

Marx's Theory of Value and the "Transformation Problem"

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I. INTRODUCTION

It is curious that in the almost eighty years since the publication of Volume III of Marx's *Capital*, a major theoretical problem, the infamous "transformation problem," has never been satisfactorily resolved. Throughout Volume I, written by Marx *after* he had already completed the first draft of Volume III, the analysis is based on the assumption that exchanges of commodities take place at prices proportional to their labor values. I will call these prices the "direct prices" of commodities. In Volume III, which was compiled by Engels from the incomplete first draft, after Marx's death, Marx extends his analysis to take into account "prices of production," demonstrating how one can derive these prices from the "direct prices" of Volume I. This derivation, from then on the center of an intense controversy, was the original "transformation procedure."

Opponents of the labor theory of value immediately seized on the apparent incompleteness of Marx's procedure. Bohm-Bawerk, for instance, questioned the tenability of Marx's statement that the sum of prices after the transformation would remain equal to the sum of values; others have pointed out that Marx's procedure contains an "error," because while he transforms the prices of outputs from "direct prices" to "prices of production," he leaves the inputs untransformed. Since commodities appearing as outputs of a productive system are often also inputs into the system, it is argued that Marx's procedure is logically flawed; "direct prices" and "prices of production" are two separate and unrelated phenomena, leading to a "great contradiction" between Volume I and Volume III of *Capital*. More recently, essentially the same point has been made by Samuelson [17], in which he attacks the very idea of a transformation procedure: "Contemplate two alternative and discordant systems. Write down one. Now transform by taking an eraser and rubbing it out. Then fill in the other one. Voila! You have completed your transformation algorithm."¹ As we shall see, this criticism is completely incorrect. It is also somewhat misplaced; if anything, it applies most properly to the neoclassical "transformation procedure" which was the center of the so-called Cambridge Capital Controversies, a procedure in which Samuelson himself was quite prominent.*

On the Marxian side, there have been, of course, many "solutions" to the

*For a discussion of this debate as a neoclassical "transformation problem," see Shaikh [19]. This article, a solution to a problem that has plagued a century of Marxian scholarship, was previously unpublished.

transformation problem, from Bortkiewicz's original transformation procedure and its subsequent variants to Francis Seton's important paper [18]. Unfortunately, as even supporters and sympathetic critics of the labor theory of value admit, these "solutions" all suffer from the same basic defects; they show "the formal possibility of a consistent derivation of prices from values"² while apparently severing the crucial links between price and value magnitudes which Marx seemed to emphasize in his own procedure. In most discussions of the issue, these links have appeared in the form of the following equalities: of the "sum of prices" and the "sum of values"; of the magnitude of profits and the magnitude of surplus-value; of the profit-wage ratio and the rate of surplus-value; and of the general rate of profit in price terms and the same rate in value terms. As is well-known by now, in any "correct solution" either the first or the second, but not both, can be always made to hold, while in general the other two cannot. What then are we to make of Marx's procedure?

It has been suggested that Marx, having published Volume I in full confidence that the labor theory of value was the correct basis, discovered too late, in writing Volume III, that it was not. But that doesn't work, because we know that Volume I was published well after Volume III had been drafted. Others, perhaps more charitably, have suggested that because the labor theory of value as a theory of relative prices was so much a part of the tradition of classical economics, it was taken over by Marx almost unexamined. A variant of this line of reasoning, which is popular among some Marxists, is that if nowadays we view Marx-as-an-economist as a member of the classical school, it is we who import into Marx's theory of value, which is only nominally similar to that of Smith and Ricardo, the pre-Marxian question of the quantitative relationship between prices and values. In the variant, therefore, the lack of examination is on our part, not that of Marx. Marx was simply not terribly concerned with the quantitative relationship.³

To anyone who has read Marx's voluminous comments and critiques of the classical economists, notably in *Theory of Surplus-Value* and in *Capital*, it becomes impossible to ascribe to Marx an unthinking take-over of a labor theory of value from anyone at all. Marx spends literally hundreds of pages discussing values and their relationship, both qualitative and quantitative, to wages, profits and prices; no aspect, no issue, is ignored in these incredibly detailed discussions. So the main line of that argument does not hold up. As for the variant, insofar as it argues that there is a vast difference between the "value" of Smith and Ricardo and the "value" of Marx, it is undeniably correct; where it goes wrong is in jumping from this important fact to the conclusion that Marx either does, or even could ignore the quantitative aspects which dominated the pre-Marxian "value theory."

Consider for a moment the fact that there is a vast difference between Einstein and Newton too, one which stems from different methodologies, different objects of analysis, etc., and extends all the way to differences in concepts and calculations. There is, in other words, what Thomas Kuhn calls a "paradigm break" between the two modes of analysis.⁴

The notion that Einstein and Newton, for instance, treat what appears to be some autonomously defined subject—"Physics"—is an illusion which is fostered by textbook propagandists whose very aim is to treat science as the glorious

and lofty march towards "truth." In reality, however, almost every conception and calculation in Relativity Theory contradicts those of classical physics.

To reduce Einstein to a "tidied up" Newton would therefore be impossible. What is worse, this impossibility would show up in the form of "logical contradictions," "redundancies," and "irrationalities" in Einstein, not in Newton, for the propositions derived from the Theory of Relativity cannot be derived within a Newtonian basis. What can we say, for example, in a Newtonian framework about the fundamental Einsteinian notion that there exists a finite limit, the speed of light, for the velocity of any object? Only that it is clearly wrong, or at best, a notion we (as Newtonians) have no use for in our framework—one which therefore appears "mythical," "metaphysical," "irrelevant."

Insofar as some Marxists have pursued a similar line of argument as to the "reduction" of Marx to Ricardo, they have been making an absolutely crucial point: namely, that by attempting to "reduce" Marx to Ricardo, or to neoclassical economics, the impossibility of this reduction will manifest itself as a series of "contradictions" and "irrationalities" in Marx! What we think we find, on a Ricardian or neoclassical basis, is that Marx is simply incorrect, or at best gets involved in an "unnecessary muddle."⁵ What we have in fact demonstrated is that you cannot derive Marx from Ricardo or Samuelson.

Obviously, none of this implies that Marx is above criticism. The point here is that in order to be able to evaluate Marx's solution to some problem, we must first of all define the problem. We must, in other words, *locate* the problem in terms of some general analysis, so that we may see which solutions are adequate and which are not. It has often been said that the hardest part of solving a problem is figuring out the question!

Some Marxists, however, jump from the implications of the difference between Marx and Ricardo to the false conclusion that Marx was, or at least that Marxists could be, unconcerned with the quantitative relationships between prices and values (whether he was and whether Marxist analysis could be are in fact two separate issues, but one leads to the other).

To begin with, the statement that Marx did not in fact consider these matters to be important runs headlong into the contrary evidence of the vast amount of attention Marx's writings give to them; the only way to get around this evidence in turn, is to try and show that the issue itself is irrelevant. In this way the real basis of this line of reasoning turns out to be the argument that Marxist analysis can, and should ignore the quantitative relationship. On the one hand, this argument gets much of its impetus from the persistent, and to some extent, damaging attacks on the "transformation from values to prices"; and on the other, it derives much of its appeal from a reaction against the obvious banality of neoclassical economics, in which relative prices figure so prominently. Nonetheless, the argument is simply untenable, for it is based on an *unspoken* conception about scientific analysis which when made explicit is quite unsupportable: namely, that as a science, the Marxist analysis of capitalism can simply choose to ignore the quantitative aspects of any phenomena, once it has understood the qualitative aspects. Marx himself had a higher opinion of his work:

Considering what this third book treats, it cannot confine itself to general reflection relative to this synthesis. On the contrary, it must locate and

describe the concrete forms . . . The various forms of capital, as evolved in this book, thus approach step by step the form which they assume on the surface of society, in the action of different capitals upon one another, in competition, and in the ordinary consciousness of the agents of production themselves. (*Capital*,* Volume III, Part I, Ch. I, p. 25)

Unfortunately not many Marxists today seem willing to accompany Marx all the way in his arduous journey; and of those that do, even fewer appear to be interested in pulling together and extending, where necessary, the sometimes incomplete analysis of Volume III. The labyrinths of the turnover of capital in Volume II, the "petty detail" of the endless tables of differential rent in Volume III, and certainly the unending controversy about the "transformation problem" must all seem so very tedious, perhaps even dangerously confusing, to those who remain content to bask in the brilliance of Volume I.⁶ But Marx at least did not find in the difficulty of a subject a sufficient reason for avoiding it:

That is a disadvantage I am powerless to overcome, unless it be by forewarning and forearming those readers who zealously seek the truth. There is no royal road to science, and only those who do not dread the fatiguing climb of its steep paths have a chance of gaining its luminous summits. (*Capital*, Volume I, "Preface to the French Edition," p. 21)

II. VALUE AND PRICE

1. Calculation versus Conception

I have, up to now, confined myself to a discussion of the so-called "transformation problem" and of various attitudes toward it. It is, however, a major purpose of this paper to demonstrate that one can, *precisely in the manner set out by Marx*, calculate the "correct prices of production" from values. The link between the two, one so obvious that until recently it seems to have been completely overlooked,** is simply that while Marx's procedure is a perfectly general one, it is only the first step in an iterative transformation from "direct-prices" to "prices of production." But while this extension of Marx's procedure does falsify the so-called "impossibility theorems" on it (most recently voiced by Paul Samuelson), it by no means establishes the need for such a transformation in the first place. As has often been pointed out, "prices of production" can instead be calculated directly from the same "economic data" as "direct-prices." The difference between the two methods of calculation therefore lies not in the end point but in the beginning; that is, it lies not in the magnitude of "prices of production" but in their meaning, in their conception. To reduce the issue of the transformation to one of merely calculation, is simply to reduce Marx to neoclassical economics. And, as I pointed out earlier, the impossibility of such a

*All quotes from *Capital* refer to the International Publishers edition, New York, 1967.

**The transformation procedure contained in this paper was first presented in a paper delivered to the Graduate Economics Department of Yale University, February 1973. A similar result was presented by Michio Morishima in "Marx in the Light of Modern Economic Theory: An Inaugural Lecture," London School of Economics, November 1973.

reduction can only "show up" as a "redundancy" in *Marx*: after all, if both methods arrive at the same end point, why bother with Marx's needless "detour" through values?

The question may be put more precisely: in what way is Marx's analysis of value different from that of orthodox economics? What sorts of issues, conceptions, and calculations are specific to it alone? What laws does Marx derive from it which cannot be derived from conventional economic analysis? Unless we make an attempt to answer these questions, any discussion of the "transformation" issue is quite irrelevant: without a proper understanding of the concept of value as it appears in Marx, it is pointless to try and analyze the so-called "transformation from values to prices of production." The discussion of the actual transformation algorithm is therefore postponed until Section III. In this section we must establish its *raison d'être*.

2. Basic Method

Whatever the social form of production, labourers and means of production always remain elements of it. But in a state of separation from each other either of these factors can be such only potentially. For production to go on they must unite. The specific manner in which this union is accomplished distinguishes the different economic epochs of the structure of society from one another. (*Capital*, Vol. II, Ch. I, Section I, p. 34.)

The specific economic form, in which unpaid surplus-labour is pumped out of direct producers, determines the relationship of rulers and ruled, as it grows out of production itself and, in turn, reacts upon it as a determining element. Upon this, however, is founded the entire formation of the economic community which grows up out of the production relations themselves, thereby simultaneously its specific political form. It is always the direct relationship of the owners of the conditions of production to the direct producers . . . which reveals the innermost secret, the hidden basis of the entire social structure and with it the political form of the relation of sovereignty and dependence, in short, the corresponding specific form of the state. (*Capital*, Vol. III, Ch. XLVII, Section II, p. 791.)

The preceding quotes present a crucial element of the Marxist approach to history: namely, that the specific manner in which production is organized, and surplus-labor extracted from the direct producers, forms the "hidden basis of the entire social structure." For Marx, it follows from this that the concepts adequate to the analysis of any specific historical epoch, including that of capitalism, must necessarily be based on these aspects of its social practice. The struggle for production is the fundamental social practice in all human society; hence the analysis of production is the beginning point of Marxist analysis. The extraction of surplus-labor is the basis of all class societies; hence its study is the source of the concepts adequate to an analysis of all class societies. *Capital* is Marx's application of this approach to the analysis of capitalism.

3. The Production of Commodities

One very important aspect of the social process in which laborers and means of production are united in the *capitalist* mode of production, as opposed to all

others, is that under the capitalist mode the overriding aim of production is not production-for-direct-social-use but production-for-exchange. In the caste system of India, for example, the social regulation of productive activity is made starkly visible by the existence of hereditary castes whose members can, and in fact must, perform only those concrete types of labor which are required of their caste. Production is, in this society, production-for-direct-social-use (whatever we may think of that use); distribution of the products of labor is similarly directly regulated.

But in capitalism, we have commodity production. What turns a product (something which is produced) into a commodity (something which is bought and sold) is a specific set of social structures which organize the productive activities (the labor) of society around production-for-exchange. In commodity production, production necessarily implies exchange; exchange is a necessary step in the process of reproduction. Society is organized in such a way that there is no *direct* social regulation of productivity activity: during production people act as individuals, relating only to their products; it is in exchange, therefore, that the true social nature of their existence is forcibly demonstrated to them through the relation of their commodities to those of others. Exchange, so to speak, is a "symptom" of commodity production, and its real limits can only be understood by relating exchange to its "hidden basis"—i.e., to production. It follows, therefore, that in a Marxist analysis the derivation of the categories of exchange, such as money and price, as well as their movements, must necessarily be based on the categories of production. Taken by itself, as an eternal category divorced from any particular type of production, exchange appears to be a smooth, static, inherently equilibrating process: witness the parables of neoclassical economics. Circulation is, to all appearances and purposes, the sphere of freedom, equality and equilibrium. But for Marx, circulation is precisely the sphere in which the contradictions inherent in the production of commodities are "both exposed and resolved";⁷ the manner in which these contradictions in production dominate exchange, both qualitatively and quantitatively, is what Marx means by the law of value: "in the midst of all the accidental and ever fluctuating exchange-relations between the products, the labour-time necessary for their production forcibly asserts itself like an overriding law of Nature."⁸

4. Exchange-Value and Value

In all production, concrete (i.e., specific) types of labor and concrete inputs result in a concrete product. Moreover, since the produced inputs themselves must be the products of past labor, we may say that in all production, including commodity production, concrete products are the results of concrete labors, in a given natural context.⁹ But commodity production (the production of goods-for-exchange) necessarily implies exchange; and in exchange the distinct qualities which give various commodities their "concreteness" are abstracted from. In exchange, what matters is not the physical properties of iron but how much wheat, or cloth, or coffee, etc., we can get for the iron; hence in exchange we treat every commodity not as a concrete bundle of distinctive qualities, but as the equivalent of specific *quantities* of all other commodities.

Precisely because exchange is a social process which quantitatively compares and equates different products, it is only in those societies which produce for exchange that the product of human labor acquires the property of "quantitative worth." In addition to being useful, they are now also "valuable": they are commodities.

We have to get a little more exact in our terminology at this point. In conventional usage (and with some classical economists), the term "value" sometimes refers to the notion of a useful object, and at other times to the notion of the "quantitative worth" of an object. In order to avoid confusion, therefore, Marx uses the term *use-value* to mean useful object, and the term *exchange-value* to mean the quantitative "worth" of an object. In Marx's terminology, therefore, a commodity is both a use-value and an exchange-value.

It is usually not difficult to explain what is meant by a useful object.* But when we say that a commodity is "worth" something just what is implied? Suppose I say that in barter a bushel of corn is "worth" a ton of iron, and also a yard of silk, and an ounce of gold, and so on. At first glance, what I appear to be saying is that there are many different quantitative expressions for the "worth" of a bushel of corn, depending on which other commodity (iron, silk or gold) I choose to *measure* it by.

But there is a deeper problem here. In order for me to measure the "worth" of corn in terms of gold, for instance, gold must also be "worth" something itself. Otherwise I cannot say how much gold is equivalent to a bushel of corn. It is just like my saying that a stone "weighs" ten grams; what I mean is that on a scale it takes ten pieces of iron called gram-weights to equal the weight of the stone. But clearly, in order for me to carry out this operation, both stone and iron must already possess the property of being "heavy," of having "weight"; the gram-weights don't make stones "heavy," they only measure the already existing heaviness of stones.

Exactly the same conclusion applies to "quantitative worth." The factors which cause commodities to have "quantitative worth" in the first place must be carefully distinguished from the measurement of this "worth." Measuring the "worth" of corn in iron will give a different result from measuring it in gold; but neither measure causes corn to have "quantitative worth." Rather, each merely expresses the preexisting "worth" of corn in terms of some particular commodity.

The question of exchange-value ("quantitative worth") is therefore really a twofold one: first, what is the cause of "quantitative worth"; and second, how is this "worth" actually expressed, measured, in exchange?

If we look at society as a regularly reproduced set of social relations, it becomes very clear that the production and reproduction of the masses of useful objects which correspond to various social needs requires a definite, quantitative distribution of social labor. Each different useful product requires a concretely different type of labor; reproduction of the material basis of the society consequently requires the existence and reproduction of appropriate amounts

*The apparent simplicity of the term useful object or use-value is misleading. Many Marxists, for instance, confuse it with physical object, i.e., a good as opposed to a service. This is definitely *not* the sense in which Marx uses the term use-value.

of different concrete labors. That is to say, social labor from the point of view of its capacity to produce different use-values is what Marx calls social labor in its role as *concrete* labor.¹⁰

A commodity, however, is more than a mere use-value; it is at the same time an exchange-value, an object possessing "quantitative worth." It follows from this that the very same social relations which endow use-values with the property of "quantitative worth," endow the labor which produces these use-values with the capacity to create "quantitative worth." From this point of view, all commodity producing labor is qualitatively alike and quantitatively comparable: it is what Marx calls "(commodity producing) social labor in its capacity as *abstract* labor."¹¹

Therefore, to the question on the cause of exchange-value, Marx's answer is: abstract labor, i.e., labor actually engaged in commodity production, is the cause of exchange-value.¹² Moreover, if we consider the production of a commodity from the point of view of the whole society, it becomes apparent that the commodity's exchange-value represents the total amount of abstract labor-time socially necessary¹³ for its production, both directly (in the process of producing the commodity from its material inputs) and indirectly (in the process of producing the material inputs themselves, and the inputs of the inputs, and so on). Marx consequently refers to this total sum of abstract labor-time as the *immanent measure* of a commodity's exchange-value, what he calls its "Value."¹⁴

The discerning reader will have noticed that I have capitalized the term Value. This is done in order to emphasize the distinctiveness of Marx's use of the term, and especially to avoid confusing it with the term "value" in orthodox economics (where it generally refers to a price of some sort).

It should also be noted here that the Value of a commodity is the *average* amount of abstract labor-time required for its production. The total output of a particular commodity represents* the expenditure of a certain amount of abstract labor-time which under existing conditions is required for its production. In exchange, however, all commodities of a given type are treated alike; each commodity is merely "an average sample of its class,"¹⁵ and as such represents the average expenditure of abstract labor-time.¹⁶

In order to avoid confusion later on, I will distinguish between the *sum of Values* (the abstract labor-time required to produce the total social product**), the *total Value* of a given branch of production (the Value of its total output),¹⁷ and the *unit Value* of a single commodity (the average Value in the sense defined above). All terms are defined over a given period of time.

*The term "represents" is used here rather than the more common term "embodied." It is clear in Marx, for instance, that it is not the historical cost of a commodity in labor-time, but rather its current cost of reproduction, which determines the magnitude of a commodity's Value. (*Capital*, Vol. I, Ch. 1, p. 39). As such, it is not a question of the labor-time "embodied" in a commodity but of the social cost which the current production of the commodity entails.

**I refer here only to the total *commodity* product. Use-values produced for direct use are not treated here, in spite of their great importance in concrete analyses of actual capitalist societies. Marx himself distinguishes between social *capital* and social *wealth* "of which capital is only a part." (Marx, *Capital*, Vol. II, Ch. x, p. 200).

5. Money and Price

We turn now to the second aspect of exchange-value: how is "quantitative worth" actually expressed in exchange? To this Marx answers: in exchange, the "quantitative worth" of a commodity *must* take the form of money-price. Since exchange is the interchange of two commodities, at first glance it seems obvious that there are as many measures of a commodity's worth as there are other commodities to measure it by. And historically, where exchange is sporadic or irregular, this is in fact true. But as exchange spreads and develops, this variety of different possible measures increasingly becomes a barrier to the smooth functioning of the process; without a point of reference, the direct comparison of every commodity with every other becomes impossibly complex. Consequently it becomes increasingly necessary to socially recognize a given commodity out of those available as the one commodity in which all others are to express their "worth"; this special commodity therefore becomes the universal equivalent, the money-commodity. We will henceforth assume it is gold.*

Notice that money does not by itself cause commodities to have "worth," any more than gram-weights cause stones to have weight. On the contrary, it is only because both gold and the other commodities have "quantitative worth" (exchange-value) in the first place that we can express their worth of commodities in terms of gold. The money-price of a commodity is the "golden" reflection, the external measure, of its exchange-value. It is what Marx calls the *form* taken by Value during exchange.¹⁸

6. Production and Circulation

The foregoing analysis has focussed on the difference between Value and money-price. Implicit in this distinction, however, is another equally important one: the Marxian distinction between the production of commodities and their circulation.

Production, Marx notes, is the creation or transformation of a use-value.¹⁹ Insofar as the product is a commodity, it belongs to some individual; it enters circulation, therefore, as private property.

Consider the case of two commodity producers, a fisherman and a hunter. They bring definite quantities of fish and game, respectively, to the market for the purpose of exchange; commodities with definite Values representing definite quantities of abstract labor-time thus enter the market-place.

Now what happens in exchange? In the exchange process the two commodity producers negotiate terms under which they will *transfer the titles* to their respective commodity property.²⁰ But note: the time they spend bargaining over these terms of trade will in no way increase the total amount of fish or game to be had; it will determine only the final pattern of distribution.²¹ In fact, insofar as they need to subsist during the actual process of exchange itself, their

*It is beyond the scope of this paper to discuss the different forms of money such as token money (metallic and paper tokens of gold and silver) and credit money. In any case, this extension of the analysis cannot be attempted without first resolving it satisfactorily in the simplest case—that of pure gold-money.

costs of circulation, costs of exchange, could appear only as a deduction from the total production and value-creation of both of them. If they commissioned a third [person to perform] these exchanges, and thus lost no labour time directly, then each of them would have to cede a proportional share of his product to [that third person] . . .

Circulation costs as such, i.e. consumption of labour time or of objectified labour time, of values, in connection with the operation of exchange . . ., are therefore a deduction either from the time employed on production, or from the values posited by production. *They can never increase the value.* They belong among . . . the inherent costs of production resting on capital. (Marx, *Grundrisse*, Notebook VI, pp. 632-633. Emphasis added)

This is a very important point in Marx's analysis. The circulation process is the process whereby commodities change hands, where their titles of ownership are transferred. As such, no commodities and hence *no Value is created in the circulation process.*²² If anything, part of the previously produced mass of commodities (and hence the Value previously created in production) may be used up just in the struggle over its distribution.

One immediate implication of this is that the categories of circulation are thereby limited by those of production.* Value is created in production, materialized in commodities; *regardless of the actual money prices at which these commodities are sold*, only the same mass of commodities (and hence the same amount of Value) exists after the sales as before. Different price relations will therefore give rise to different distributions of the total commodity-product, and of the total sum of Values, but they cannot by themselves change these totals. It is on this basis that Marx argues:

If commodities are sold at their values, then the magnitude of value in the hands of the buyer and seller remains unchanged. Only the form of existence of value is changed. If the commodities are not sold at their values, then the sum of converted values remains unchanged; the plus on one side is a minus on the other. (Marx, *Capital*, Volume II, Ch. VI, Section 1.1, p. 129)

7. The Importance of Prices

In commodity producing societies the object of production is not direct use, but personal gain through exchange. Individuals produce without any apparent social regulation. Nonetheless, they too exist within a social structure. For each individual to be able to specialize in producing for exchange, others must do so too; for exchange to proceed without rupture, the various products must correspond to the various social needs. Since under this form of social organization the correspondence between the various social needs and the distribution of social

*Another implication is that not all labor-time, even if it stems from wage labor employed by capitalists, leads to the creation of Value. This has been a perennial topic of discussion in Marxist literature under the heading of productive and unproductive labor. Though we cannot treat it here, it is important to note that it arises from the distinctive character of the Marxian concept of Value.

labor required to satisfy these needs cannot be brought about directly, it must be done indirectly. What in other societies is a direct evaluation of the importance of a particular type of labor in terms of its concrete product, becomes in commodity producing societies the indirect evaluation of this labor—through the “quantitative worth” of its product. It is only in exchange that the true social nature of commodity production is made apparent; and precisely because commodity production is undertaken for personal gain, for the money which is to be made, *it is the money-prices of commodities that serve as the immediate regulating mechanism of the system.* Far from being a “veil,” money constitutes a very important feedback mechanism.

It follows from the above that the laws which determine money magnitudes such as prices, profits, and wages, are of the utmost importance in understanding the laws of motion in capitalism.*

Now of course it was known well before Marx's time that supply and demand were the immediate determinants of actual market phenomena. But even classical political economy was aware that over the course of time the ceaselessly fluctuating interplay of supply and demand was itself regulated by a much more fundamental principle: the Law of Equal Profitability.

For instance, if as a result of market conditions a particular sector's rate of profit rose above the average rate, then the flow of capital would tend to be biased towards that sector, causing it to grow more rapidly than demand, and driving down its market price to a level consistent with average profitability. Conversely, the sectors with low profitability would tend to grow less rapidly than demand, causing their prices and profitability to rise.

The classical economists were thus able to demonstrate that behind the continuously varying constellation of market prices there lay another set of prices, acting as “centers of gravity” of market prices and embodying more or less equal rates of profit. The name given to these regulating prices in classical political economy was natural prices; Marx calls them prices of production. Their discovery was the first great law of prices.

By David Ricardo's time, the problem had moved on to a higher level. What Ricardo sought to do, for instance, was to go one step further and look behind prices of production themselves, to discover *their* “centers of gravity.” That is, just as the market price of a commodity was shown to be regulated by its price of production, Ricardo sought to show that this regulating price was itself subject to a hidden regulator—the total quantity of labor time required to produce the commodity, both in its direct production and in the production of its means of production.

In speaking . . . of the exchangeable value of commodities, or the power of purchasing possessed by any one commodity, I mean always that power which . . . is natural price. (D. Ricardo, 1962, p. 92)

*The problem that Marx set himself in *Capital* was to “lay bare the economic law of motion of modern society.”²³ But why this task? Because he knew only too well that in *order to change the world it is necessary to first understand it.* In particular, he knew that without an adequate understanding of how the capitalist system operates, of the manner in which its underlying contradictions give rise to the phenomena of regular and violent crises, of increasing wealth alongside increasing misery, of rising productivity which leads to falling profitability, and many others—without an adequate understanding of these *laws* of capitalism, attempts to change it would be doomed to failure.

The great cause of the variation in the relative value of commodities is the increase or diminution in the quantity of labour required to produce them. (*Ibid.*, p. 36)

There we have it: the *great* cause of the variations in the (relative) price of production of a commodity is the variations in the total labor time that goes, directly or indirectly, into its production. The total quantity of labor time was the center of gravity of the commodity's price of production, just as this price of production was itself the center of gravity of its market price. This was Ricardo's attempt to formulate a second great law of prices.

What Ricardo perceived was that there was an intrinsic connection between the "quantitative worth," the exchange-value, of commodities, and the total labor-time required for their production.²⁴ This, according to Marx, was Ricardo's great scientific merit.²⁵ But at the same time Ricardo was trapped by the conceptual framework of bourgeois political economy, which saw all production as being alike. He was consequently unable to distinguish concrete labor, an aspect of all social production, from abstract labor, an aspect which only commodity producing labor takes on. Ricardo therefore misses the difference between Value and the form of Value. Instead of recognizing price as the manner in which the exchange process reflects Value, and developing the various intermediary links between the two, he attempts instead to fuse them together through his law of prices. His failure to adequately distinguish between Value and price is, according to Marx, the first great source of error in his analysis.²⁶

In addition to that, however, there is another problem. How can Ricardo attempt to analyze the effects of a uniform rate of profit on prices, asks Marx, when he nowhere discusses what determines the *level* of this rate of profit? And this in turn leads to an even more basic question. A uniform rate of profit is simply a way of saying that profits on different capitals are proportional to the size of these capitals: that is, each capital gets a share of total profit in proportion to its own size. But Ricardo nowhere discusses what determines aggregate profit in the first place. How then can he attempt to isolate the factors which regulate the movements of prices of production when he is missing a crucial ingredient—profit?

It is therefore apparent to Marx that even given the relation between Value and money price which he himself derives,²⁷ the specific manner in which Value regulates price cannot be developed without first showing how profit arises. And this, as we shall see next, leads Marx to the concept of surplus-Value.

III. SURPLUS-VALUE AND PROFIT

1. The Circulation of Money and the Circulation of Capital

We have up to now focused on the relationship of the circulation of commodities to their production; on the basis of this we were able to derive the categories of Value, money, and price, and discuss their mutual interrelationship. But the very existence of the circulation of commodities within a capitalist mode of production immediately implies that, for those who function as capitalists, the process of circulation is itself a means to realizing a profit: where then does the profit of the capitalist class as a *whole* come from?

Marx begins by noting that once we consider commodity production within the context of capitalist production, the overall process of circulation is in reality two different processes with different functions and hence different laws. In the first process, the owners of commodities (CC) exchange them for money (M) in order to be able to use this money to buy other commodities (CC) for the purpose of consumption.* This circuit in the overall circulation process therefore has the form $CC \rightarrow M \rightarrow CC$, and is the aggregate of the exchanges of one set of commodities for what is, under the existing conditions of exchange, an equivalent set. In this process money is an intermediary between two sets of commodities; once acquired it is spent, and for the individuals involved in it, the process terminates in consumption. Marx calls this "selling in order to buy";²⁸ in it, money functions as money only.

In the second circuit, however, the owners of money (M) exchange it for commodities (CC) in order to get more money ($M' = M + \Delta M$), i.e., in order to make a profit ΔM . Money here is not spent, it is merely *advanced* in order to make more money, through the intervention of commodities. The process of $M \rightarrow CC \rightarrow M'$ tends to be self-perpetuating, since it can always lead into $M' \rightarrow CC \rightarrow M''$, etc. The initiators of this process function as capitalists: $M \rightarrow CC \rightarrow M'$ "is therefore in reality the general formula of capital as it appears prima facie within the sphere of circulation."²⁹ Marx calls this second process "buying in order to sell";³⁰ in it, money functions as *capital*. It makes a profit. But how is it possible to make money by merely advancing money?

2. Surplus-Value

The first step in the solution to the problem of profit is to recognize that it is not simply a question of money. Money, after all, represents a command over actual commodities, and hence over the actual labor-time materialized in them. If therefore in the circuit $M \rightarrow CC \rightarrow M + \Delta M$, the profit of the capitalist class (ΔM) is to be something more than a monetary illusion, if it is to represent a potential increment in their real wealth, then *their money profit ΔM must itself be matched by an actual increment in the commodities available, and hence in materialized labor-time*. That is, ΔM must be matched by an increment in the total Value of the commodities represented by CC . This increment in Value necessary for any real profit, Marx calls surplus-Value.

3. Constant Capital

Ostensibly, the process of the formation of capital, as represented by $M \rightarrow CC \rightarrow M'$, is a process occurring wholly within circulation. But Value is itself a result of production; it cannot be created in circulation, and hence neither can the necessary increment in Value, surplus-Value. Surplus-Value, if it is possible at all, can only arise from production. And indeed, if we examine $M \rightarrow CC \rightarrow M'$ more carefully, we find that the first stage involves the purchase of human and nonhuman inputs required for production, whereas the final stage involves the

*Marx uses the symbol C to represent commodities (as in $M \rightarrow C \rightarrow M'$) and also to represent constant capital (as in $C + V$). In order to avoid any possible misunderstanding, I will use "CC" for the former and "C" for the latter.

sale of the outputs of production. The commodities purchased as inputs and the commodities sold as outputs are in fact not the same, and it is the intervention of *production* which distinguishes them. The formation of capital, which appears to exist solely within circulation, in reality encompasses a process of production; properly speaking, it should be represented by $M \rightarrow CC \dots P \dots CC' \rightarrow M'$, with the stage $CC \dots P \dots CC'$ representing the effect of production. Not just production or even just commodity production but, as we shall see, capitalist commodity production.

Means of production and laborers combine in all production. But in commodity production, the means of production are themselves commodities, and as such represent, in their total Value, the quantity of abstract labor-time that was socially necessary for their own production. If we examine the process of production over a period of time sufficiently long so that even the most durable means of production are entirely used up, then it becomes clear that the Value of the means of production must become incorporated into the commodities produced over this period. The bodily forms of the means of production either wear out (as with machines) or are physically incorporated into the product (as with raw materials); but precisely because these means of production are socially necessary under existing conditions, the abstract labor-time represented by them is also (indirectly) socially necessary for the production of the commodities. It is a necessary component of the total Value of the product. From the point of view of Value, therefore, the means of production only contribute as much Value as they actually contain. As such they cannot be the source of the increment in Value upon which any nonillusory aggregate profit must be based; Marx therefore calls the capital advanced in the form of the means of production "constant capital."

4. The Value of Labor-Power

The formation of capital, the process represented by $M \rightarrow CC \dots P \dots CC' \rightarrow M'$, presupposes not just commodity production but capitalist commodity production. And under capitalist commodity production, not only are the products of labor bought and sold as commodities, but so too is the very capacity-to-labor itself.

This capacity-to-labor, which Marx calls labor-power, is "the aggregate of those mental and physical capabilities existing in a human being, which he exercises whenever he produces a use-value of any description."³¹ In all societies, it is the basis of the productive activities of human beings; but for this fundamental human property to become a thing to be bought and sold, a commodity, it must exist within a specific social context. Not only must the laborer have the legal title to his labor-power, he must also be obliged to sell it and not other commodities. He must be free not only to dispose of his own labor-power as a commodity, but also "free" of the means of production which might enable him to be a producer of other commodities. He must be a wage-laborer.

The Value of the commodity labor-power, like that of every other commodity, is determined by the abstract labor-time socially necessary for its production under existing conditions. Since labor-power is a capacity of living beings, its production implies their continued maintenance and reproduction; hence it implies a given quantity of commodities as means of subsistence,

sufficient not only to maintain laborers in their normal state as laborers but also sufficient to support their families so that they may as a class continue to perpetuate themselves.* The Value of the means of subsistence of the total workforce is therefore the abstract labor-time socially necessary for their maintenance and reproduction, and hence is the measure of the Value of their labor-power (V).

When a capitalist purchases the commodity labor-power, he purchases the capacity-to-labor of workers, and in order to utilize this commodity he must extract as much labor-time from these workers as he can. The concrete functions that workers perform in their productive activities involves the transformation of the means of production into specific commodities; as such, the time spent by workers in these activities is itself a quantity of socially necessary abstract labor-time (L), which is in effect incorporated into the commodities. From the social perspective of Value, therefore, workers add a quantity of Value (L) to the Value (C) contained in the means of production they use up.

5. Surplus Labor-Time

Capitalist production begins with the commodities CC , means of production and labor-power; as commodities they represent a definite quantity of Value, $C + V$. In a period of time sufficiently long, the entire Value C of the means of production will be *transferred* to the product. On the other hand, the Value V of labor-power employed in this period is *replaced* with the Value added to L by workers in the form of the amount of labor-time they actually spend in production. Thus while the Value of the initial commodities is $C + V$, the Value of the final product is $C + L$. The formation of capital, which we have represented as $M \rightarrow CC \dots P \dots CC' \rightarrow M + \Delta M$, can therefore also be represented by $M \rightarrow (C + V) \dots P \dots (C + L) \rightarrow M + \Delta M$. Clearly, *surplus-Value, the Value increment* $S = (C + L) - (C + V) = L - V$ which is necessary to match the money increment ΔM can arise if and only if the labor-time (L) put in by workers is greater than the labor-time (V) socially necessary for their reproduction.

The same result can be derived differently. Imagine for a moment that at any given level of technology, workers in all branches of production work just long enough to produce the commodities necessary for the needs of the working class as a whole and to replace the means of production they use up in this process. Under these circumstances, no matter how "advanced" the technology, there can exist no social surplus, and hence no basis for capitalist profit. If, and only if, workers can and actually do work longer than the time necessary to maintain themselves and the means of production, will there arise a continuing social surplus; the time spent by workers in producing this surplus, their surplus labor-time, is therefore the real basis of capitalist profit. And of course since the

*As in the case of every other commodity, the value of labor-power is given by the average labor-time required to produce the average quantity of means of subsistence of the average labor-power, under existing conditions. But for simple, *unskilled* labor-power, these existing conditions are themselves "the product of historical development, and depend therefore to a great extent on the degree of civilization of a country. . . . In contradistinction therefore to the case of other commodities, there enters into the determination of the value of labour power a historical and moral element. Nevertheless, in a given country, at a given period, the average quantity of the means of subsistence necessary for the labourer is practically known." (Marx, *Capital*, Vol. I, Ch. VI, p. 171).

The issue of skills requires further treatment which cannot be undertaken here. See instead Shaikh [19], Rowthorn [16].

necessary labor-time described above is none other than the aggregate value of labor-power V , the surplus labor-time is none other than aggregate surplus-Value S .³² Once again we see that surplus-Value is the "hidden basis" of any real capitalist profit.

None of this, by the way, implies that Marx intended the labor theory of value as a theory of property rights, à la Locke or even Proudhon. Marx's goal was a scientific analysis of capitalism, not a mere moral critique.³³

IV. THE TRANSFORMATION FROM DIRECT PRICES TO PRICES OF PRODUCTION

1. Exchange at Values: Direct Prices

In the Marxist conception of exchange-as-the-circulation-of-commodities, the total labor-time materialized in commodities during their production is the basis for their exchange-value and money-price, while the surplus labor-time materialized in them is the basis of the capitalist profit to be realized from their sale. Without a proper understanding of the quantitative and qualitative relationships between the sphere of production and the sphere of circulation, of the *limits* imposed on circulation by production, the laws of circulation must remain a mystery. Neoclassical economics is a testament to this.

For Marx, it was absolutely critical that the dominance of production over circulation be properly understood. It is in production that capitalist wealth is created and expanded, and Value and surplus-Value are materialized in commodities. Circulation, as we have seen, is the process whereby the previously created use-values are transferred from one hand to another, by means of money-prices.

Two things follow from this. First of all, it is in circulation that the Value magnitudes take their money-forms: Value takes the form of money-price, surplus-Value the form of money-profit; and secondly, neither Value nor surplus-Value are created in circulation, precisely because in this process commodities are merely exchanged, not created. This means that regardless of the actual money-prices involved, there can be no *real* increase in capitalist wealth through circulation.

It is obvious that the most direct way to explore the production and expansion of capitalist wealth is to assume that exchange takes place in proportion to the Values of commodities, so that the money-price of every commodity is equal to its Value relative to the Value of the unit of money (say one ounce of gold). I will henceforth call prices so determined "*direct prices*."

When indeed the analysis is begun this way, as Marx does in Volumes I and II of *Capital*, it becomes clear that none of the basic categories of capitalist circulation, the categories of capital and labor, money and price, and wages and profits, owe their existence to any *deviations* of relative prices from relative Values.

The conversion of money into capital has to be explained on the basis of the laws that regulate the exchange of commodities, in such a way that the starting-point is the exchange of equivalents . . . the formation of capital must be possible even though the price and value of a commodity

be the same; for its formation cannot be attributed to any deviation of the one from the other. If prices actually differ from values, we must, first of all, reduce the former to the latter, in other words, treat the difference as accidental in order that the phenomena may be observed in their purity, and our observations not be interfered with by disturbing circumstances that have nothing to do with the process in question. (*Capital*, Vol. I, Ch. V, p. 166, text and footnote 1.)

2. The Conceptual Basis for Prices of Production

There is yet another reason for beginning with direct prices (exchange at values): the major *systematic* deviation of relative prices from relative Values arises when commodities exchange at "prices of production." But prices of production are prices which reflect a general rate of profit; and a general rate of profit in turn presupposes the existence of profits. Prior to any question about the formation of a general rate, therefore, is the question about the source of profit.³⁴ This question leads Marx to surplus labor-time and hence to surplus-Value, and once again the analysis comes to Value.

The path from Value back to price of production involves two major steps. First, one must examine and understand prices and profits in general; this was done through the analysis of the relationship of production to circulation, and of the relationship of Value to money. Second, since prices of production must reflect a general rate of profit, one is led to an analysis of the formation of this general rate out of the individual rates of profit in each sector of production. We turn to this now.

Let us recall that the general process for the formation of capital could be written as $M \rightarrow C + V \dots P \dots C + L \rightarrow M'$, where M is the money price of commodity inputs into production: the means of production having the Value C and labor-power having the Value V . M' , on the other hand, is the money price of the commodity outputs of production; their total Value is $C + L$. By definition, $S = L - V$.

In money terms, the general money rate of profit is $r = (M' - M)/M$, the aggregate profit $M' - M$ divided by the capital advanced M . In terms of Value, the general Value rate of profit is $\rho = S/(C + V)$, the aggregate surplus-Value S divided by $C + V$, the Value of the inputs. Obviously, if prices are proportional to Values, then the general money rate of profit must equal the general Value rate of profit: $r = \rho$.

We now consider two individual circuits of capital involving sectors of production I and J , as represented by $M_i \rightarrow (C_i + V_i) \dots P \dots (C_i + L_i) \rightarrow M'_i$ and $M_j \rightarrow (C_j + V_j) \dots P \dots (C_j + L_j) \rightarrow M'_j$, respectively. If prices are proportional to Values, then in each sector the sectoral Value and money rates of profit are the same. We need therefore deal only with the Value rates $\rho_i = S_i/(C_i + V_i)$ and $\rho_j = S_j/(C_j + V_j)$.

The first question we must then ask is: are these two Value rates ρ_i and ρ_j generally equal? For if they were, then at prices proportional to Values each sector would have the same money and value rates of profit, and no movement of prices would be necessary to equalize the individual rates of profit. To facilitate the answer, Marx rewrites each expression for the value rate of profit by

dividing both the numerator and denominator of each fraction by the Value of labor-power V :

$$\rho_i = \frac{S_i}{V_i} \left| \frac{C_i + V_i}{V_i} \right. \quad \text{and} \quad \rho_j = \frac{S_j}{V_j} \left| \frac{C_j + V_j}{V_j} \right.$$

Each Value rate of profit is therefore itself the ratio of two component ratios: S/V , which Marx calls the rate of surplus-Value, and $(C + V)/V$, which he calls the organic composition of capital. We will deal with each in turn.

A. The Equality of Rates of Surplus-Value

For society as a whole in any given period, the productive activities of workers may be viewed as a certain aggregate quantity of labor-time L . But the very fact that the concrete labor-times of different workers can be added together requires that they have already in some way been made qualitatively equal, that they have been reduced to quantities of some *general* social labor-time, what Marx calls "abstract" labor-time. This reduction of concrete labor-times to abstract labor-time is of course a consequence of generalized commodity production, as discussed in the section on Value (II.4); for our purposes, what is important in this is that it implies that the labor-time of each worker represents a definite quantity of abstract labor-time.³⁵

Of the aggregate labor-time L , a certain portion V represents the time socially necessary for the production of the means of subsistence of the working class, and the remainder S , the aggregate surplus labor-time, constitutes the surplus-Value materialized in commodities during their production. If the working day is the same in all branches of production, then each worker adds the same amount of Value to the product, in a given time period (like a day). If the wage rate for a given type of work is the same in all branches, then each worker can purchase the same share of the aggregate means of subsistence; a uniform wage thus represents a given quantity of (abstract) labor-time (say 4 hours a day) which each worker must put in to reproduce the Value of his or her labor-power. Clearly, if the length of the working day (say 10 hours) is indeed the same in all branches, each worker will work the same amount of surplus labor-time (6 hours a day). That is, in each sector, the rates of surplus-Value will necessarily be equal. These rates, therefore, cannot be the source of any differences between the Value rates of profit ρ_i and ρ_j .

B. The Inequality of Organic Compositions of Capital

The above results imply that in any one sector, say sector J , V is an index of the total quantity of labor-time L worked in that sector, since any one hour of abstract labor-time requires the fraction v for its reproduction: $V = vL$. The quantity C , the value of the means of production in this sector, is, on the other hand, an index of the specific types and quantities of commodities which enter into this process of production as means of production. In general, therefore, unless each sector employs the same types of commodities and labor-powers in the same proportions as every other sector, the ratios C_i/L_i and C_j/L_j will differ.

Since V_i and V_j are indexes of L_i and L_j , in general the organic compositions $(C_i + V_i)/V_i$ and $(C_j + V_j)/V_j$ will differ.

To reiterate Marx's conclusion: in general, the sectoral rates of surplus-value will be equal, but the organic compositions of capital will not. Hence in general the value rates of profit will differ from sector to sector.

C. The Deviations of Prices of Production from Direct Prices

Let us now return to the two circuits of capital $M_i \rightarrow (C_i + V_i) \dots P_i \dots (C_i + L_i) \rightarrow M'_i$ and $M_j \rightarrow (C_j + V_j) \dots P_j \dots (C_j + L_j) \rightarrow M'_j$. We began earlier by noting that if prices were proportional to Values, the money rates of profit $r_i = (M'_i - M_i)/M_i$ and $r_j = (M'_j - M_j)/M_j$ would be equal to the corresponding Value rates of profit $\rho_i = S_i/(C_i + V_i)$ and $\rho_j = S_j/(C_j + V_j)$. If in addition the Value rates of profit were themselves equal to each other, then at direct prices, capital in each circuit would realize the same money rate of profit and no movement of prices would be necessary to bring these money rates into line with the general rate.

We have just seen, however, that in general the sectoral rates will differ; if for instance ρ_i was greater than ρ_j , the capital invested in sector I would, with prices proportional to Values, earn a higher money rate of profit than would capital invested in industry J ($r_i = \rho_i > r_j = \rho_j$). To equalize these money rates, therefore, relative prices would have to deviate from relative values in such a way as to lower M'_i relative to M_i and to raise M'_j relative to M_j , for only in this way would the higher money rate of profit r_i be reduced and the lower money rate r_j be raised.

In any sector K , M'_k represents the money price of the commodities produced, what I called earlier the sector's total price; M_k , on the other hand, is the money price of the sector's commodity inputs (means of production and labor-power), what Marx calls its (money) cost-price. Since both the total price M'_k and the cost-price M_k are in essence determined by the prices of commodities, any movements of relative prices, including the ones under consideration here, will in general change both M'_k and M_k : the overall price movements necessary for the formation of a general rate can therefore be quite complicated, as Sraffa has so elegantly demonstrated.³⁶

Nonetheless, beginning from prices proportional to Values, for any sector I whose Value rate of profit ρ_i is higher than the average Value rate ρ , its total price M'_i must fall relative to its cost-price M_i , in order to bring its money rate of profit r_i into line with the general money rate r . The opposite movement must take place for a Sector J whose Value rate of profit ρ_j is lower than the average Value rate ρ .

Since the differences in the value rates ρ_i and ρ_j upon which these price movements are predicated are themselves a consequence of the differences between sectoral organic compositions of capital, one may equally well say that, beginning from prices proportional to Values, a sector's total price must fall (or rise) relative to its money cost-price according to whether its organic composition of capital is lower (or higher) than the social average, if its particular money rate of profit is to conform to the general rate.

It does not follow from the above, however, that the general money rate

of profit will continue to equal the general *Value* rate of profit, once prices deviate from a strict proportionality with Values. To see why, let us recall that M' , the aggregate price of commodities, is the total price of the commodities which form the social product. On the other hand, the aggregate cost-price M is the total price of the commodities, the means of production and the labor-power, which form the inputs into the aggregate process of production. Since the price of labor-power is determined by the price of its means of ~~production~~ *subsistence*, the aggregate cost-price M is in effect the total price of the means of production and the means of subsistence.

Suppose the social product was 100 bushels corn and 100 tons iron. M' would be its total price. In general, the aggregate means of production and means of subsistence will also consist of quantities of one or both of these commodities, say 80 bushels corn and 60 tons iron. M would then be their total price. Because these two aggregate "bundles" of commodities will generally differ in their proportions of corn to iron, as is true of the case illustrated above, any movement in the price of corn relative to iron will affect them unequally. Hence any movement of relative prices will in general change the ratio M'/M or equivalently, the general rate of profit $r = [(M' - M)/M] = [(M'/M) - 1]$.

The quantity M' is of course the sum of prices, while the quantity $\Delta M = M' - M$ is aggregate money profit. The above result may therefore be stated in an equivalent form: in general, any deviations of relative prices from relative Values, including but not only those which arise from the formation of a general money rate of profit, will make it impossible for both the sum of money prices M' and the sum of money profits ΔM to remain strictly proportional to the sum of Values $C + L$ and the sum of surplus-Values S , respectively. This result is well known in the debate about the so-called transformation problem; but as it is stated above, it arises in a broader context. In any case, in order to discern its real content, we must examine matters a bit more carefully.

3. Some General Effects of Price-Value Disproportionality

In much of the literature on the "transformation problem," there is a great confusion between Values, prices proportional to Values (what I call direct prices), and prices of production. In particular, since direct prices are so simply related to Values, the general issue of the differences between price and Value, and profit and surplus-Value, tends to be taken up only when we turn to prices of production. All of a sudden, we are confronted with the impossibility of a simple proportionality between Value magnitudes and their money-forms, and it begins to seem as if the analysis of Value is something quite separate from the analysis of price.³⁷

For this reason, I have attempted throughout this paper to carefully distinguish between Value, which stems from production, and money-price, which is the form taken by Value in circulation. With this distinction in hand, it is possible to see that money-magnitudes are *always* different, both qualitatively and quantitatively, from Value magnitudes. Marx notes, for instance, that precisely because the form of Value is not the same thing as Value, the determination of money-price is a *complex combination* of its Value elements.

Consider the simplest case, that of direct prices. Suppose the Value of a

gold coin weighing $\frac{1}{4}$ ounce (which we call a "£")* is $\frac{1}{2}$ worker-hour, while that of a bushel of wheat is 100 worker-hours. The direct price of wheat will then be £200. Even right here, Value (100 hours) and price (£200) are both qualitatively and quantitatively different (though related) magnitudes, with different units.

Now suppose the Value of wheat falls by half, to 50 worker-hours. How will this be reflected in its direct price? Well, says Marx, that depends; if the Value of gold also fell by a half, the money-price of wheat would remain constant at £200; if the Value of gold fell by more than a half, the money-price of wheat would rise even though its Value fell!³⁸ Even in this simple case, therefore, the laws which determine the money-form of Value are more complex than those which determine Value itself. But this is hardly an analytical defect; on the contrary, it is the whole point of theoretical analysis to be able to derive more complex categories from basic ones.

If indeed price and Value are always distinct, what exactly is the "transformation" issue about? Clearly, it is about a *transformation in the form-of-Value*; it is a transformation from the direct expression of Value (direct prices) to a more complex expression (prices of production). What we have to do, therefore, is to see what is altered by this change in form, and what is not.

We begin by noting that what we are considering here is a *pure* change of form. For instance, in the traditional formulation of the transformation we analyze a capitalist society in a simple or extended reproduction, first when exchange is ruled by direct prices, and then when it is ruled by prices of production.** In both cases, the composition and distribution of the use-values is the same: the same mass of commodities is circulated in either case, with the same physical composition of means of subsistence and surplus-product. Thus the same total commodity Value, the same aggregate Value of labor-power, and the same aggregate surplus-Value, is circulated by the two different price-forms. From the point of view of the system as a whole, the transformation leads to no *real* change; all that changes is the manner in which given production relations are manifested in circulation.

From the point of view of individual capitals, however, the situation is indeed different. With direct prices, each capitalist realizes an amount of money ~~proportional~~ ^{profit} to the surplus-Value contained in the commodities he sells. With prices of production, each sector's money profit is no longer proportional to its surplus-Value; since the sum of Values (and hence the total surplus-Value) circulated is still the same as before, the above change of form has the effect of redistributing surplus-Value from one sphere of production to another.

The fact that prices diverge from [proportionality with] values cannot, however, exert any influence on the movements of social capital. On the whole, there is the same exchange of products, although the individual

*Originally a "£" represented a pound of silver. Hence the name. Over time, however, while the money-name "£" was retained, the silver or gold content decreased steadily. By Marx's time, a "£" represented roughly $\frac{1}{3}$ of a pound of silver, or about $\frac{1}{4}$ of an ounce of gold (Marx, *Contribution to a Critique . . .*, Ch. II, Sec. 1, p. 72).

**See section IV.4 of this paper, which discusses the calculation of prices of production.

capitalists are involved in value-relations no longer proportional to their respective advances and to the quantities of surplus-value produced singly by everyone of them. (Marx, *Capital*, Volume II, Ch. XX, Section 1, p. 393)

There is no need to waste words at this point about the fact that if a commodity is sold above or below its value, there is merely another kind of division of surplus-value, and that this different division, this changed proportion in which various persons share in the surplus-value, does not in any way alter either the magnitude or the nature of that surplus-value. (Marx, *Capital*, Volume III, Ch. II, p. 43)

What has been said above in fact applies to any set of prices which differ from direct prices, not just to prices of production. What it shows is that there are *limits* to the effects of different forms of Value, and that these limits arise precisely in the Value magnitudes whose distribution is brought about through these money-forms.

It does not follow from this, however, that the determination of money-prices is of no consequence. Different forms of Value have different *real* effects on individual capitals, and these in turn have different implications for the dynamic process of accumulation and reproduction. It is through the actual movements of money-prices that the system is regulated; as such, the analysis of prices of production (which act as centers of gravity of market prices), and of their relation to Values, is of the utmost importance to concrete analysis. The first step (which in most discussions of the "transformation problem" is the *only* step) along this path is the derivation of prices of production from direct prices.

4. The Calculation of Prices of Production

In general, we may characterize any two circuits of capital as $M_i \rightarrow (C_i + V_i) \dots P_i \dots (C_i + L_i) \rightarrow M'_i$ and $M_j \rightarrow (C_j + V_j) \dots P_j \dots (C_j + L_j) \rightarrow M'_j$.

When exchange is at Values, the money rate of profit in each circuit will equal the Value rate of profit in that circuit. Since Value rates will in general differ from sector to sector, owing to differences in their organic compositions of capital, exchange at Values will imply unequal rates of profit in different sectors, and hence in different circuits of capital.

It follows from the above that the formation of a general rate of profit out of the various individual rates of profit will require that for a sector with a Value rate of profit higher than the social average, the money price of its product M'_i must fall *relative* to its money cost-price M_i , since only this movement will lower its money rate of profit r_i . As we saw earlier in section III.2.C, this *must* hold regardless of how complicated the effects of the formation of a general rate of profit on the overall pattern of prices. And as we shall see immediately, *it is precisely this movement which is captured by Marx's own transformation procedure.*

A. Marx's Transformation Procedure

The example below illustrates the three basic circuits of capital in Marx's analysis: Circuit I represents the production of the means of production themselves,

Circuit II the production of the means of subsistence of the working class, and Circuit III the production of the means of consumption of the capitalist class. The example itself, though from Bortkiewicz, not Marx, is used because it is the standard illustration of the so-called transformation "problem" and appears in most discussions of the issue.

Because we have throughout distinguished between Value and money-price and because the issue at hand centers on differences in their magnitudes, we must be careful with notation. As defined earlier, C_i will represent the value of the means of production of the i th department, V_i the value of the labor-power employed there, and $S_i = L_i - V_i$ the surplus-value produced there; the total value $C_i + L_i$ produced will be designated by W_i . In contrast, MC_i will represent constant capital, the money price of the means of production used in the department, and MV_i variable capital, the money price of the labor-power used there; as before, M_i will be the total cost-price and M'_i the total price of the product. All Value quantities will be in units of (abstract) labor-time, worker-hours, and all money quantities in £'s ($\frac{1}{4}$ ounce gold coins). It is also assumed that each £-coin has a Value of $\frac{1}{2}$ worker-hour.

When exchange is at Values, we get the results shown in Table 1. It should be noted that the table has been designed to correspond to the whole circuit of capital, $M \rightarrow (C + V) \dots P \dots (C + L) \rightarrow M'$, so that the phases of circulation are clearly distinguished from those of production.

Marx's transformation procedure is simple: noting that in Table 1 the total cost-price $M = \text{£}1350$ (column 3) and the total money profit $\Delta M = \text{£}400$ (column 10), we get an average rate of profit on social capital of $r = 400/1350 = 29.63\%$.

At existing prices, however, the capital in circuit I, invested in department I, would realize only a 19.05% rate of profit. Thus, in order to raise its money rate of profit to the average level, it must raise its money price. Since its money cost-price is £630, the "normal" profit that it would earn at the average rate of profit is 29.63% of £630, which is £186.67: the level to which it must raise its price therefore is given by $M = \text{£}630 + \text{£}186.67 = \text{£}816.67$. Similarly, department II must lower its money-price to $M' = \text{£}570.37$, and department III must lower its to $M' = \text{£}362.96$ (see Table 2).

Table 2 illustrates Marx's transformation procedure. In it, the transformation per se refers to the movements of money-prices, *not* to changes in the Value flows. *Moreover, the direction of movement of money prices M'_i to their corresponding cost-prices M_i is the correct one: M'_1 rises relative to its cost-price, and M'_2 and M'_3 fall relative to theirs.*

B. The "Correct" Prices of Production

From Bohm-Bawerk onwards, critics have argued that Marx's procedure was simply incorrect. They pointed out, for instance, that his transformation leaves the money prices of inputs (MC_i , MV_i) unchanged, whereas a thoroughgoing transformation would change these too. Marxists have countered these charges by claiming that, in any case, one can show the formal possibility of deriving prices of production from direct prices; in the Bortkiewicz method, for example, one can solve for a series of price multipliers which would enable one to trans-

Table 1 / Exchange at Values

				$M \rightarrow (C + V) \dots P \dots (C + L) \rightarrow M'$				Value Rate of Profit % (P_j)	Total Price (M_j')	Total Profit (ΔM_j)
	Constant Capital (MC_j)	Variable Capital (MV_j)	Cost-Price (M_j)	Value of Means of Prod. (C_j)	Value of Labor-Power (V_j)	Surplus Value (S_j)	Total Value (W_j)			
(Means of Production)	450	180	630	225	90	60	375	19.05	750	120
(Means of Subsistence)	200	240	440	100	120	80	300	36.36	600	160
(Capitalist Consumption)	100	180	280	50	90	60	200	42.85	400	120
	<u>£750</u>	<u>£600</u>	<u>£1350</u>	<u>375</u>	<u>300</u>	<u>200</u>	<u>875</u>		<u>£1750</u>	<u>£400</u>

Table 2 / Marx's Transformation

Dept.	MC_j	MV_j	M_j	$M \rightarrow (C + V) \dots P \dots (C + L) \rightarrow M'$				M_j'	(Money Profit) ΔM_j	(Money Rates of Profit) % r_j
				C_j	V_j	(Surplus-Value) S_j	W_j			
I	450	180	630	225	90	60	375	816.67	186.67	29.63
II	200	240	440	100	120	80	300	570.37	130.37	29.63
III	100	180	280	50	90	60	200	362.96	82.96	29.63
	<u>£750</u>	<u>£600</u>	<u>£1350</u>	<u>375</u>	<u>300</u>	<u>200</u>	<u>875</u>	<u>£1750</u>	<u>£400</u>	

form the exchange-at-Values scheme of Table 1 to the "correct" exchange-at-prices-of-production scheme.³⁹ Then, depending on whether one prefers the sum of prices or the sum of profits as constant, one can always "normalize" the multipliers derived from the Bortkiewicz method to make one or the other hold, for in general both cannot.

Even if the controversy about the appropriate "normalization," much of which arises from a confusion between Value and money-price, is satisfactorily resolved, the real problem with all of these foregoing transformation procedures remains: they effectively sever the link between Values and money-prices, or at least bury it in algebra, and are forced to reject Marx's own procedure as completely erroneous. Thus for instance in this example, the appropriate algebraic procedure would "jump" us from Table 1, representing exchange at Values, to Table 3 below, which portrays the "correct" price of production scheme under an (algebraically) arbitrary "normalization" which keeps the sum of money-prices (£1750) invariant to the transformation. In all of this, Marx's own transformation, as represented in Table 2, plays no role at all.

Table 3 / The "Correct" Prices of Production

Dept.	MC_j	MV_j	M_j	$M \rightarrow (C+V) \dots P \dots (C+L) \rightarrow M'$				M_j	Money Profits	
				C_j	V_j	S_j	W_j		ΔM_j	r_j
I	504	168	672	225	90	60	375	840	168	25%
II	224	224	448	100	120	80	300	560	112	25%
III	112	168	280	50	90	60	200	350	70	25%
	£840	£560	£1400	375	300	200	875	£1750	£350	

C. Marx's Transformation Procedure Extended

Marx himself never goes beyond the transformation procedure he illustrates in Volume III of *Capital*. And yet in several instances, he indicates clearly his awareness of the issue:⁴⁰

Aside from the fact that the price of a particular product . . . differs from its value . . . the same circumstance applies also to those commodities which form the constant part of (its) capital, and indirectly also its variable part, as the labourer's necessities of life. . . Under capitalist production, the general law acts as the prevailing tendency only in a very complicated and approximate manner, as a never ascertainable average of ceaseless fluctuations. (*Capital*, Vol. III, Ch. IX, p. 161.)

The foregoing statements have at any rate modified the original assumptions concerning the determination of the cost-price of commodities . . . Since the price of production may differ from the value of a commodity, it follows that the cost-price of a commodity containing this price of production of another commodity may also stand above or below that portion of its total value derived from the value of the means of production consumed by it. It is necessary to remember this modified significance of the cost-price, and to bear in mind that there is always the possibility of error if the cost-price of a commodity in any particular

sphere is identified with the value of the means of production consumed by it. Our present analysis does not necessitate a closer examination of this point. (*Ibid.*, pp. 164-65.)

To his critics, especially to those for whom only the *calculation* of prices of production has any significance, Marx's postponement of the "feedback" effects of the price-Value disproportionalities is an admission of failure—hence the so-called "great contradiction" between Volumes I and III.

But there is in fact a simple alternative: Let us extend Marx's procedure by progressively "feeding back" the effects of the initial price-Value disproportionalities and see what happens. Table 4 illustrates this extended procedure. In order to emphasize the fact that the transformation and its extension affect only money flows M and M' , and not the Value flows $(C + V) \dots P \dots (C + L)$, I have included both. This is somewhat tedious but it does make it clear that Value and surplus-Value are distinct from price and profit, a distinction which arises precisely from the difference between the spheres of production and circulation. But before we turn to this, we must first understand the logic involved.

We begin with exchange at Values (as was previously illustrated in Table 1). Let us now consider for a moment the real content of Marx's transformation procedure. If prices were actually proportional to Values, then rates of profit in each sector would differ from the social average. All other things being equal, either the competition of capitals or the threat of this competition would force the various sectors to adjust the prices of their products in such a way as to realize only the average rate of profit. In Department's II and III, for instance, which would have higher than average profit rates, either the threat of competition or else the actual inflow of capital would lower prices till only the average profit was obtained; in Department I, the reverse would take place.

In any real situation similar to the above, the actual adjustment process would involve changes in both the unit prices and the quantities sold; any actual inflow of capital would lower price through an expansion of supply; conversely, any lowering of price in response to the threat of competition would increase the amount sold.

But what we are interested in here is the pure change of form involved in the equalization of profit rates. And this, for a *given* mass of commodities, is an adjustment process *which leaves the total sum of money prices unchanged*: since the cost-prices have already been incurred by the individual capitalist, the immediate burden of adjustment must fall upon current product prices, and their response in the face of capitalist competition is precisely to rise or fall till the individual rates of profit all equal the existing average rate. This simply means that the unit price of *average* commodity output is under no immediate compulsion to change, because in this case the rate of profit *is* the average rate. The average commodity, however, is only a microcosm of the total mass of commodities: the constancy of its price is therefore equivalent to the constancy of the total sum of prices.

Marx's transformation procedure is merely an application of the logic of this adjustment process. In Table 4, the initial situation under consideration in Step 1A is exchange at Values: the sum of prices is £1750, and the sum of profits is £400. Step 1B then illustrates Marx's own transformation, in which

Table 4 / The Transformation from Direct Prices to Prices of Production*

	Dept.	MC _i	MV _i	M _i	M → (C + V) ... P ... W → M'							ΔM _i	% r _i	ψ _i (Multiplier**)
					C _i	V _i	S _i	W _i	M' _i					
Step 1A	I	450	180	630	225	90	60	375	750	120	19.05	—		
Exchange at values	II	200	240	440	100	120	80	300	600	160	36.36	—		
	III	100	180	280	50	90	60	200	400	120	42.85	—		
		<u>£750</u>	<u>£600</u>	<u>£1350</u>	<u>375</u>	<u>300</u>	<u>200</u>	<u>875</u>	<u>£1750</u>	<u>£400</u>				
Step 1B	I	450	180	630	225	90	60	375	816.67	186.66	29.63	1.089		
Marx's transformation	II	200	240	440	100	120	80	300	570.38	130.38	"	0.951		
	III	100	180	280	50	90	90	200	362.96	82.96	"	0.907		
		<u>£750</u>	<u>£600</u>	<u>£1350</u>	<u>375</u>	<u>300</u>	<u>200</u>	<u>875</u>	<u>£1750</u>	<u>£400</u>				
Step 2A	I	490.00	171.12	661.12	"	"	"	"	816.67	155.54		"		
Cost-prices adjusted to	II	217.78	228.14	445.92	"	"	"	"	570.38	124.45		"		
reflect prices of produc-	III	108.88	171.12	280.00	"	"	"	"	362.96	82.96		"		
tion of Step 1B		<u>£816.66</u>	<u>£570.38</u>	<u>£1387.04</u>	"	"	"	"	<u>£1750</u>	<u>£362.96</u>				
Step 2B	I	490.00	171.12	661.12	"	"	"	"	834.12	173.00	26.17	1.021		
Prices of production	II	217.78	228.14	445.92	"	"	"	"	562.62	116.70	"	0.986		
adjusted to equalize rates	III	108.88	171.12	280.00	"	"	"	"	353.26	73.26	"	0.973		
of profit in Step 2A		<u>£816.66</u>	<u>£570.38</u>	<u>£1387.04</u>	"	"	"	"	<u>£1750</u>	<u>£362.96</u>		⋮		
⋮												⋮		
Final Step	I	504	168	672	"	"	"	"	840	168	25	1.		
"Correct" prices of	II	224	224	448	"	"	"	"	560	112	"	1.		
production	III	112	168	280	"	"	"	"	350	70	"	1.		
		<u>£840</u>	<u>£560</u>	<u>£1400</u>	"	"	"	"	<u>£1750</u>	<u>£350</u>				

* ψ_i = ith price multiplier ≡ (ith price in current step) ÷ (ith price in previous step)

** The actual calculation was done to three significant digits after the decimal point. The numbers shown here are rounded off to two places.

the immediate process of adjustment redistributes the given mass of surplus-Value (whose magnitude cannot of course be changed in circulation) by raising prices in Department I and lowering them in II and III. The sum of money prices remains unchanged at £1750, and in this instance the sum of money profits also remains at its previous level of £400.

Expressed in proportion to its previous price, which was its direct price, the change in the money-price of Department I is $\psi_1 = 816.67/750 = 1.089$. Similarly, $\psi_2 = 0.951$ and $\psi_3 = 0.907$.

It is only in the next step, Step 2A, that we see the effect of the above deviations from direct prices on the cost-prices in each amount of capital. Since Department I produces the means of production for all departments, its price multiplier $\psi_1 = 1.089$ will imply higher money prices (MC_i) for all means of production. Similarly, since Department II produces the means of subsistence, its price multiplier $\psi_2 = 0.951$ implies a lowering of the money costs of labor-power (MV_i) in each amount. ψ_3 , on the other hand, will not affect either component of cost-prices, since Department III produces only commodities for the consumption of capitalists.

Capitalists in each department will now have incurred new cost-prices differing from those in Step 1B. If they were to continue to sell their products at the prices of Step 1B, their rates of profit would no longer be equal. This is the case illustrated in Step 2A. The overall effect of the preceding "feedbacks" is to raise the aggregate cost-price from £1350 to £1387.04. Since the sum of prices is unchanged, this results in a decrease of total money profit from £400 to £362.96.

Once again, therefore, capitalists in each sector would be compelled to adjust their individual money rates of profit to conform with the average rate, through the movements of their respective commodity-prices; once again, the average commodity, and hence the total mass of commodities, would be under no such compulsion, so that the total sum of prices would remain constant at £1750.

The resulting situation is depicted in Step 2B. Department I's price, compared to its previous level in Step 1B (and 2A), has risen again, this time by $\psi_1 = 834.12/816.67 = 1.021$, while those of II and III have fallen from their previous levels by $\psi_2 = 0.986$ and $\psi_3 = 0.973$. The pattern of transfer of surplus-Value has therefore been altered once again; moreover, in this case the money form of the mass of surplus-Value (i.e., total money profit) has been altered in magnitude. In the same way, the money rate of profit (26.17%) is no longer simply equal in magnitude to the value rate of profit (29.63%).

In each succeeding step, the procedure may be repeated until the changes from one step to another are negligibly small—and we find ourselves with the "correct" prices of production first illustrated in Table 3! This is not, as is usually the case, on the basis of an alternative to Marx's procedure of transformation, but rather on the basis of its successive application.

The procedure illustrated in Table 4 is quite general. The proof is left to Section VI of the mathematical appendix to this paper.

V. SOME FURTHER CONSIDERATIONS

In the preceding discussion, four important points have emerged in connection with the so-called "transformation problem."

First of all, it is not a case of transforming "Values into prices." Rather, it is a case of transforming one form-of-Value, direct prices, into another form, prices of production.

Secondly, the issue under consideration involves a pure change of form. As such, the transformation from direct prices to prices of production does not involve any *real* change for the system as a whole. The total mass of commodities, and the various portions of it going to each class, remain the same as before. By the same token, so do the sum of Values and sum of surplus-Values. What the transformation brings about is a different division of the total pool of surplus-Value among individual capitalists.

Third, the transformation procedure set out by Marx reflects the inherent nature of the process of the equalization of profit rates. This is a continuously occurring process, and in its pure form it acts by changing prices of individual commodities while leaving the sum of prices of a given mass of commodities intact. In addition, Marx's procedure can be extended in a simple way to derive the "correct" prices of production.

Lastly, in the case of the "correct" prices of production, the money rate of profit will deviate from the Value rate of profit. Like the deviations of prices of production from direct prices, however, the money and Value profit rate deviation is systematic and determinate. Though we do not prove it here, it can be shown that (under any given conditions of production), the money rate of profit will vary with the Value rate.⁴¹

These connections by no means exhaust the possibilities. The relation between the mass of surplus-Value and its transformed money-form (total money profits under prices of production) still needs to be better specified. So too does the relationship between individual prices of production and the corresponding Values.

Perhaps the most important point to keep in mind is that the laws that Marx derives on the basis of this theory of Value cannot be derived from a theory which *begins* with prices of production. For instance, Marx's distinction between Value and money-price goes hand in hand with a corresponding differentiation between production and circulation. It consequently becomes necessary to distinguish between activities which produce commodities and those which circulate them, and eventually this difference develops in the more complex and powerful distinction between surplus-Value *producing* labor (what Marx calls "productive" labor) and all other types (which Marx relegates to the category of "unproductive" labor). Among other things, an increase in the proportion of unproductive labor (say advertising) to productive labor, for a given level of total employment, would imply a smaller mass of surplus-Value to be shared out, and hence a smaller rate of profit. Such a conclusion has no parallel in orthodox theories of price.

Marx's analysis abounds with similar examples. His theory of money, for instance, is the direct opposite of the Quantity Theory.⁴² Similarly, his theory of the falling tendency of the rate of profit, and the theory of accumulation and

crises which stems from it, receive their characteristic form from the distinction between constant and variable capital—precisely a distinction which makes no sense without the notion of Value.

All of this means that if Marx's economic analysis is to be developed, it must first be understood. Or else it must be abandoned altogether. The latter path is no doubt simpler, and certainly more consistent with orthodox economics. If the task is to understand the world in order to change it, then the *adequacy* of analysis, not its "acceptability," is all that matters. And on that basis, it seems to me that Marx's analysis is the most appropriate starting point.

VI. CONCLUSION

It is the function of all scientific analysis to get beneath the surface of phenomena, to reduce their apparent movement to the real: "... all science would be superfluous if the outward appearance and the essence of things directly coincided."⁴³

The outward appearance of the sphere of circulation is one of freedom, equality, and choice: it is a world whose real inhabitants are inherently-equal-things, commodities, a world into which human beings enter only as representatives of these "natural" democrats: "It is an enchanted, perverted, topsy-turvy world, in which Monsieur le Capital and Madame la Terre do their ghost-walking as social characters and at the same time directly as mere things."⁴⁴

To Marx, the great merit of classical economy was that it saw through, albeit incompletely, this "false appearance and illusion, this mutual independence and ossification of the various *social* elements of wealth, this personification of things and the conversion of production relations into entities, this religion of everyday life. It did so by reducing interest to a portion of profit and rent to the surplus above average profit, so that both of them converge in surplus-value; and by representing the process of circulation as a mere metamorphosis of forms, and finally reducing value and surplus-value of commodities to labour in the direct production process."⁴⁵ In this way the classical economists were able to get beyond the simple conceptions generated by the outward appearance of capitalism, penetrating the disguise of circulation and seeing behind it the process of production. But they themselves were trapped by their inability to properly distinguish capitalist production from other historically determinate forms; by taking as given and eternal the concepts generated by the outward appearance of capitalist production, they remained "more or less in the grip of the world of illusion which their criticism had dissolved."⁴⁶

The "world of illusion" Marx refers to represents the conceptions common to bourgeois thinkers; it covers not only the actual analysis of classical economists and of their targets, the vulgar economists, but also the conceptual framework within which they clash. Contained in their agreements and disagreements is an implicit philosophy, an implicit theory of history, an implicit anthropology, and so on.⁴⁷ Thus for Marx the critique of classical economy is at the same time a critique of its philosophy, its history, its anthropology. His analysis in *Capital* is necessarily predicated on all of these critiques; the vast distance between Marx and the classical economists, and hence between "value" in Marx and "value" in classical economy, can only be understood if one recognizes

that in solving the problems of the classical economists Marx also breaks with the (often implicit) bases on which they had formulated their questions.

Insofar as the problems to be dealt with center largely on the magnitude of Value, as is often the case in this paper, the real difference between Marx and Ricardo, the difference in their methods, tends to be hidden. Marx's superior ability to solve Ricardo's problems, is, as he himself insists, due to his ability to transcend "the world of illusion" in whose grip Ricardo remains. This superior ability is therefore only a symptom of the real difference between Marx and the classicals. But to those who either explicitly or implicitly reduce Marx to Ricardo, this symptom becomes the real difference itself. Marx becomes a clever, if somewhat mystical, post-Ricardian.

The very same process of reduction often operates even further in the comparison of Marx to neoclassical analysis. Not only are Marx and Ricardo lumped together, but both are reduced to the one-dimensional world of neoclassical analysis. Here, the very conception of the problem to be analyzed is usually neoclassical; even those who reject the flatness of its theory are very often forced to fight their battles on its terms, and hence *within* its general framework.

The so-called transformation problem is a classic example of all this. As it is usually presented, the central issue is one of the *calculation* of static prices of production, and the major point of contention is the presence or absence of a relationship between Marx's transformation procedure and the "correct" one.

I have, as much as possible, attempted to avoid this trap. Certainly the issue of calculation is relevant; but the *conception* of that-which-is-to-be-calculated comes first, for in that conception lies the superiority of Marx's method. The early part of this paper therefore attempts to provide the basis of Marx's conception of prices in general, and prices of production in particular. In this way we are able to resolve many of the confusions surrounding the so-called "transformation problem," as well as being able to demonstrate that the "correct" prices of production can be calculated from values *in the manner suggested by Marx's own transformation procedure.*

Mathematical Appendix

Lack of space makes it impossible to include the mathematical appendix to this reading. However, a copy of the appendix is available on request from the author of this reading.

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NOTES

1. P. A. Samuelson [Bibliography Reference 17], p. 400.
2. R. Meek, "Some Notes on the 'Transformation problem'," in Meek [12], p. 150.
3. See, for instance, Mandel [5], pp. 64-65. For a non-Marxist with a similar position, see Baumol [2].
4. Kuhn [4]. The term "paradigm break" is used figuratively here. The notion of a break between the problematic of classical economy and that of Marx, which Althusser [1] discusses, is considerably more precise.
5. J. Robinson [15], p. xi, and Ch. III, especially pp. 20-22.
6. Marxists who attempt to directly apply the abstract categories of Volume I of *Capital* are in a sense reverting to a Ricardian methodology. Marx is careful to point out that a basic flaw in Ricardo's method is that he "jumps" directly from the abstract (value) to the concrete (prices of production, rent, taxes) without tracing the intermediate connections. (Marx, *Theories of Surplus Value*, Part II, Ch. x, Sect. 4.6., p. 191.) It takes Marx three volumes to make that connection!
7. K. Marx, *A Contribution to the Critique of Political Economy*, p. 86.
8. Marx, *Capital*, Vol. I, Ch. 1, p. 75.
9. *Ibid.*, p. 43.
10. *Ibid.*, p. 46.
11. The distinction between concrete labor and abstract labor is similar to (though distinct from) the distinction between productive and unproductive labor. In both cases, the properties of Value and surplus-Value lie at the heart of the matter.

12. Marx [10].

13. Marx uses the term "socially necessary labor-time" in two senses. First, the average quantity of abstract labor-time required to produce a single commodity; this determines the magnitude of its Value (*Capital*, Vol. I, Ch. I, p. 39). Second, the total quantity of labor-time which would be required to produce a given type of commodity in the amount consistent with effective demand; if the actual quantity of labor-time, and hence the actual amount of the product, deviates from the above necessary amount, the market-price of the commodity would deviate from its regulating price. (*Capital*, Vol. III, Ch. xxxvii, p. 635). The first sense of socially necessary relates the commodity to its conditions of production. The second sense relates the mass of commodities to the expressed social need for them.

14. "... he [Adam Smith] confuses—as Ricardo also often does—labour, the *intrinsic* measure of value, with *money*, the *external measure* . . ." (Marx, *Theories of Surplus-Value*, Part II, Ch. xv, Section 2, p. 403).

15. Marx, *Capital*, Vol. I, p. 39.

16. The amount of labor-time socially necessary for the production of a commodity is determined by the average conditions of production of the average commodity. If the *average* conditions are altered, as in Marx's example of the introduction of power looms in weaving, then though existing cloth may have required more time than this new average, the magnitude of its value is still determined by the current average, precisely because all cloth of a given quality is treated alike in exchange. Similarly, if hand-loom weavers continue to hang on, then even though it may take them twice as long as the average to produce a bolt of cloth, the *value* of the cloth is nonetheless determined by the average. See Footnote 13 above, also.

17. The total social product is usually defined to include only the commodities newly produced in the given period of time. However, the existence of durable commodities implies that in any given period, "used" commodities and inventories of unsold products may enter exchange as commodities even though they have not been *produced* in that period. In the treatment of fixed constant capital, for instance, this issue becomes important. Marx himself suggests in the treatment of fixed constant capital that the portion which is not used up in the process of production should be counted as part of the annual product (*Capital*, Vol. I, Ch. IX, p. 213). Properly speaking this treatment of fixed constant capital requires Marx's theory of *rent*, and for that reason is not developed in this particular paper. It should be noted, however, that a Marxian treatment of this issue will not be identical with the von Neumann-Sraffa "joint product" approach.

18. Marx, *Capital*, Vol. I, pp. 47-48.

19. Marx, *Capital*, Vol. I, Ch. VII, Section 1.

20. Marx, *Capital*, Vol. II, Ch. VI, Sect. I and Sect. III, p. 149.

21. *Ibid.*, pp. 129-130.

22. *Ibid.*, Ch. V, p. 127. Of course, the circulation process adds to the *money price* of a commodity. As long as Value and price are kept conceptually separate, this presents no problems at all.

23. Marx, *Capital*, Vol. I, "Preface to the First German Edition," p. 10.

24. Marx, *Theories of Surplus-Value*, Part I, pp. 164-167.

25. *Ibid.*, p. 166.

26. *Ibid.*, Ch. X, Section A. See also pp. 106, 164, 174-176.

27. In *A Contribution to the Critique of Political Economy* [7], Marx begins by assuming that commodities exchange at Values, and then poses a series of objections to this assumption as a challenge to his own beginning. Of these, the "last and apparently the decisive objection" has to do with the fact that commodities with no Value can possess exchange-value. This problem, he says, "is solved in the theory of rent." (pp. 61-63)

28. Marx, *Capital*, Vol. I, Ch. IV, p. 147.

29. *Ibid.*, p. 155.

30. *Ibid.*, p. 147.

31. *Ibid.*, Ch. VI, p. 167.

32. If workers work only long enough to produce their means of subsistence and the commodities necessary to replace the means of production used up, then the only *final* (net) outputs of the system are the means of subsistence. As such the total time put in by workers is the time directly required to produce the means of subsistence, plus the time directly required to replace the means of production used up in producing these means of

subsistence. But the latter time is also the time *indirectly* required to produce the means of subsistence: hence the total time they work is the sum of the direct and indirect labor-time necessary to produce the means of subsistence—which of course is by definition the (labor) Value of these commodities, and hence the (labor) Value of the labor-power which is reproduced through their consumption.

Similarly, any surplus labor-time they work over and above this necessary labor-time is the labor Value of the surplus-product, surplus-Value.

33. See Meek's discussion of this (false) issue in [12], pp. 215-225.

34. Marx, *Capital*, Vol. III, Ch. IX, p. 157.

35. The *product* of each concrete labor-time has a definite quantity of Value—abstract or general labor-time—which is measured by the average quantity of labor-time required for the production of the average product of this type. As such, the actual quantity of labor time put in by a given worker, such as the hand-loom weaver of Footnote 13, counts only as the quantity of average value-added in the production of the average commodity.

36. Sraffa's initial point of reference is a set of prices which obtain when the rate of profit is zero. As is well known, in the simplest case relative prices are then proportional to relative Values. The subsequent movements of relative prices at alternate positive rates of profit which he then analyzes may be therefore viewed as the analysis of relative price-Value deviations at alternative levels of the rate of surplus-Value.

37. A. Emmanuel [3] provides a modern example of a neo-Smithian theory of price, in which the "labor theory" of price is valid when there is only one class of recipients of the net product (laborers), and the theory of prices of production is valid when there are two classes of recipients: capitalists and workers (see Emmanuel, *op. cit.*, Ch. 1, and Appendix V). This rejection of "labor" as a determinant of price has its roots in the confusion and difficulty surrounding the "transformation problem."

38. See Marx, *Capital*, Vol. I, Ch. 3, Section 2b, pp. 53-54.

39. Sweezy [21], Ch. V.

40. In addition to the transformation discussion in Volume III of *Capital*, see: *Theories of Surplus Value*, Part III, Ch. XX, p. 82 and pp. 167-168.

41. It has been proved in various places that, under given conditions of production, a rise in the rate of surplus-Value will increase the *money* rate of profit. Since it will also have the same effect on the *Value* rate of profit, it follows that the two move together (see, for instance, Medio [11], pp. 339-340; or Morishima [14], Ch. 6).

42. See Marx, *Capital*, Vol. I, Ch. 3; or *Contribution to the Critique of Political Economy*, Chapter 2.

43. Marx, *Capital*, Vol. III, Part III, Ch. XLVIII, p. 813.

44. *Ibid.*, p. 830.

45. *Ibid.*, p. 830. Emphasis added.

46. *Ibid.*, p. 830.

47. See Althusser's discussion of this in [1], Ch. 2-4.