worldwide currency market that was not restrained by any commodity base (like gold or silver). From then on, Negri and Hardt claim, the economic, political, social and personal weave together so that “in the globality of biopower every fixed measure of value tends to be dissolved, and the imperial horizon of power is revealed finally to be a horizon outside measure” (Hardt and Negri 2000: 384). That is, the post-1971 period of “free floating” currencies is one where there is no economic determinant of the last degree. The prices of commodities, say Negri and Hardt, are based on so many woven together elements that it is impossible to see them as indicators of any one quantity like socially necessary labor time. At best, “the indexes of command [e.g., currency exchange rates] are defined on the basis of always contingent and purely conventional elements” (Hardt and Negri 2000: 355).

However, Negri and Hardt place too much historical importance on Nixon’s abolition of the gold standard in 1971. On the one side, specie-backed monetary systems were always subject to “contingent and purely conventional elements” from debasements to bullion export restrictions, on the other side, the determination of the socially necessary labor time required for the production of a commodity inevitably wove together a wide variety of economic, political, social and even personal-cultural considerations in determining its value. The post-1971 monetary environment might be more subject to political power than the previous periods, but that does not give us any reason to think that Nixon’s fiat caused a historical leap from the finite to the infinite in economic value. After all, one can hardly claim that there are no continuities in ratios of economic ratios (e.g., of profitability, exchange rates, and exports) between the pre- and post-1971 periods.

The second source of Negri’s and Hardt’s rejection of the measure of value is the evocation of a philosophical curse. Negri and Hardt identify measurability with all that is intellectually hateful to the rebel soul: “the great Western metaphysical tradition,”

“a transcendent order,” “God,” “cosmos,” and “epistemological prohibitions,” etc. Negri and Hardt apparently believe that any claim to be able to measure a phenomenon legitimates it and the social form it is a constituent of: “Even Marx’s theory of value pays its dues to this metaphysical tradition: his theory of value is really a theory of the measure of value” (Hardt and Negri 2000: 355).

The curse attached to measurability deepens when Negri and Hardt link it with “the transcendent” and then point out “When political transcendence is still claimed today [CGC: perhaps a good example is when George W. Bush evokes God as the inspirer of the invasion of Iraq], it descends immediately into tyranny and barbarism” (Negri and Hardt 2000: 355). The implication being: if you insist on measuring value, then you are on the way to supporting genocidal “shock and awe” displays!

After such a performance, our authors rightly pause to ask: “Are we thus simply making a nonsensical nihilist claim when we assert that in the ontology of Empire value is outside measure?” Their answer is “No,” and then they invoke, contra those reactionary measuring philosophers Aristotle, Hegel and Marx, unnamed Renaissance humanists (perhaps Pico della Mirandola, Machiavelli, Bruno) to support their own transcendental insistence that “no transcendent power or measure will determine the values of our world. Value will be determined only by humanity’s own continuous innovation and creation” (Hardt and Negri 2000: 356).

What is the source of Hardt’s and Negri’s philosophical curses and transcendental assurances? My answer is: Hardt’s and Negri’s confusion of two distinct kinds of skepticism. For in agreement with Marx’s transvaluation of value, one might question the value of value and ask why indeed should the value of a commodity be “the material expression of human labour expended to produce them.” This skepticism towards the “false” objectivity of value, however, is often confused with a skepticism towards the value of objectivity itself. Whatever one might think about the value of objectivity, one should not confuse skepticism with regard to it and skepticism with regard to the value of commodity values. For very different arguments and considerations must apply in support of either. This confusion has a tradition in the history of Marxism that goes back to Georg Lukacs and continues to other contemporary theorists beside Negri and Hardt like John Holloway [(Lukacs 1971), (Holloway 2002)]. But it is a confusion just the same and I believe that it lead to Negri and Hardt questioning and even putting a curse on measurement, scientificity, and any other objectifying process.

However, such a approach would inevitably disqualify these two authors from explaining the major phenomena in contemporary capitalism (postmodern or not!) The most important being, why is the average rate of profit positive? Moreover, their Renaissance insouciance toward measuring in a post-capitalist world would strike anyone who is tempted to think that “another world is possible” with fear and trembling, for s/he might wonder how bread would be baked in the measureless ovens of the future. For bread baking does require knowing how many cups of flour must be mixed with how many cups of water to make dough, i.e., there is a value to objectivity.

In other words, whatever one thinks of the correctness of the Marx’s texts dealing with the metrics of capitalism and their relevance to the debates on post-capitalism, they at least entertain the problems that any adequate anti-capitalist revolutionary theory must pose. The Negri-Hardt criterion would simply relegate these texts to the “dust bin of history” and leave the anti-capitalist movement bereft of the only thoroughly discussed body of thought on these vital matters. Consequently, their criterion decisively fails on this count.

Subsumption

The second reason for the failure of the criterion is that it undermines the analysis of capitalism that Negri and Hardt themselves present. In other words, their criterion’s razor threatens to cut apart their own work. This is due Negri’s and Hardt’s enormous emphasis on Marx’s distinction between formal and real subsumption of labor by capital. They use the term “real subsumption” to refer to social-cultural phenomena otherwise associated with “postmodernism” and with productive phenomena otherwise associated with “post-Fordism.” It is their primary Marxian loan word.

This conceptual move is attractive, but it certainly does not fit Marx’s historical assumptions. For Marx real subsumption was not a thing of the “future,” it was fully present in his time. Indeed, he devised a set of conceptual pairs that parallel each other:

| | |
|--|--|
| Formal subsumption | Real subsumption |
| Absolute surplus value | Relative surplus value |
| Commodities exchanged at value | Commodities exchanged at their price of production |
| Most industries operating with a low organic composition | Industries operating with a widely dispersed composition |

There are vertical as well as horizontal relations between these columns of pairs. The vertical connections are logical and roughly as follows:

- With *formal subsumption* of labor by capital there is little effort made to increase the productivity of labor and so the productive (and reproductive) routines and techniques used are largely “as is.” Consequently, the only way to increase surplus value is by extending the working day (i.e., through *absolute surplus value* creation). Since there is little investment in equipment, the *organic composition* (the ratio of constant capital to variable capital, i.e., investment in machines and plant) is relatively and uniformly low in most industries and human labor (direct application of muscle, bone and brain) is the prime “input.” Consequently, the primary determinant and differential of exchange *value* is direct socially necessary labor-time.
- With *real subsumption* there is a “revolutionary” application of science and technology to the productive process making it possible to decrease the necessary part of the working day and to intensify its productive density (hence producing *relative surplus value*). This leads to a great variety of investment possibilities both within and among branches of production, hence there develops an *immense vertical spectrum of organic composition possibilities* (from almost labor-less production in atomic power plants to labor-intensive production in sweat shops and plantations). Since any source of commodities must be owned and invested in by capitalists, they will demand an equal rate of profit as their brethren (in the long run) even if “their” workers produce next to no surplus value. In other words, these capitalists will demand *the price of production* (i.e., the sum of their constant capital and their variable capital plus the product of this sum and the rate of profit) in value terms instead of the actual value of their commodities.

The horizontal relations among the rows of pairs are historical, in the sense that capitalism tends to move from the left to the right element of the pair simultaneously. That is why Marx writes in the *Grundrisse* that the notion of value “explodes” in the period when science and technology takes an increasing role in the production process in many industries (Marx 1973: 705). For in these industries there is no correlation between the labor-time expended there and the price of the commodities sold. But it is not that the value of these commodities is immeasurable. Marx introduces a notion of “price of production” after the *Grundrisse* to point out that this situation will not automatically lead to a fundamental breakdown in capitalism. On the contrary, the

prices of the commodities produced in many branches of production with relatively little labor have a mathematically determined character: their price of production includes surplus value created in other branches of production of lower organic composition in proportion to the capital invested in the industry.

Consequently, Negri and Hardt use of Marx's notion of subsumption (formal and real) is fundamentally distorted, because for Marx this notion is logically connected with value phenomena (indeed with the law of value as expressed in the notion of the price of production). A judicious application of the Negri-Hardt's criterion would cut off the very Marxian concept that they hoped to save and hence mangle their own texts. For any such criterion needs to conserve the logical structure of the text it is operating on.

Another consequence of my textual analysis of Marx's work is the recognition that Marx was not prophesying about the deep future when he was writing in the *Grundrisse* about production being dominated by machines and their operators becoming mere appendages. Or, at least, he turned that prophetic vision into an everyday observation by the time he described an "organized system of machines" in *Capital I* (Marx 1976: 503). The moment of real subsumption had already occurred in "modern industry" along with the allied value phenomena: increasing relative surplus value creation, increasing organic composition differentials, and increasing deviation of prices of production from values. These tendencies were common phenomena in the mid-19th century as well as in the beginning of the 21st century.

"General Intellect" and "immaterial labor" are not invitations to go beyond capital, as Negri and Hardt claim, but rather have always been part of the work capital has exploited whether it was waged or not; the recent crisis of the "New Economy" (the capitalist expression of Negri's and Hardt's "real subsumption" description) has shown that the amount of labor involved in computerized labor does not change the dynamics of capitalist accumulation. Bangalore's high tech workers are more terrifying to US "symbolic analysts" than the Taliban fighters in Kandahar because they are their real competitors in the international labor market. In fact, the Law of Value has been most tyrannical in the current neoliberal period! Any reading of the financial press and economic policy makers' positions statements would give one the impression that the Law of Value, as usually understood, is a truism. Surely what is the prescription for any economic problem but more discipline of labor, more labor flexibility and productivity, a reduction of labor costs, and so on? This is so obvious one must be incredulous in hearing the snide comments academic economists make about the law of value. Of

course, if you want your products to compete on the world market you need to reduce the socially necessary labor time required to produce them, by any means necessary.

By applying to Hardt's and Negri's theory Marx's observations of what occurs to social perception in the transformation from formal to real subsumption one can understand how Marx would explain why Negri and Hardt might be tempted to reject the Law of Value. When one moves both mentally and socially from the items on the left column of our Table to those on the right a process of occlusion and oblivion prevails: the productive powers of labor seemed to be transferred to those of capital. As Marx writes in *Capital III*:

Capital thus becomes a very mystic being, since all of labour's social productive forces appear to be due to capital, rather than labour as such, and seem to issue from the womb of capital itself...Not only does it appear so but it is true in fact that the average prices [of production] of commodities differ from their value, thus from the labour realised in them, and the average profit of a particular capital differs from the surplus value which this capital has extracted from the labourers employed by it...Normal average profits themselves seem immanent in capital and independent of exploitation (Marx 1966: 827-9)

Negri and Hardt simply inverted this mysticism of capital to a mysticism of an immeasurable value-creating labor process.

Though Marx clearly believed that over time the second column of phenomena under "real subsumption" in the Table becomes more dominant than the first, *it never becomes a totality as long as capitalism continues to exist because of the crises associated with the Falling Rate of Profit*. That is, if the branches of high organic composition increase without limit, the rate of profit will fall to zero...unless there are countervailing forces that shift the weight back to the column of formal subsumption. The major countervailing force is the creation of new areas of absolute surplus value creation among populations that are formally out of the capitalist system, either due to their ability to preserve their pre-capitalist subsistence economy in the face of centuries of capitalist threat or due to their ability to recreate some new form of non-capitalist subsistence in post-colonial or post-capitalist settings.

In conclusion, Negri's and Hardt's use of the notion of subsumption detached from the Law of Value in even its more restricted sense is problematic, for the notions of real and formal subsumption in Marx's texts are part of a network of concepts defined in labor-value terms like organic composition, surplus value, price of production. By stripping "subsumption" from "labor-value" discourse Negri and Hardt provide only a

distant approximation to Marx's concept to the point that it appears to be a little like the imaginary togas of the French revolutionaries of '89.

Conclusion: A Broken Heart?

"Mr. Kenge," said Allan, appearing enlightened all in a moment. "Excuse me, our time presses. Do I understand that the whole estate is found to have been absorbed in costs?"

"Hem! I believe so," returned Mr. Kenge. "Mr. Vholes, what do *you* say?"

"I believe so," said Mr. Vholes.

"And that thus the [Jarndyce and Jarndyce] suit lapses and melts away?"

"Probably," returned Mr. Kenge. "Mr. Vholes?"

"Probably," said Mr. Vholes.

"My dearest life," whispered Allan, "this will break Richard's heart!"

—Charles Dickens, *Bleak House* (1853)

Negri and Hardt presented a relatively simple criterion for determining what part of Marx's works are still relevant to the struggles of the anti-capitalist movement in the 21st century. My rejection of their criterion is not only a reflection on the limitation of their effort, however. Their failure, when added to the more than half century-long failure of efforts to devise a satisfactory criterion to determine the "true" Marx, the "scientific" Marx, the "humanistic" Marx, the "subjective" Marx, or the "revolutionary" Marx is evidence for a wider claim that appears on our horizon: no criterion will be able to create a dichotomy among Marx's texts that will isolate the acceptable kernel for today's anti-capitalist movement.

Is the result of this essay, then, that Marx's texts cannot be used for the anti-capitalist movement or that the cost of "saving" Marx's legacy has used up its value, as the Jarndyce and Jarndyce suit used up the Jarndyce estate in *Bleak House*? Is this a prescription for suffering with a Marxist broken heart? No. It is a call, however, for *defetishizing* the vast collection of texts that come to the anti-capitalist movement under the name of Marx or, to use another metaphor, for Marx's texts to be used as a *common* instead of as a *memorial park*. Marx's texts should not be seen as a legacy. He set the model for dealing with his texts in the way he related to the texts of the political economists, the philosophers, the chemists, mathematicians, biologists and physicists of his day. He "borrowed" massively from them without apology and without permission. If an organic chemistry model worked in describing the micro-exchanges that made up the reproduction (and rupture) of capital, Marx used it. If a piece of

Hegel's dialectical logic would make the point he wanted to make, he "coquetted" with it. Marx was a shameless bricoleur on the commons of knowledge.

At the moment, unfortunately, Marx's texts are treated like nuggets of always fluctuating political exchange value instead of use values for anti-capitalist thought and action. For example, the century-long discussion of the transformation of values into prices "problem" revolves around the vindication or the public humiliation of Marx's texts instead of whether this transformation tells the anti-capitalist movement anything useful about the structure and vulnerability of capitalism. The struggle over the transformation problem has been largely a game of "got'cha" with the bourgeois academics (whenever they are politically threatened) pointing out the logical and mathematical infelicities of *Capital III* and Marxists running to provide ever more weighty mathematical retorts. The animus on all sides of the debate is a struggle of worth (of the preservation of tradition and honor) instead of use.

But the key question in this matter is: does the transformation of values into prices have explanatory power to help in understanding the structure of capitalism or not? What are the areas that this transformation helps to explain the operation of capital? If there are such areas (e.g., in the examination of "unequal exchange" or of the "energy crisis"), then the logical and mathematical difficulties can and will be overcome. For as any student of the history of science knows, there are no interesting theories without logical and mathematical infelicities (quantum mechanics and general relativity theory included).

Notes

1. The study of anti-capitalism in the pre-Marx period is becoming increasingly sophisticated. Two important recent books in this literature are (Federici 2004) and (Linebaugh and Rediker 2001). The first deals with the anti-capitalist struggle at the originary moment of capitalism (in the fifteenth, sixteenth and seventeenth century) and the second with the rise of anti-capitalist movements in the Atlantic world during the seventeenth and eighteenth centuries. An important collection of immediately pre-Marx communist writings is to be found in (Corcoran 1983).

The term "anti-capitalist movement" that I am using here is broader (both temporally and socially) than the one developed by Alex Callinicos in his *An Anti-Capitalist Manifesto* (Callinicos 2003), where he relegates the referent of the term to the post-Seattle movement against the G-8, WTO, World Bank and IMF.

2. Instead of, for example, expanding of the notion of value into the realm of the labor of reproduction or into the natural environment, as advocated by some feminists and ecologists. For efforts along these lines see (Dalla Costa 1973) and (Salleh 1997).
3. For acerbic accounts of these debates see (Steele 1992) and (Rutland 1985). However sourly one might depict these debates, they are still important to study for any movement that wants to say more than "Another World is Possible." For without saying more, one is in the position of being a logician instead of a revolutionary.
4. This development was described retrospectively by the neo-Kantians like Simmel and Cassirer in the early 20th century [(Simmel 1990), (Cassirer 1923)].
5. Similar to the neo-Kantian critique of Marx, Philip Mirowski's main criticism of Marx is that he was not attentive to the transformation of substance to field theories in the physics of his day (Mirowski 1989). He claims that Marx's economics was still "substance" based and that he saw labor as a substance (like caloric) that is stored in the commodity. But this critique is off the mark for two reasons: (i) Marx was quite familiar with the development of field theories in physics and (ii) his notion of "social necessary labor time" was a "field" concept since it can change independent of the local condition of production.
6. It is interesting that in the late 1970s Harry Cleaver and Negri were equally interested in reading Marx's texts "politically." They published their results nearly simultaneously (Cleaver in 1977 and Negri in 1979). In doing so, Negri expunged Chapter I of *Capital I* from the roster of "quick" texts of Marxism since it clearly was dependent upon the Law of Value and labor-value discourse. Cleaver rejects this conclusion in his Introduction to *Marx Beyond Marx* and tries to "save" all of Marx's writings (Negri 1984: xxvii).
7. Negri's and Hardt's implication being that there was a historical era when power could calculate and order production at a global level. The period of the gold standard is the most likely candidate for such an era, since gold became the common standard of world trade then. One could directly measure the value of a commodity anywhere.
8. In the early twentieth century there was much discussion about kinds of measurements that parallel this discussion of substance versus field quantities. These included direct versus indirect measurements and extensive versus intensive

measurements. Thus the measurement of length would be direct and extensive measurement, while the measurement of temperature would be indirect and intensive (Savage and Ehrlich 1992: 2-3).

9. According to the legend, the Pythagoreans both discovered the “irrationality of the square root of two” and kept it hidden, threatening to kill any member of their society that revealed it to outsiders. The proof is very simple and, if one believed that only those entities that can be expressed by ratios of whole numbers are measurable, then the square root of 2 (and infinite other such entities) would be immeasurable. The solution to this problem was devised by Eudoxus and later formalized by Euclid. He denied the definition of same ratio as the following: P/Q is said to be the same as X/Y when, m and n being any (positive) integers whatever, mX is greater than, equal to or less than nY according as mP is greater than, equal to, or less than, nQ (Koslow 1992: 151). In other words, the test for proportional equality is infinite, but determinate.

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