Samuelson, Marx, and Their Latest Critics

And I am right
And you are right
And all is right as right can be.

—The Mikado

I

Paul Samuelson's 1971 contribution to this *Journal* on "The Marxian Notion of Exploitation" [4] has elicited, not unexpectedly, an unprecedented number of responses, ranging in tone from the scholarly to the vituperative. One response [1, 1972] which was both brief and early, has been published, with a reply by Samuelson [2, 1972]. In this comment, A. P. Lerner accused Samuelson of "unwarranted concessions" to "the over-thoroughly demolished labor theory of value" and of unintentional support to "true believers" as against "sophisticated economists" within the Marxian camp itself. Other comments, which were longer or were written later, attack Samuelson, in most cases, from the opposite direction—as a spokesman for the bourgeois establishment willfully blind to the merits of Marx.

Mark Perlman, in his editorial capacity, has been uncertain as to the proper reaction to these anti-Samuelson contributions. He has invited me, a more-or-less neutral eclectic (whose left head does not always know what his right head is thinking) less to comment on the accumulated commentaries than to outline, for economists uninitiated into "Marxism-Modernism" controversy, what this latest round is all about.

II

Samuelson has been feuding with Marx' ghost for half a generation—likewise with the worshippers at Marx' shrine, and with the judgment of many segments of the (admittedly segmented) "intellectual free market in ideas." Samuelson's major conclusion has been that, as an economist and particularly as an economic analyst in the sense of Schumpeter's *History of economic analysis,* Marx has been over-rated and was actually no more than "a minor post-Ricardian." This conclusion, however, is not involved here. Rather, Samuelson concerns himself at this time largely with certain subsidiary propositions:

1. The first of these propositions relates to the "transformation algorithm" between a set of *values* (defined as hours of socially-necessary and homogeneous labor time) and the corresponding set of long-run competitive equilibrium *prices.* Such an algorithm, if it exists, brings prices within the tent of the labor theory of value. (At the same time, its inverse brings labor values within the tent of bourgeois price theory.) Marx' particular transformation algorithm (and many others based upon it) Samuelson downgrades as following an illegitimate methodology [4, 1971, p. 400; see also 3, 1970]

> "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. *Voilà!* You have completed your transformation algorithm." By this technique one can "transform" from phlogiston to entropy; from Ptolemy to Copernicus; from Newton to Einstein; from Genesis to Darwin—and, from entropy to phlogiston. . . .

2. Samuelson's second proposition is that anything "static" the labor theory of value can do, competitive price theory can do better and more easily.[1] This includes the definition and measurement of labor "exploitation." It follows that the theoretical chapters of *Das Kapital,* Vol. I (which conform strictly to the labor theory of value) constitute a long and distracting detour in the Marxian argument.

[1] In other words, the labor theory of value is "Ptolemaic" and neoclassical economics is "Copernican" and not the other way around, as some of the commentators suggest (see Section VI below)

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3. Samuelson's third proposition extends his second to the dynamic case. It occurs in his reply to Lerner, rather than in his original article, and deals with exploitation only indirectly. It shows how, using the device of the factor-price frontier, one may derive the result that *either* the rate of profit *or* the real wage rate (or both) must rise over time in consequence of net capital accumulation or net technical progress [2, 1972, pp. 53–56]. This result Samuelson interprets as overthrowing at least one of Marx' two dynamic principles: "Marx' Law" of the falling rate of profit and the so-called principle of increasing misery of the working class.[2]

III

Has Samuelson demonstrated his trio of propositions? The first, clearly, is the most important to any treatment of "Marxian Economics as (Modern) Economics." Samuelson's proposition, as I rephrase the terse literary statement in II-3 above, dismisses Marx' transformation algorithm between competitive prices and labor values as so fundamentally defective as to render his procedure "taking an eraser and rubbing out" the labor theory of value when dealing with problems of competitive price and profit.

Transformation algorithms are tricky things. The simplest ones are one-to-one, order-preserving, proportionate, or linear transformations. When one shifts a set of measurements in feet to the corresponding set in inches, or a set of centigrade temperature readings to its Fahrenheit equivalent, he employs a transformation algorithm as naturally and unconsciously as Monsieur Jourdain spoke French prose. It appears, however, that no such equally simple algorithm exists for transforming a set of n labor values for the products of n departments of an economy into the corresponding set of n long-run competitive-equilibrium prices, while (1) reconciling the inter-departmental equality between rates of surplus value or exploitation (from the first set)[3] with the inter-departmental equality between the rates of profit (from the second set), and (2) allowing completely and consistently for the fact that the prices of department i (not merely labor values) are costs for departments 1, 2, . . ., n. The actual algorithm need not be linear. It need not even by order-preserving; that is, the price of a may exceed the price of b even though its labor value may be less, and so on.

Marx tried nobly with inadequate mathematical background—as had David Ricardo a generation before—to work out the transformation algorithm for his system. Unlike Ricardo, who never completely satisfied himself with what George Stigler would later call a "93 percent" labor theory of value, Marx thought he had succeeded. All but the truest of the true believers now agree that he had not. I rate his effort as a near miss; my own effort (a century later, with all that that implies) was no better and probably worse.[4] Samuelson is more rigorous and severe; following the input-output matrix-algebra solution of Francis Seton and Michio Morishima, he will take nothing less; a miss is

[2] In this discussion, Samuelson measures the real wage conventionally, in units of wage goods rather than of the number of labor hours embodied in those goods. More controversially, he identifies "increasing misery" with falling real wages, rather than a falling labor share in the national income or a rising severity of subjective malaise or "alienation."

[3] If a worker works 10 hours, receiving wages which will buy the product of 6 hours of labor, his labor power constitutes 6 hours of variable capital V; he also produces 4 hours of surplus value S. The Marxian rate of surplus value or rate of exploitation S' is in this case S/V or 66⅔ percent, but the rate of profit P' cannot be computed, even in labor hours, from the information given. Incidentally, his wage rate—in labor hours per labor hour, *i.e.*, as a pure number—is $V/(S+V)$ or 0.6. It also follows that uniformity of wage rates and of working days between departments requires equalization of rates of surplus value.

[4] Samuelson's comment on my published efforts [4, 1971, p. 428, note 38] is, alas, correct, except for a typographical error. (In the first equation, W_1 should read S_1.) I presently use the revision (in my notation, which differs from Samuelson's), for a 2-department case:

$$P' = \frac{p_iS_i + (p_i - p_1)C_i + (p_i - p_2)V_i}{p_1C_i + p_2V_i} \quad (i = 1, 2)$$

I believe this meets Samuelson's criticism (at the cost of decreased simplicity), but avoids the complexities of the Seton-Morishima solution. It is not, strictly speaking, a transformational algorithm, but raw material from which such an algorithm is obtainable by solving a general-equilibrium system for the P_1 terms.

as good as a mile,and the "near miss" category does not apparently exist. Hence the quotation cited in II-3.

Not only was Marx wrong; he was also ambiguous. At least (like the Bible, or Adam Smith, or Alfred Marshall, or Lord Keynes) he seems ambiguous *ex post*, for future generations trying to guess from his works his answers to questions he never answered.[5] The two examples most relevant to our present discussion are: (1) Did Marx mean the inter-departmental equality of *exploitation* rates to hold in money prices as well as in labor values? and (2) Did Marx constrain his system macroeconomically by requiring the weighted sum of values to equal the weighted sum of prices, or by requiring total surplus value to equal total money profit, or did he follow the subsequent usage of a "non-basic" commodity as a *numeraire* whose price was set arbitrarily at unity?

Agreeing that Marx' transformation algorithm was technically defective, let us now attempt a thought-experiment. Let us correlate, for n departments, the disequilibrium prices determined by Marx' transformation algorithm with the true equilibrium ones computed by the correct transformation algorithm. Should the correlation be negative, or should it be positive but not differ significantly from zero, Samuelson's proposition would be both correct and unexaggerated. If the correlation is positive and sufficiently close to unity, the Marxists and neo-Marxists would be right in downgrading Samuelson's contribution to a second- or third-order technical correction or hair-splitting exercise. It would be my expectation, originally inspired by none other than Samuelson himself[6] and affected by Stigler's estimate for the Ricardian system, that the Marxists and neo-Marxists will be more nearly correct.

IV

Assume the existence of an impeccable transformation algorithm—due to Marx, Samuelson, Morishima, or the Great White Whale—between the labor theory of value and conventional price theory. It operates like a perfect instant dictionary or simultaneous translator or black box between the English and Russian languages. The question raised by Samuelson's second proposition, relating primarily to economic statics, is whether such a perfect dictionary-translator-black box renders either language obsolete, and if so which one?

It would be clear to the representative Englishman or American, without special interest in Russian linguistics or Russian poetry, that after such an invention he should stick to English and forget about learning Russian. His representative Russian counterpart would, one presumes, reach precisely the opposite conclusion. To one brought up like Samuelson and me on neo-classical economics, it is "obvious" that we already know the easier Copernican system, and that the labor theory of value is the complex Ptolemaic one. In the same way, we "know" that the irrational irregularities of English usage are easier than the Byzantine complexities of Russian grammar. To one brought

[5] Other examples of Marxian ambiguity, which have disturbed friendly, hostile, and neutral scholars alike, include the following:
1. Did Marx consider "alienation" a specific consequence of capitalism or of commodity production generally? If the latter, could it lessen significantly, short of the passage to full communism?
2. What did Marx mean by "increasing misery" (discussed in Note 2, above).
3. How seriously did Marx consider the Ricardo-Lassalle "iron law of wages" as a long-run determinant of the equilibrium wage rate?
4. Did Marx measure the "organic composition of capital" by C/V or $C/(C+V)$? Did he believe the choice made any substantive difference?
5. Did Marx consider the division of surplus value (between investment and luxury consumption) a technological or institutional given, or subject to significant influence by relative prices and profit rates?
6. How did Marx consider the falling rate of profit and the inadequate purchasing power of the masses (liquidation and realization crises) to interact in producing capitalist decline?
7. Did Marx see the overthrow of capitalism as following only from revolution unleashed by the forces mentioned in (6)? Or did he see these forces as setting only an outer limit for the timing of the revolution? Or did he believe successful revolution might occur at any time, regardless of the "objective forces" of (6)?

[6] In the mid-'30s, Samuelson was an undergraduate operating at the doctoral-candidate level and I was *vice versa*. He opened my eyes to the quantitative plausibility of the maligned labor theory of value by pointing out the sample correlation of over .90 between "labor" and "product" in his own (unpublished) experiments with the Cobb-Douglas function in its original 1928 version.

up like our Russian contemporaries on Marxist political economy, both conclusions are equally obviously wrong, and so where are we?

If there is a semi-objective test as between the two systems of economic analysis, it may involve looking at "converts" from one to the other. I have known a number, but hardly a random sample, in both directions. I note two characteristics, both of which may be due to sampling error. (1) Most converts in each direction claim to be shedding pedantry, mysticism, and dogma, in favor of a more obvious, simple, and relevant way of looking at the world. Implication: Neutral. (2) Of those shifting from the labor theory of value to neo-classicism on the above grounds, the preponderant majority have the advantage of intuitive mathematical ability, high-level mathematical training, or both; the same is not true for converts in the other direction, who tend if anything toward "non-rational ways of knowing." Implication: Proposition possibly disconfirmed(?).

One of Samuelson's critics makes an additional point, with which I should disagree. He considers the concept of "exploitation" in its Marxian sense incompatible with conventional economics. (See below, Section VI-2). It is true that Pigou and his successors propose restricting the term to imperfectly competitive situations. But one can also define exploitation of labor in a Marx-like manner, as a situation in which the average wage is less than the average value added per worker.[7] If one does so, what is lost but rhetoric?

Coexistence within the neo-classical framework of a multitude of "exploitation" concepts and definitions does, of course, impress upon the student the subjective nature of the term. The student may even agree with the frequently-quoted conclusion that exploitation has ceased to be a noun and has become a noise. Should this be charged against price theory as a defect?

V

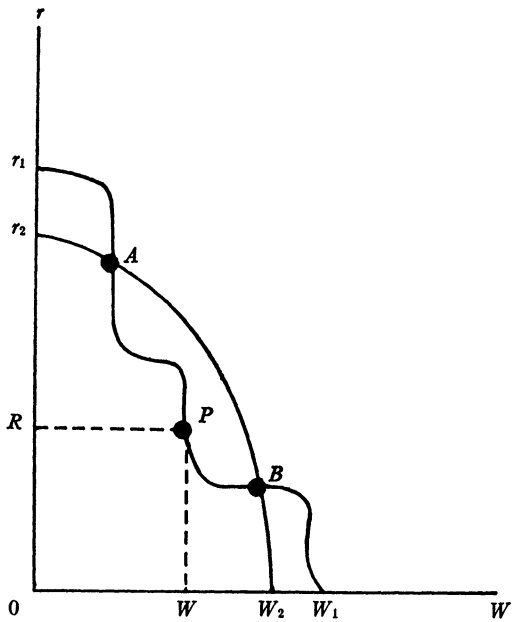
What we have called Samuelson's "third proposition" is correct, except that it leaves out of account pathological and special cases which may become important in the future. The relevance of this proposition is another matter.

Let us measure, on the horizontal axis of a diagram, the average wage rate w, and on the vertical axis, the average profit rate r of the same economy. Let us assume a constant employment level of both labor and capital. At time t_1, if labor were available free of charge (and could live on air), capitalists would obtain the economy's entire net product. and their profit rate would be r_1. If, on the other hand, capital were available free of charge as manna, leets, or meccano sets from Heaven, the entire product would go to labor and the average wage would be w_1. As we raise our notional wage rate above zero, the residual profit rate wonld fall, and vice versa. The line r_1w_1 of the diagram would, therefore, slope downward as drawn, although its convexity is indeterminate.

The techniques used at t_1 in our model economy would normally vary from point to point along the wavy-line r_1w_1 function. Probably but not necessarily, the r_1-vicinity techniques would be more labor-intensive than the w_1-vicinity techniques, because labor would be relatively cheaper near r_1 and capital relatively cheaper near w_1. (Numerous names have been given the wavy-line, downward-sloping function itself. One such name, given by Samuelson, has been "factor-price frontier.")

We now suppose a new bundle of techniques (blue-prints) available, resulting from innovation, capital accumulation, population growth, and-or net discovery of resources. This new bundle by itself yields a new factor-price frontier r_2w_2. If the new techniques are to be viable, the new frontier must lie outside the old one—must yield higher profits for a given wage rate, or vice versa—for *part* of the length of r_1w_1, but not necessarily for all of it. The two frontiers may cross any number of times;

[7] One can even denote as "surplus value" per worker the difference between these two quantities, and as a "rate of surplus value" the ratio of the surplus value per worker to the average wage. One "radical" definition of exploitation, incidentally, is not Marxist at all, but dominates the thinking of the man on the left side of the street. It can be phrased: a worker is exploited if his wage is insufficient to support himself and three dependents in "decent" fashion. A commonly-mentioned figure in 1972 America is $6500 per year.



we assume two crossings at A and at B. Then the new factor-price frontier at t_2 is not r_2w_2 but r_1ABw_1. The old techniques, in other words, are not forgotten but remain available.

Consider as our starting position some point P on r_1w_1, which is obsolescent at t_2. Samuelson's argument is that from P no rational market economy will move to the Southwest, lowering *both* r and w respectively. One of these may fall, but not both. In terms of Marx' laws, therefore, either the falling rate of profit or the principle of increasing misery (in Samuelson's interpretation) must be wrong, and both may be.

Yes, but—suppose the capitalist world at t_1 is limited to the U.S. and Canada, while at t_2 South Asia is added; might not the world weighted average r_2w_2 lie wholly within r_1w_1? Or if net resources decline, or the Bomb falls, or skills and blue prints are lost, or the Black Death returns, or California slides into the Pacific Ocean, or . . . some other super-calamity strikes, of the type imagined

When you're lying awake with a dismal headache
And repose is tabooed by anxiety

(or portrayed by ecologists on lecture platforms and Forresterians to the Club of Rome).

Furthermore, to repeat, this particular proposition, assuming its truth, loses much of its force if the principle of increasing misery means anything other than the falling real wage level which Samuelson, quite understandably, supposes it to mean.

VI

It is high time for our six unpublished comments to be mentioned individually. (I have mined them, without adequate acknowledgement, in Section IV). The six authors are, in alphabetical order: Gordon Bjørnson (La Mesa, Cal.); Jean Cartelier (Amiens, France); Bruno Jossa (Naples, Italy), David Laibman (New York, N.Y.); Paul Massick (Cambridge, Mass.); Murray Wolfson (Corvallis, Ore., *pro tempore* Durham, U.K.).

The six consider different points, which seldom overlap. Space limits me to condensing, and therefore distorting, their arguments as I understand them, and sometimes including a sentence or two of my own. Copies of all six comments are on file at this *Journal's* office in Pittsburgh. The ordering below is, again, alphabetical.

1. Bjornson, a monetary economist, faults Marx for slighting money in his theory of market price determination, and also faults Samuelson for letting the slip pass. In my view, his argument is based on a misunderstanding of Marx' "price of production" concept. Marx, like most microeconomists before and after him, was assuming some one commodity as standard of value, or *numeraire.* His absolute prices of production are "real prices" or "corn prices" rather than money prices.

2. Cartelier presents a beautifully clear and brief summary of the issues between Samuelson and the Marxists. He also makes the Mill (and now the Sraffa) point that, unlike the laws of value and production, the determinants of income distribution are "of human institution solely." This whole line of argument is overlooked, Cartelier maintains, when one considers exploitation through the glass of neoclassical price theory, in which production and distribution are determined simultaneously. Value theory in some form, such as the labor theory, seems to Cartelier requisite for raising, let alone carrying forward, the Sraffa challenge to orthodoxy.

3. Jossa raises a terminological caveat. When Samuelson talks of labor as a determinant of cost and price, he seems to be talking about labor hours ($V + S$) rather than variable capital (V) alone. When, in his algebraic derivations, Samuelson augments "labor coefficients" to take account of surplus value, Jossa feels he is treating surplus value as an additional element in cost, and confusing the labor theory of value with a generalized cost theory of the sort Marx calls "Vulgar Economy."

4. Laibman makes two points. His first point is that, since there exists a transformation algorithm between labor values and competitive prices—his own suggested algorithm stressing an invariant wage rate—the technical slips in Marx' original algorithm are of less significance than Samuelson supposes. Laibman's second point is that the labor value presentation is significant not for technical superiority but for its indispensability "to the understanding of the price system, in the sense of establishing economic categories as social categories expressive of social relations and structure."

5. Mattick is a Marxian labor economist. In the Marxian schema of general social science, he says value theory is logically prior to price theory. Price theory makes no sense without value theory, but the converse does not hold: "from a Marxian point of view, there is no way of understanding price formation except by way of the value concept." He emphasizes the argument that for Marx' purposes of discovering capitalist laws of motion, the divergence of relative prices from relative values is a meaningless epiphenomenon. He interprets Samuelson's transformation algorithm as proving that one *cannot* obtain price theory from value theory, whereas they would seem to prove the precise opposite; if Marx could not obtain price theory, it was because his particular algorithm was defective. As for exploitation, Mattick criticizes Samuelson as charging that workers exploit themselves by saving too little, and as ignoring the reduction of labor income (requisite for saving) by a capitalist class monopoly of the means of production.[8]

[8] Mattick's comment has been published as an independent paper in the Fall 1972 issue of *Science and Society*. Another commentary (by Gayle Southworth, and not submitted here) appears in the Fall 1972 issue of *The Review of Radical Political Economics*.

6. Wolfson's contribution is both long and ambitious.[9] It may also develop into an independent paper on the transformation algorithm. Two of Wolfson's points are: (1) A transformation algorithm should yield uniform rates of surplus value (as well as of profit) in price terms; (2) The choice of technique which itself determines the input-output coefficients (for the transformation algorithm in Samuelson's presentation) may be class-dominated, so that the input-output coefficients themselves need not be taken as fixed. (Capitalists choose techniques which maximize total profits, while workers would prefer techniques which maximize their own incomes).

It may not be possible to impose so many restrictions simultaneously on any transformation algorithm. As a fair-to-middling high school geometry student, I was dressed down every other week or so by my teacher for what she called "overworking a line," or assigning to this line more properties than I had justified previously.[10] At times, in reading Wolfson's manuscript, I have wondered whether he might not be "overworking a transformation algorithm," a higher-level instance of the same mistake. Events may well prove me wrong, but the possibility of overwork should be kept in mind at this stage.

MARTIN BRONFENBRENNER
Duke University

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[9] It is also the only one I have been able to discuss personally with its author.

[10] Example: From some arbitrary point P, drop a perpendicular bisector to the line AB.