

A Critique of the Standard Account of the Socialist Calculation Debate

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As the Marxian philosopher Louis Althusser used to put it, no reading is innocent. The meaning a reader derives from a particular piece of scholarly literature is unavoidably influenced by his premises and analytical framework. When the underlying theoretical framework of the reader differs sharply from that of the writers under examination the result is likely to be profound misunderstanding. Few instances of "non-innocent" reading can match the distortion that the standard account of the socialist calculation debate has imparted to that famous controversy. Many of the most influential early readers of the debate later corrected at least part of their initial errors of interpretation. However, the version of the history of thought of the debate that has come to dominate the profession still retains most of those initial errors. This essay will survey the origins and development of the standard view of the socialist controversy, offering suggestions along the way about how and why this interpretation seriously misreads some of the arguments of the debate.

The two sides of this controversy can be designated as the "Austrians" who issued the challenge to socialism—notably Ludwig Mises, Friedrich Hayek and Lionel Robbins¹—and, on the opposite side, the "neoclassicals" who defended one form or another of socialism from this challenge—primarily the so-called "market socialists" Oskar Lange, H. D. Dickinson, Fred M. Taylor, Abba P. Lerner, and E. F. M. Durbin, and, from a somewhat different point of view, Maurice Dobb.²

The entire debate concentrated on attempts to answer the initial challenge by Mises that rational central planning of the vast and complex modern economy would be "impossible." Without private ownership of the means of production, he argued, there could be no competitive market for these capital goods, and without markets, there could be no prices for the various scarce means of production. Lacking the guide of market prices, the central planners would be "in the dark" as to the *relative* scarcity of different components of the capital structure and so would invariably fail to combine and use them efficiently.

The famous "market-socialist" response by Lange is generally under-

stood to have effectively answered Mises by first admitting the indispensability of "markets" and "prices," and by then arguing that these could be reconciled with "public" or "common" ownership of the means of production. Lange considered the Walrasian simultaneous-equation formulation that had been advanced by Enrico Barone in 1908 to be a rigorous and conclusive answer to Mises' claim that socialism was "theoretically impossible." He invoked Fred Taylor's "trial and error" method³ as a refutation of the Hayek-Robbins thesis that socialism, though theoretically possible, was impracticable.

However, this entire elaborate answer to the Austrian challenge is premised upon a particular neoclassical reading of that challenge. Clearly if, as this paper contends, the neoclassicals, including Lange himself, fundamentally misunderstood the Austrian challenge they are supposed to have refuted, the challenge ought to be considered anew. However, before we can confidently embark on such a reconsideration, we should attempt to offer a plausible explanation of how the economics profession came to misunderstand the calculation debate so thoroughly.

This misunderstanding, we will argue, is rooted in basic differences between the "Austrian" and "neoclassical" paradigms which were not yet evident to either side at the time of the debate, but which have since become clarified, especially in Professor Kirzner's Austrian critique of neoclassical choice theory.⁴ These implicit differences made it easy for neoclassical participants and readers of the debate to attach inappropriate neoclassical meanings to the concepts the Austrians were employing. In particular the concepts "economic theory" (misunderstood to mean static equilibrium theory), "efficiency" (mistaken for "Pareto optimality"), "ownership" (taken to mean formal legal title, rather than *de facto* control, over resources), and "competition" (read as the state of perfect competition rather than as a process) were "lost in the translation" by the neoclassical historians of thought of the debate.

We begin by outlining (1) the major elements of the standard account of the debate, documenting in footnotes that this interpretation thoroughly permeates contemporary economics, and (2) contrasting elements of what we will call the "alternative" interpretation. We will then conduct a critique of this standard account, selecting seven representative interpreters of the debate (including some of the most respected scholars in economics) for analysis. It will be our contention that, despite the accumulated weight of scholarly authority associated with such names as Joseph Schumpeter, Abram Bergson, Benjamin Ward, and Frank Knight, this prevailing interpretation ought to be rejected in favor of an alternative, "revisionist" interpretation which carries the authority of a rather less famous name like that of Trygve Hoff.⁵ It would seem that this is an ambitious enough task for one paper; thus it is hoped that we will be forgiven for not venturing to offer a thoroughgoing reexamination of the calculation debate from this

alternative perspective. We only intend to demonstrate that the generally accepted view of the debate is riddled with errors and thus urgently requires such a thorough reexamination.

The Two Interpretations of the Debate in Outline

1) *The Standard Account of the Debate*

- a) *pre-1920*: Before the debate, it is generally agreed, very little attention had been paid to the economics of socialism.⁶ Much of what did exist in such literature failed to realize that some form of market prices and some use of money were indispensable for rational planning. The failure of the War Communism period in the Soviet Union is often cited as evidence that many early socialists erred in underestimating the importance of prices for central planning.⁷ The view is occasionally expressed that in actuality this conception of socialism without prices was a straw man fabricated by Mises and Hayek and that it was never seriously held by socialists.⁸ The more common view, however, is that at least some early socialists had to be taught their economics by neo-classical economists. In any case, few modern socialists believe that prices, money, and markets (at least for consumer goods and labor) can be dispensed with until scarcity itself is eliminated.⁹
- b) *Mises*: Mises' calculation argument is generally credited with having shaken socialists out of their neglect of the economics of planning, but few commentators on the debate are willing to grant him much more than this stimulative accomplishment.¹⁰ His argument is usually interpreted in neoclassical terms, as a denial of the "logical credentials" of socialism,¹¹ and thus as an assertion that rational economic calculation is not only "impracticable," but also "theoretically" impossible without private ownership of the means of production, even under static conditions.¹² Some discussants say that the practical experience of socialist planning in the USSR refutes Mises' claim,¹³ many claim that either Lange's or Barone's argument conclusively counters Mises', but there is a remarkably wide consensus that he was wrong.¹⁴
- c) *equation-solving*: It is generally held that, before Mises issued his challenge, Barone's equilibrium argument had already established the "theoretical" possibility of socialism by showing that in principle the Central Planning Board (CPB) could solve a set of simultaneous equations, in much the same way as is done in practice by the market. The same general equilibrium logic of choice which Walras had developed to analyze capitalism could be applied to socialism.¹⁵
- d) *impracticability*: The view is common that Hayek's and Robbins' arguments were substantially different from Mises', constituting a retreat to the acceptance of the theoretical possibility, but a denial of the practicability of socialism. The essence of their argument is taken to

be that solving Barone's equations is not feasible as a method of central planning.¹⁶ Hayek is sometimes also credited with having raised some important issues concerning the centralization of knowledge, risk, and managerial incentives, though these are generally held as considerations to be taken into account by central planners rather than as arguments against central planning.

- e) *trial and error*: It is widely held that the market-socialists, particularly Lange, met Mises on his own terms¹⁷ and thoroughly proved that Mises and his school were wrong.¹⁸ They demonstrated that a determinate equilibrium can be defined for socialism as Barone had shown, and that, contrary to Hayek and Robbins, the CPB could "find" this equilibrium set of prices by a process of trial and error. Thus it is claimed that socialism is practicable in principle.¹⁹
- f) *conclusion*: The implication that is usually drawn from the debate is that economic theory *per se* cannot decide the great controversy between capitalism and socialism. Neither system is as praiseworthy in practice as the debaters depicted them in theory.²⁰ The efficiency criteria of the debate were developed under strictly static welfare assumptions,²¹ while under more realistic, non-static assumptions neither system can boast the virtues of Pareto-optimality.²² Most economists agree that there are strengths and weaknesses of each system. Some stress that market-socialism has the potential of improving upon capitalism;²³ others emphasize that, though socialism is theoretically unassailable, it nevertheless has other, major deficiencies deemed to be outside the province of economic theory, notably the danger of bureaucratization.²⁴ Most economists criticize both sides of the famous controversy for dealing on too abstract a level and for comparing the idealization of one system with the practical weaknesses of its opposite.²⁵ A related reaction to the debate is the argument that the participants focused too much on alternative "Isms," that the controversy was a stale quarrel over unworkable extremes—"plan vs. market"—while contemporary economists agree that both institutions are indispensable.²⁶ Modern dispute is only over the proper mix of the two.²⁷
- g) *beyond the debate*: The most significant element in the standard account of the calculation debate is the view that the debate was marred by its exclusive attention to "statics." Two of the major subsequent developments in socialist economic theory can be understood as differing attempts to advance central planning theory beyond this static equilibrium context. Thus one branch of modern socialist economics, "planometrics," seeks to produce mathematical procedures for getting prices to approach their equilibrium values, as against the debate's focus on formal conditions for static equilibrium.²⁸ Another branch, which we will call "macroplanning," seeks to examine ways to

control and improve the overall growth rate of the economy and to influence the direction of new investment in broad macroeconomic categories of production toward this end, as against the debate's emphasis on static microeconomic efficiency.²⁹ The consensus seems to be that, with these "dynamic" developments, central planning theory has rid itself of its earlier static perspective.

2) *The Alternative Account of the Debate*

- a) *pre-1920*: The standard view is not sufficiently cognizant of the extent to which the Marxian model of socialism was dominant—if not particularly explicit—in socialist economics before 1920. It is true that most socialists avoided any direct discussion of the workings of proposed socialist institutions, but a very definite idea of their conception of central planning is nonetheless evident from their critique of capitalism. Both the dismal failure of the attempt to abolish markets and money during the War Communism period in the USSR, and the arguments of Mises and Hayek, make this early idea of socialism very difficult to defend today. However, this largely rejected early vision of central planning is the most consistent and important of any that have been developed, and therefore its abandonment marks a far more serious retreat by socialists than the standard view suggests.
- b) *Mises*: Mises was not denying the validity of the "pure logic of choice" for socialism; he was, on the contrary, insisting that central planners *must* find a way to apply this kind of logic to socialism or they will be doomed to calculational chaos and be unable to use resources efficiently. By our interpretation Mises was definitely *not* making an equilibrium argument and was aware that under static assumptions there is no problem for central planning. His discussion was primarily directed at proponents of Marxian socialism and was thus centered mainly on the argument that prices (and not some objective value measure such as labor hours) are necessary for rational calculation. However, contrary to the standard view, his argument is fully applicable to all forms of socialism which advocate common or state ownership of the means of production. Properly interpreted, this challenge has yet to be adequately answered by advocates of central planning.
- c) *equation-solving*: Barone's argument is fully consistent with, but much less complete than, Mises' challenge. It simply establishes the formal similarity between socialism and capitalism under static conditions: if the number of (independent) equations equals the number of unknowns the system is "determinate". Mises maintained that such equations were inapplicable to the real world of continuous change even if, given a powerful enough computer, they were solvable.
- d) *impracticability*: The central arguments advanced by Hayek and Robbins did not constitute a "retreat" from Mises, but rather a clarification directing the challenge to the later versions of central planning

via "equation-solving" and "trial and error." Although comments by both Hayek and Robbins about computational difficulties of the equation-solving approach were responsible for misleading interpretations of their arguments, in fact their main contributions were fully consistent with Mises' challenge and were similarly unanswered.

- e) *trial and error*: The "trial and error" response to the Austrians was based on a close analogy with the perfect competition model which itself does not explain dynamic price adjustment under realistic conditions of change. Thus, contrary to the standard view, Lange's model does not constitute an answer to the Misesian argument.
- f) *conclusion*: The usual conclusion that economic theory cannot decide any important issues in comparative economics is valid only if "economic theory" is seen as strictly static equilibrium analysis. The broader Austrian conception of an economic theory that deals with change can shed considerable light on comparative economics issues and can help us to understand many of the practical problems of the mixed economies of both the East and the West. The Austrians did not limit discussion to the extreme "Isms," but explicitly contrasted mixed economy models with "pure" capitalism and socialism.
- g) *beyond the debate*: The modern "planometric" and "macroplanning" attempts to advance central planning theory beyond the static framework of the early market-socialists have retained essentially static assumptions in their analyses.

Joseph Schumpeter

The interpretation of the calculation debate that has been offered by Joseph Schumpeter, deservedly considered among the greatest historians of thought in economics and one of the most influential contributors to comparative economics, will be an appropriate, authoritative starting point for our survey. Although he devoted only a few pages—in the "Equilibrium" chapter—of his monumental *History of Economic Analysis* to the issue, a great deal of his *Capitalism, Socialism and Democracy*³⁰ (especially chapter XVI) discusses the debate specifically. Schumpeter's account not only conforms with the standard view of the controversy, but it has also been extremely influential in the development of the consensus around this view.

Schumpeter sharply divides the debate into three separate questions concerning, respectively, the theoretical possibility, the practicability in principle, and the relative efficiency, of socialism from an economic point of view. He begins by asking "whether or not there is anything wrong with the pure logic of a socialist economy." It is clear from his discussion that he is referring to the question of the determinateness of a static equilibrium formulation for a socialist society. He poses the question whether the data and

rules of rational behavior under socialism would still "yield equations which are independent, compatible—i.e., free from contradiction—and sufficient in number to determine uniquely the unknowns of the problem before the central board or ministry of production."³¹

His answer to this question is an unqualified yes. Indeed he registers some surprise that anyone could have ever denied it and that orthodox socialists failed to produce an answer to it until they were "taught their business" by bourgeois economists such as Pareto, Barone, and Wieser. At this time Schumpeter unambiguously describes Mises as "the only authority standing for denial that we need to mention," although in his later work he was to express some doubt about this interpretation.³²

Schumpeter believes it to be clear that "economic rationality" can be attained without actual markets in capital resources and that "this follows from the elementary proposition that consumers, in evaluating ("demanding") consumers' goods, *ipso facto* also evaluate the means of production which enter into the production of those goods."³³ He formally derives demand functions for consumers goods and supply functions of labor and saving, and then confidently asserts that "the reader will have no great difficulty in seeing how, guided by these functions and by its own technological knowledge, the ministry will cause appropriate quantities of consumers' and investment goods to be produced."³⁴ The ministry can dispense with a capital market by "allocating productive resources—all of which are under its control—to . . . industrial managements according to certain rules": (1) they "must produce as economically as possible"; (2) the planning apparatus "declares itself ready to 'sell' to any industrial management unlimited quantities of producers' goods and services at stated 'prices'"; and (3) the managements assure that "production in all lines should be such as to make 'prices' equal (not merely proportional) to marginal costs."³⁵

Under these conditions the task of each industrial board is "uniquely determined."

Exactly as today every firm in a perfectly competitive industry knows what and how much to produce and how to produce it as soon as technical possibilities, reactions of consumers (their tastes and incomes) and prices of means of production are given, so the industrial managements in our socialist commonwealth would know what to produce, how to produce and what factor quantities to "buy" from the central board as soon as the consumers have revealed their "demands."³⁶

Thus under socialism the mechanism for the realization of the equilibrium solution is the Central Planning Board (the CPB) rather than a market in capital goods. The ministry of production "has simply to set a single price on every kind and quality of producers' goods . . . and to see to it that that price exactly 'clears the market.'" On a purely theoretical level Schumpeter concludes that there are no grounds for doubting the "determinateness" or "formal rationality" of the socialist system.³⁷

Next Schumpeter endeavors to meet the "practical impossibility" argument to which he says Hayek and Robbins retired "after having accepted defeat on the purely logical issue." He believes he can "easily dispose" of this argument as well, which he dispatches with a cursory remark that "a glance at our solution of the theoretical problem will satisfy the reader that it is eminently operational." The ministry of planning, he asserts, "would command information sufficient to enable it to come at first throw fairly close to the correct quantities of output in the major lines of production, and the rest would be a matter of adjustments by informed trial and error." In fact Schumpeter, going further in this respect than the standard view generally does, agrees with Lange that the "market-socialist" solution to the Austrian challenge would not only be *as possible* but would be even "easier" than the capitalist one. In particular a whole class of "uncertainties" that plague capitalists concerning "the reaction of one's actual and potential competitors and about how general business situations are going to shape" can be expected to "vanish almost completely" under socialism.³⁸ The more standard view on this issue is that while socialism can eliminate some kinds of uncertainties relative to capitalism it may in practice aggravate other kinds.

Having established, at least to his own satisfaction, that socialism is both theoretically and practically possible, Schumpeter goes on to his third consideration: the relative efficiency of socialism as compared with capitalism. He holds that "pure theory contributes little to the solution of these problems"; it merely "helps us to posit them correctly and to narrow the range of justifiable difference of opinion."³⁹ He admits, as do most commentators on the debate, that this sort of formal demonstration does not, in itself, "mean very much."⁴⁰ Nonetheless he seems to believe an answer to this question of relative efficiency again follows trivially from his previous discussion: "we need only glance at the implications of our proof of the possibility and practicability of the socialist schema in order to realize that there is a strong case for believing in its superior economic efficiency."⁴¹

The bulk of Schumpeter's considerable analytical energies concerning these issues seems to have been expended on the first, purely theoretical equilibrium argument. His conviction that the second and third arguments follow directly from "glances" at the preceding discussion places perhaps a bit more weight on this first argument than it will sustain. But, in his disproportionate attention to the equilibrium argument he is fully within a tradition that has been consistently observed both by the market-socialist participants in the calculation debate and by most of its later historians.

The discussions on the debate in his later book (*History of Economic Analysis*) while still conforming in most respects to the standard view, retreated substantially from his earlier interpretation of Mises, as well as from the implication of this view, that Hayek and Robbins were arguing something substantially different. In one place he notes that "it is sometimes

not easy to tell whether the...critics of the socialist plan, especially von Mises, really meant to deny the validity of the Pareto-Barone result." In another place, after establishing what he calls the "logical credentials of socialism," he refers in a footnote to another "purely theoretical" argument (not so designated in his earlier discussion), which he attributes to Mises as well as to Hayek and Robbins: "that, although there *exists* a determined set of solutions of the equations that describe the statics of a socialist commonwealth, there is, without private property in means of production, no mechanism by which to *realise* them." He pronounces this theoretical argument "definitely wrong" for the same reason he rejected the "practical impossibility" argument. The solutions to the Walrasian equations can be "realised" by "the method of trial and error."⁴²

Although Schumpeter still considered the Austrians' theoretical critique of socialism to have been decisively met by Lange, it is significant that in his later discussion he was no longer willing to confidently attribute a purely static equilibrium argument to Mises, according to which interpretation Mises was refuted by earlier writers such as Barone. Unfortunately the standard history has continued to perpetuate Schumpeter's earlier assessment of Mises which we will argue is demonstrably incorrect.

Abram Bergson

Abram Bergson's essay, "Socialist Economics," has been by far the most commonly referenced secondary source on the calculation debate. Schumpeter was to say of this essay that its description of the development of the pure theory of socialism "leaves nothing to be desired,"⁴³ while Benjamin Ward was to refer to the socialist controversy as having "formally ended with Bergson's summary of the issues."⁴⁴

Like the later Schumpeter, Bergson was unwilling to completely and uncritically adopt Lange's equilibrium interpretation of Mises' argument, but Bergson definitely leaned strongly toward that view. Concerning the questions raised by Mises "as to whether socialism can work at all, and how well," Bergson begins his article by pointing out: "By now it seems generally agreed that the argument on these questions advanced by Mises himself, at least according to one interpretation, is without much force."⁴⁵ He suggests that the later emphasis of critics of socialism on the question of the possible incompatibility of planning with political freedom "has the appearance of a tactical maneuver to bolster a cause which Mises' theories have been found inadequate to sustain."⁴⁶ Thus Bergson appears to accept both Lange's interpretation and refutation of Mises.

In a section entitled "The Ends," Bergson lays out some issues concerning "the formulation of a scale of values, on the basis of which the alternative uses of resources are to be evaluated." Among these are (1) the question of the extent to which either consumer sovereignty or the CPB should

dictate the ends of social production, and (2) the controversy over whether individual preferences are fundamentally incommensurable or can be meaningfully aggregated into a social welfare function which the CPB could work to optimize.⁴⁷ The first of these, though important for other reasons, is irrelevant to the calculation debate, since Mises' challenge, as he explicitly noted, applies whether the ultimate preferences are those of a single dictator or of a free consumers' goods market. Likewise, the second issue over interpersonal utility comparison, while undoubtedly an important matter for economic theory (about which Mises took a very definite position), is not crucial to the calculation argument. Even an economy possessed of "utilometers" enabling an accurate and meaningful cardinal measurement of everybody's preferences would still face the problem of imputing these final demands into the higher stages of production.

The next section of Bergson's article, significantly entitled "Optimum Conditions," begins to approach the calculation argument in the standard neoclassical manner.

In accord with familiar theoretic procedure, technical knowledge and tastes are taken as given. . . . On this basis it is possible to derive from the given ends a series of conditions ("equations") which must be satisfied if the optimum allocation is to be achieved. The optimum conditions are sufficient in number to determine the amounts of each and every sort of goods and services allocated to each and every use (the "unknowns").⁴⁸

Bergson thus presents the formal case for the determinateness of a socialist equilibrium, giving some indication that this comprises a rather abstract "theoretical" argument based on some unrealistic assumptions rather than any sort of proof of practicability.

Thus, if the scale of values implied by the ends were known in complete detail (that is, if all the utility functions were known), and detailed information were available on techniques and on the stocks of resources on hand, it would be possible at least theoretically to solve this system of equations for the concrete values of all the unknowns.⁴⁹

Bergson then goes on to summarize the subsequent neoclassical contributions to the debate which have been "concerned chiefly to formulate explicitly the optimum conditions . . . and to develop the analysis to deal with various complexities." As with Schumpeter we have a preoccupation with equilibrium analysis, the refinement of the "optimum conditions" such as that the marginal rate of substitution for each pair of consumers' goods must be the same for all households, that "factors must be combined in a technologically optimum manner," and that the "marginal value productivity of each factor must be the same in every industry."⁵⁰ A considerable literature in welfare economics—to which Bergson had made a seminal contribution—has exhaustively studied these equilibrium conditions and has

undoubtedly promoted clarity in our formal depictions of both capitalist and socialist equilibria.⁵¹ The question remains, however, how producers would know what the "technologically optimum manner" of production or the "marginal value productivity of each factor" is, without a competitive capital market. Assuming technology to be "given" may be a legitimate analytical procedure within an equilibrium framework, but it crucially begs the whole question of the calculation debate.

In his section IV Bergson specifically addresses the issue of the contributions this abstract equilibrium analysis can make to the central planners' task. First, this framework might "assist the Board to formulate a conceptually satisfactory scale of values to guide the economy, one that is internally consistent and in principle at least covers the bill." Secondly, the analysis "establishes the implications of the given ends," i.e., the optimum conditions, which would be a "prerequisite for the construction of a planning scheme which might approximate the given ends in practice." It could be said that Mises' whole argument was essentially that, in practice, noncompeting producers could not determine the complex implications of the consumer demands with respect to the more efficient applications of the means of production toward those ends. But Bergson, at least in this article, seems to grossly oversimplify the practical difficulties involved in this imputation process.

It happens that the criteria for the optimum that have been set forth are conceptually simple and, for the cases where small adjustments are possible, require for their application only facts which actually might be experienced in a given situation (the marginal rates of substitution, marginal productivities, etc.).⁵²

Would such "facts" as marginal productivities really be "experienced" without a competitive process? Surely we cannot simply assume that actual market participants would have all the knowledge necessary for the economist's formal proof of a determinate equilibrium. That theoretical proof proceeds as if each producer initially had a complete "cookbook" of technological recipes which, in conjunction with the appropriate prices given to him by the CPB (or the Walrasian auctioneer), he uses in order to select his optimum production technique. Such a discussion may be helpful as an heuristic device in showing the interdependence of decisions in the market, but as a purported description of the decision-making process of actual producers this approach is very ill-suited and misleading.

When Bergson comments that the CPB would "adjust prices and wages from time to time in order to bring the demand and supply of goods and services into line,"⁵³ he seems to seriously underestimate the degree to which unexpected changes permeate a modern economic system. The economy appears as if it is normally in a state of equilibrium from which it is only occasionally disturbed. But, as Hayek and Mises were frequently to emphasize,

the implications of an economy's being in equilibrium show that this is a totally unrealizable situation, in which, despite the passage of time, every agent's plans are perfectly meshed with everyone else's, in which genuine uncertainty has been banished, and in which such institutions as money and even prices would be superfluous. In such a world Lange's proposed "trial and error" solution would indeed be workable, since the CPB would have ample time to alter one "price," holding the others at their equilibrium values until complete equilibrium is reached.⁵⁴ As Hayek puts it, "With given and constant data such a state of equilibrium could indeed be approached by the method of trial and error. But this is far from being the situation in the real world, where constant change is the rule."⁵⁵

Bergson in fact had serious doubts about the workability of Lange's solution in a continually changing world. He cited Soviet experience as indicating

that on account of the economic as well as political problems there might be very real difficulties in the way of applying the trial and error Competitive Solution. Consider the matter of high-tempo industrialization, and the rapid shifts in demand and production schedules that would be associated with this process. In such a situation, the errors involved in the operation of the Competitive Solution might well be formidable; and evidently experience could not be very helpful in rectifying them.⁵⁶

The Austrians in the debate, however, would contend that the "shifts in demand and production schedules" that occur in *normal* conditions, not just during "high-tempo industrialization," would be rapid enough to make the planners' task of locating a set of equilibrium prices by trial and error quite unmanageable. As he was to point out in a later essay, Bergson ultimately did not accept Lange's opinion that under the "competitive solution" convergence to equilibrium would be rapid, and he was to belatedly agree with Hayek that

on the contrary the task of fixing prices for an entire economy, which Lange assigns to the Board, would prove formidable. Almost inevitably, the Board would find it difficult to respond quickly to continually occurring changes in supply and demand. It would also be unable to fix prices in sufficient detail to take into account almost endlessly diverse varieties of goods produced by a modern economy. Imbalances between supply and demand, therefore, might be large and persistent.⁵⁷

Although this more recent assessment of the debate substantially agrees with the Austrians, Bergson's earlier and more influential discussion reflects a common neoclassical view of equilibrium as a normal situation of quantitative balance between supply and demand. By contrast Austrian economists view equilibrium as an entirely imaginary condition of complete coordination of plans where all "changes" are fully anticipated. As such, it may

be a useful, even an indispensable, tool of analysis, but according to the Austrian view it is never attained in any real economy. The fact of continuous disequilibrating change renders a "trial and error" process of equilibration unworkable since we could never know which of many prices are at disequilibrium with respect to some actors' plans at any time. As Mises later remarked in this regard, "The method of trial and error is applicable in all cases in which the correct solution is recognizable as such by unmistakable marks not dependent on the method of trial and error itself."⁵⁸

To his credit, Bergson in 1948 did acknowledge that in practice the CPB may encounter some severe difficulties in administering Lange's system. Among these he specifically cites three: (1) the fact that "the vast stock of detailed knowledge" necessary would be "scattered throughout the community" and the amount of this knowledge available would itself "depend on the particular administrative procedure used"; (2) it would be "physically impossible" for the Board to decide successively on all the myriads of possible alternatives; and (3) it would be difficult to control the execution of the plan once it had been formulated.⁵⁹ Each of these points was specifically argued in the debate by Hayek and will be examined here later in more detail. Bergson seems to have believed in 1948 that the so-called "competitive solution" offered by Lange, Taylor and Dickinson (particularly in Lange's "very systematic exposition") by and large overcomes all of these potential difficulties. Bergson points out the relevance to the debate of Hayek's later contributions about "The Use of Knowledge in Society," and his description of the kind of "detailed knowledge of time and place" which "by its nature cannot enter into statistics" and "cannot be conveyed to any central authority in statistical form."⁶⁰ Bergson finds these remarks a "wholesome antidote" to the tendency of many socialists to view the ministry of planning as a "committee of Supermen." However, he does not accept Hayek's conclusion that these necessary limitations on the knowledge of the CPB would render the task of setting prices impracticable, since he believes that this task can be decentralized, i.e. "broken down functionally and geographically," and be guided by "general directives" issued by the CPB.⁶¹ He also dismisses Hayek's contention that the CPB would have to continually conduct detailed audits of the cost records of the individual firms, which if true would seriously impair the decentralization advantages intended in the "competitive solution." Bergson proposes that by tying managerial incentives to profits and comparing profits of different firms the Board could dispense with such detailed studies.⁶²

Underlying this particular controversy is an ambiguity concerning the extent to which the "competitive solution" actually introduces competition into the economy. We would contend that, if genuine rivalrous competition and the market equilibrating process are *not* fully permitted in the "competitive solution", the planners will not be able to escape Hayek's problem of "scattered knowledge" as easily as Bergson suggests. If, on the other hand,

such full-fledged competition *is* allowed, the resulting system will be indistinguishable from private ownership of the means of production.

A less conciliatory attempt to answer the calculation challenge has been the "Centralist Scheme" favored by Maurice Dobb. Bergson points out how this approach would seem to bring back the problem of "solving millions of equations" which the "competitive solution" was designed to resolve. Such difficulties could be reduced, however, if one can assume fixed coefficients of production under which, in effect, relative prices can be ignored, and under which there is no basis for speaking of the marginal productivity of any one factor. Bergson notes that "Leontief found it practicable" in his famous input-output study of the American economy "to assume that for broad industrial groups the production coefficients are constant."⁶³ If fixed coefficients could be assumed, the planners would only need to devise technologically feasible allocations of resources rather than economically efficient ones. But we would contend that both the level of aggregation and the span of time for which input-output applications have been used are far too broad to aid the microeconomic production decisions with which the calculation debate was concerned.⁶⁴

Finally, at the end of the article, Bergson returns to the question he had raised at the beginning: what Mises meant when he asserted the impossibility of economic calculation under socialism. Unlike many treatments of this point, he at least admits there are two possible interpretations of Mises, those of Lange and Schumpeter on the one hand, and that of Hayek on the other.

Before describing these interpretations Bergson offers to "let Mises speak for himself" and selects four quotations⁶⁵ from Mises' essay on "Economic Calculation in the Socialist Commonwealth," which rather forcefully make the point about the necessary relationship between private ownership and prices, and between prices and rational economic calculation. Largely because of their forceful style of expression these quotations could be seen as consistent with Lange's interpretation of Mises, but in actual content they are consistent with either interpretation. Unfortunately Bergson did not choose to select the following quotations from the same group of pages which strongly support Hayek's and explicitly contradict Lange's interpretation:

The static state can dispense with economic calculation. . . . But this is only conceptually possible. . . . a static state is impossible in real life, as our economic data are forever changing, so that the static nature of economic activity is only a theoretical assumption corresponding to no real state of affairs, however necessary it may be for our thinking and for the perfection of our knowledge of economics.⁶⁶

As was argued earlier, no statement in economics stands alone. To be rendered fully intelligible it must be examined in terms of the wider conceptual framework from which it stems. It is not enough to select a few quotes,

"read innocently," to prove what Mises meant, for these words must be given meaning by relating them to the system of thought of the reader. For Lange, Schumpeter, and Bergson, rational economic calculation means calculation with equilibrium prices, but not for Mises.

Of the two interpretations Bergson considers, the one "which seems to have gained the wider currency" is Lange's: that rational calculation is "ruled out conceptually" even for a "Board of Supermen, with unlimited logical faculties, with a complete scale of values for the different consumers' goods and present and future consumption, and detailed knowledge of production techniques." If such an argument has ever been maintained by anybody, it would, as Bergson said, certainly be "easily disposed of" and would have already been

refuted completely by the work of Pareto and Barone. As the analysis of these writers shows, once tastes and techniques are given, the values of the means of production can be determined unambiguously by imputation without the intervention of a market process. The Board of Supermen could decide readily how to allocate resources so as to assure the optimum welfare. It would simply have to solve the equations of Pareto and Barone.⁶⁷

It would be difficult to reconcile this interpretation of Mises with his specific reaction to Dickinson's similar "superman" assumption: "We do not deal with the acts of the omnipresent and omniscient Deity, but with the actions of men endowed with a human mind only. Such a mind cannot plan without economic calculation."⁶⁸

Fortunately there is another interpretation of Mises, the one given by Hayek, that "Imputation is theoretically possible; but, once private ownership of the means of production has been liquidated, it cannot be accomplished in practice."⁶⁹ This, too, Bergson says, can be interpreted in two ways (represented in Schumpeter's second and third questions above), "whether a planning scheme can be devised such that it can work at all" or "which is more efficient, socialism or capitalism." Concerning the former interpretation of "impracticability," Bergson is convinced that both Lange's trial and error argument and even the simple existence of the Soviet Union refute that claim. The latter issue of relative efficiency between capitalism and socialism, then, "is now the only issue outstanding."⁷⁰

Yet in fact this last question was *always* the only issue outstanding and all the involved discussions of "conceptual" possibility and practicability "in principle" have only diverted the debate from its original and essential content.⁷¹ Mises, Hayek and Robbins never denied that socialism would be "possible" under static conditions, though they had serious doubts about the possibility of those conditions. They were denying that any procedure could be found which was efficient enough at impelling an equilibrating process to supplant the function of the capitalist-entrepreneur under private ownership of the means of production.

In 1948 Bergson viewed Hayek's arguments concerning the unworkability of Lange's solution as generally unsuccessful and this assessment has been preserved in many subsequent accounts of the debate. But just as Schumpeter reversed himself in his interpretation of Mises, Bergson was to change his mind substantively about Hayek, and in both cases it was the earlier—and in our view the less defensible—version that has been more influential in the history of thought.

In his later article, "Market Socialism Revisited,"⁷² Bergson argues, for example, that the "failure" on the part of Lange and his school "to establish any practical success criterion for managers" now seems to be a more serious deficiency than he had thought before, when he had said "our impression is that the question of managerial incentives would not present any serious difficulties." While earlier he had concluded that "there is no reason to suppose" that managers under public ownership "would necessarily be too venturesome or, as Hayek argues, too cautious,"⁷³ his later opinion had substantially changed.

Given a satisfactory test of success, managerial incentives must still be related to it appropriately. Hayek argued that such a result might not be easy to achieve. In practice, managers very likely would be reluctant to take risks. This is perhaps not inevitable, but the construction of a satisfactory incentive system now appears more difficult than I envisaged it to be previously.⁷⁴

Invariably the process by which an original controversy is summarized in secondary sources and digested by later thinkers until it filters its way into the textbooks is a gradual one. It was unavoidable that some of the earliest discussions of the calculation debate—of which Schumpeter's and Bergson's were the most often cited—would have had a greater impact than any more recent second-thoughts are apt to have had. Many third-level accounts of the debate were written before Schumpeter and Bergson changed their minds about Mises and Hayek, while fourth-level discussions in contemporary textbooks have often relied on these third-level discussions. Thus the standard version of the debate still retains errors—or so they are considered by this reader—which the authors themselves have long since corrected.

Benjamin Ward

Neither the Austrian nor the neoclassical paradigm has stood still in the intervening years since they clashed in this controversy in the 1930's. Benjamin Ward stands out as one of the leading contemporary neoclassical historians of the debate and not only his own account of the original arguments but also his view of how the subsequent developments in neoclassical theory relate to those arguments will be briefly examined. In addition we will contend that the modern Austrian developments in critique of neoclassical

economics parallel in many ways the original Austrian differences with the neoclassical market-socialists of the debate.

Ward's most systematic treatment of the comparative economics topics surrounding the debate is his influential book *The Socialist Economy: A Study of Organizational Alternatives* (1967),⁷⁵ the stated aim of which is "to relate aspects of socialist organization to economic behavior." Ward explicitly used "the socialist controversy" we are examining as the "paradigm for establishing such relations,"⁷⁶ and his detailed discussion and critique of the debate in Chapter Two comprises the basic conceptual framework for his whole book.

For Ward, the "heart" of the socialist controversy is the question: "Can a socialist society find some method of organizing the allocation of resources which will permit the economy to function with a tolerable degree of efficiency?"⁷⁷ After some sixty years of debate, he notes that "many, perhaps most, economists would consider it established that the appropriate answer is 'yes.'" Ward argues that the question as posed should, however, be considered still open, since there is a "variety of conceivable forms of socialist economy" and the answer "may not be 'yes' for every one of these."⁷⁸ Yet despite his more balanced conclusion, Ward's analytical account of the controversy fits the standard version in most respects rather well.

He begins his survey of the debate with a general statement of the crude condition of socialist economics before Barone. An attitude of mistrust of marginalist economics and almost exclusive attention to condemnations of capitalism were combined with a "rather utopian view of life under socialism" which sometimes seemed to specifically deny that scarcity would be a problem under socialism. Ward refers to Wieser's *Natural Value* as an important early contribution which showed that "the problem of scarcity and the problem of relative valuation of alternatives derivative from it were equally problems of capitalism and socialism."⁷⁹

However, Ward attributes the "first application to the socialist problem of the formal general equilibrium analysis developed by Walras and Pareto" to Barone's "Ministry of Production."⁸⁰ In this "significant step forward" Barone "attempts to show that the form of the imputation rules for a socialist and capitalist society are the same."⁸¹ Ward credits Barone with having demonstrated "in a more explicit way than had been done previously, that prices are not conceptually bound to the market."⁸² Barone offered hints of both the "equation-solving" and "trial and error" methods of attaining equilibrium prices that were to resurface in the later controversy though he did not appear very optimistic about their workability in practice.

Ward then speaks of a "retrogressive diversion" of the debate around 1920 that reverted to debating "the possibility of establishing a 'natural' socialist economy, or one in which money and pricing are completely absent." He lists Otto Neurath and Nicolai Bukharin as proponents of this step back-

wards to the view "that prices were inevitably tied to markets and capitalist exploitation" and suggests that "Mises may well have had the natural economy in mind when he asserted that socialism was 'impossible.'"⁸³

This interpretation of the early confrontation between Mises and Marxism is misleading in two important respects. First, to speak of the anti-market attitude of two Marxists as a "retrogressive" development is to implicitly credit Barone with far more influence than he actually had at the time, and to considerably understate the degree of acceptance of the Marxian view that socialist planning could and must dispense entirely with prices. According to Ward's account this model of socialism was but a temporary aberration in 1920, while we would argue that it was widespread before 1920 and is firmly rooted theoretically in Marx and Engels.

Secondly, this account leaves the misleading implication that Mises' argument applies only to this extreme notion of central planning. Although it is valuable to recall that Mises was *directing* his argument at this, the predominant version of socialism of his time, rather than at the market-socialist systems that emerged only later and in response to his challenge, it does not follow that the logic of his argument applies only to this largely abandoned program. The challenge would, to be sure, have to be reformulated with market-socialism in mind, as was done by Hayek,⁸⁴ but substantially the same problem of rational economic calculation would have to be faced by any system in which there was common or state ownership of the means of production.⁸⁵

Ward's account of the debate proceeds with a fairly sympathetic discussion of Taylor's and Lange's argument that the difficulty of rational economic calculation could be overcome "by applying the same rules for adjustment to socialist factories as Walrasian economists attributed to competitive capitalist ones." This, we are told, would be "a relatively simple job for the Ministry" and would be no more difficult for socialist firms than economic calculation already is for capitalist firms.⁸⁶ We contend that this "trial and error" solution is neither as similar to real capitalist price adjustment nor as trivial an analytic matter for a world of continuous change as Ward seems to believe.

The next section of Ward's survey, interestingly entitled "Hayek and Dobb," notes briefly some objections raised against market-socialism from these two very different perspectives. In spite of the obvious disparity of viewpoints, Dobb and Hayek appear to have been making somewhat similar accusations against neoclassical market-socialism when they focus respectively on "dynamic problems associated with market adjustment" and "the role of information in resource allocation."⁸⁷ A crucial assumption of the perfect competition model upon which market-socialism was constructed is that there is full coordination between the supposedly separate decentralized decision-makers; that there is no true uncertainty⁸⁸ either with respect to the developing environment in which each chooser finds himself or with

respect to the choices of others that are simultaneously being made. The vital and difficult questions of information flow (of learning) are obscured in an equilibrium framework which simply takes "tastes" and "technology" as data somehow already given to every firm. The real world, however, is replete with ignorance of these supposed "givens," as both these critics emphasize.

Maurice Dobb, favoring a more centralized model of socialism, locates the source of this ignorance in the decentralized organizational form of a market society with private ownership of the means of production. Ward's summary of Dobb's position stresses what contemporary Austrians call the "simultaneity problem"—that different and uncoordinated production decisions that conflict with one another are made simultaneously under capitalism—as well as the argument that expectation formation under capitalism is inherently irrational.⁸⁹

Expectations are contagious. . . and small individual producers are unaware of what is going on elsewhere at the time they make key production and investment decisions. Dobb feels that the time lag between the making of decisions and the collection of the relevant information, plus bandwagon effects, accounts for much of the fluctuation of price and output in markets, a fluctuation which is wasteful and which would not be avoided under market socialism.⁹⁰

Hayek, on the other hand, favoring private ownership of the means of production, would locate the source of this ignorance more fundamentally in the limitations of the human mind rather than in the market form of social production. Once it is understood that in the light of Mises' argument it would be impossible for all decision-making to be subsumed under a unitary central plan, we have no alternative but to permit separate simultaneous decision-making by decentralized segments of society. Hayek would agree that a degree of discoordination of these separate plans is, as Dobb argues, "an inevitable consequence of market organization," and that as a result the market economy is continuously in disequilibrium. He might even agree that, viewed from an ideal equilibrium perspective, this discoordination could be called "wasteful," but he would insist that it is not the proper method of comparison, as Schumpeter always stressed, to contrast an actual imperfect world with an hypothesized ideal one. The point of the calculation argument was not that a market *is* in equilibrium while a socialist economy is not, it is that a market possesses an equilibrating process which tends to coordinate the separate agents, while a socialist economy would lack this coordinating process.⁹¹

Ward credits Hayek with having "added . . . two important new issues"—the role of information and of risk-taking—to the socialist controversy,⁹² though Hayek himself seemed to believe he was only elaborating these points from discussions by Mises.⁹³ It is true, however, that especially in his

subsequent contributions on knowledge, Hayek was to add significantly to our understanding of the limitations of equilibrium theorizing. As Ward acknowledges, "In contemporary economics the starting point for the discussion of information is Hayek's work, and its significance appears to have first occurred to him while studying the socialist controversy."⁹⁴ Although Ward seems to concede that the difficulties of gathering the scattered knowledge necessary for economic decision-making would be telling against a fully centralized model, he finds the approach of Taylor and Lange to be immune from this criticism. Explaining in a footnote that at the time (1935) Hayek had only "some word-of-mouth knowledge of market-socialism" and "does not appear to have been familiar with Taylor's article," Ward⁹⁵ claims that Hayek "does not seem to understand how the Taylor adjustment rules might be used in practice." Ward interprets the market-socialists as advocating the genuine decentralization of production decisions and thus concludes that Hayek's overly pessimistic estimate of the difficulty of "centralized" planning "is based on the assumption that the plan must be made in some central agency."⁹⁶

Indeed such an assumption was the initial view of most adherents as well as critics of central planning, but Hayek was to deal specifically with the market-socialist attempt to partially decentralize planning. It is curious that of Hayek's two essays which discuss market-socialism⁹⁷ Ward refers only to the earlier one, written as he says before Hayek had seen the full Lange-Taylor model. His later essay, which dealt extensively with Lange's and Dickinson's proposals, is nowhere mentioned in Ward's book. As Hayek explained in this essay, the problem with the so-called "competitive solution" is that it presumes that socialist managers will obediently employ society's resources in accordance with the rules handed down to them from the ministry of production. The attitudes of such rule-following bureaucrats to the resources under their control would necessarily differ from those of private and competing owners who undertake projects at their own initiative, at their own risk, and for their own profit. It would therefore be necessary to somehow monitor plant managers' performance and this would itself require the very centralization of information the market-socialists were trying to avoid. Yet, Hayek argues, if fully self-motivated action is to be permitted to market-socialist plant managers (if they are to be free to take their own risks, reap their own gains, and offer competing bids for resources), this would entail that they be private owners of the means of production, thus abandoning the last vestige of socialism. The market-socialists were conveniently ambiguous about the degree of decentralization they were proposing, but Hayek specifically addressed a large variety of alternative proposals in his 1940 article.

Ward's survey of the socialist controversy is completed with a discussion of Abba Lerner's *Economics of Control*, a book which is infused through-

out with this market-socialist ambiguity. Lerner wishes to preserve the market mechanism and even "socially productive speculation"⁹⁸ while retaining a controlled rather than "haphazard"⁹⁹ organization of production. The confusion over these incompatible goals arises from the tendency of neo-classical theorists to think exclusively in equilibrium terms.

Lerner's overall argument, Ward says, is "a good one, that is, it 'solves' the problem of distribution within the context of the classical static economic analysis by describing equilibrium properties," although the "manner in which price adjustment would occur in the Lernerian system is quite unclear."¹⁰⁰ But, as we have been arguing, it is precisely this largely ignored matter of price adjustment, not static equilibrium, that is the point at issue in the debate. Lerner deliberately restricted his analysis to what he called a "theoretical" solution,¹⁰¹ that is, to the "static state" which Mises and Hayek had admitted from the very beginning of the controversy would face no problem of economic calculation. Clearly if advocates and opponents of socialism are to confront each other directly in useful debate, the analysis will have to be carried beyond this equilibrium framework within which all participants seem to agree there is no problem. The most serious shortcoming of Ward's discussion of the debate is that he attributes this preoccupation with static equilibrium to the controversy as a whole rather than, as we would argue, to its market-socialist participants.¹⁰²

Ward recognizes that this exclusive focus on static equilibrium severely limited the results of the classic controversy—"there appear to be no clear-cut answers about the feasibility of the socialist form of economic organization"—and attributes this to the insufficient development of economic analysis at the time. In a section entitled "The Present State of the Debate" he endeavors to fill in the "gaps and failures" of the original discussion "from the point of view of contemporary economics."¹⁰³ He refers in this respect to some refinements of general equilibrium analysis¹⁰⁴ and to extensions of this formal approach to studies of "the stability and convergence properties of general equilibrium models"¹⁰⁵ and "nontâtonnement processes."¹⁰⁶

However, the fundamental flaws of the original controversy are rooted in a neoclassical perspective that has been retained in these modern contributions. The basic conception of choice that underlies these contributions is still the narrow "optimizing" notion that had pertained to pure equilibrium analysis. It is significant that the primary emphasis of the modern Austrian school that stems from Mises and Hayek is on precisely the narrow nature of neoclassical choice theory even in its supposedly non-static forms today.

The original market-socialist participants in the debate believed that they were advancing beyond pure equilibrium analysis when they postulated that the ministry would adjust prices by "trial and error" until the equilibrium was "found," much as neoclassical theory conceives the Walrasian auctioneer doing in a market economy. But the Walrasian approach itself does

not explain price adjustment, so it scarcely serves as an argument for the feasibility of market-socialism to suggest an analogy with this approach. This model cannot explain the movement of prices since everyone is supposed to passively take prices as "parametric." It therefore has to employ the fiction of a centralized auctioneer as its *Deus ex machina*.

Perhaps the most crucial difference between this imaginary auctioneer adjustment model and the real world concerns the question of trading at "false prices." Contrary to the assumptions of the Walrasian approach, in actual market exchanges there is no way to prevent the data from changing before an equilibrium constellation of prices can be found. As Edgeworth pointed out, this means that trading in the market will invariably take place at disequilibrium prices, and this is itself a disequilibrating force.¹⁰⁷

Yet many of the same theorists who explicitly recognize that the auctioneer model is unlike real market processes nonetheless endeavor to model central planning schemes after the Walrasian procedure. Indeed many advocates of "planometrics," iterative computational techniques for adjusting prices to equilibrium, insist that it is a strength of their approach that they can, by using an auctioneer-like approach, attain equilibrium "more easily" than real markets can with their problems of "false trading." Thus Ward, in his contrast between centralized and decentralized models of socialism, seems to consider it an advantage of centralized models that "no goods would be traded until the adjustment process, carried out by paper and pencil, or rather computer, had arrived at the optimal plan for quantities and prices,"¹⁰⁸ whereas decentralized models have to contend with the "problem" of allowing irreversible exchanges to take place at disequilibrium prices.

We would contend that this is a peculiar way of looking at the issue of trading at "false prices." Actually such trading, though perhaps a liability for formal general equilibrium analysis, is a definite advantage of real market processes over planometric models. The fact that the latter have never proved practicable can largely be explained by their lack of this "problem" of disequilibrium transactions. The chief strength of the real equilibrating process, as contrasted with auctioneer-type models, is that it works tolerably well *without* eliminating exchanges at "false prices," and, in particular, by taking advantage of knowledge actively being generated by the disequilibrium competitive process.

Ward discusses a number of planometric models, concentrating on some linear programming methods proposed by Montias, Malinvaud and Dantzig,¹⁰⁹ all of which require that trading and production cease while supply and demand information throughout the structure of production is communicated to the ministry of production. The advantage of these schemes is supposed to be that the technological knowledge (the coefficients of production) need not be known by the central planners, this feature alleg-

edly insulating them from Hayek's critique. Each of these procedures requires that an iterative process of searching out the equilibrium be performed and results communicated back and forth between plant managers and the CPB. In every iteration the producer is supposed to examine a provisional constellation of prices and react to it with a new set of optimal demands of inputs and estimates of outputs that he can expect to deliver if these prices are decided upon. The CPB then performs another computation with this information and produces a new set of prices. This procedure continues until equilibrium prices, or an acceptable approximation thereof, are established. Then and only then, production and trading can be renewed.

Aside from the practical difficulties of implementing any of these models,¹¹⁰ their fundamental problem is that they, like the Walrasian approaches from which they stem, trivialize the problem of the dispersion and acquisition of knowledge in the production process. Each producer is assumed to already have at his disposal a complete set of technologically feasible production methods into which he need only plug the CPB's computed prices in order to decide the best combinations of resources. We would argue on the contrary that producers discover feasible and more efficient methods of production only by *trying* different ones and either failing or succeeding, success being revealed only in profit and loss figures. The advantage of the nontâtonnement equilibrating process is that it depends on the competition of separate private owners who disagree about which techniques are better. This competition permits different entrepreneurs to try their hand at proving their views on the market by making a profit. Those with more accurate expectations and more efficient technological methods struggle rivalrously against those with less. Market competition is thus what Hayek calls a "discovery procedure" in which the extensive knowledge which neoclassical economists graphically depict in simplistic production possibility surfaces, is not, in fact, inherently in the mind of the plant manager any more than it could be at the disposal of the CPB. Without an ongoing competitive discovery process the manager, too, would be ignorant about what methods are more efficient than others.

Hayek's discussion of the difficulties of centralizing the dispersed knowledge of an economy has frequently been interpreted, by Ward as well as other modern theorists, as indicating only that the producer's choice of the optimal production technique must be decentralized, while the adjustment of prices could still be performed by a central bureau equipped with a sufficiently powerful computer. We will contend, however, that this dichotomy between the discovery of correct prices and the discovery of efficient production techniques is an artificial theoretical procedure that begs the essential questions of the calculation debate. In the real-world market process, "trial and error" experimentation with techniques and prices are in-

extricably bound together. Actual producers simultaneously bid prices up and down as part of their experiments with production techniques and without this competitive process would not know what techniques are better.

Others: Lippincott, A. Sweezy, Dobb, Knight

Benjamin E. Lippincott. In his introduction to the influential 1938 book that contains Taylor's and Lange's central contributions to the debate, Lippincott repeats virtually every detail of Lange's interpretation of the calculation argument. We are told that Mises' argument "had really been disproved early in the century by Barone," who "proved that in principle the accounting prices of a socialist economy would be as economically significant as the market prices of a competitive economy." Lippincott further believes that this "mathematical demonstration using simultaneous equations" is sufficient to "demonstrate that it was possible for a socialist economy to make a rational allocation of resources." Like the other neoclassical interpreters of the debate, he emphasizes "the great formal similarity of a socialist regime to a competitive one" purely on the abstract equilibrium level of analysis, and from this (admitted) similarity he immediately concludes with an assertion that socialism is "theoretically" possible.¹¹¹ And, as with most neoclassical treatments of this issue, he trivializes the complex process of imputation when he states that "it naturally follows... that the preferences of consumers, as expressed by their demand prices... are the guiding criteria of production, and ultimately of the allocation of resources."¹¹²

We have argued that this prevalent Lange-Schumpeter interpretation of Mises—that he was denying that there could be defined a determinate equilibrium under socialism—is mistaken, and in particular that it fails to take into account the essential differences between the Austrian and neoclassical paradigms. Lippincott goes even further by explicitly identifying the Austrians as merely a branch of a rather broadly defined "orthodox" economics, by which he means "economists of the school of Marshall and of the Austrian and Lausanne schools." All three branches of marginalism are indicted together for dealing exclusively with static analysis:¹¹³

Holding that the proper field of economic theory is the field of pure abstraction, where logic and mathematics can be rigorously applied, they have limited their analysis very largely to a condition of static equilibrium—a condition where change is ruled out and economic forces are in balance. As a result of this, they have given little attention to institutional considerations.¹¹⁴

Although early Austrian economists must share some of the blame for expressing their arguments in such a way as to permit this association with neoclassical equilibrium theorizing, they were never primarily concerned

with equilibrium and were quite seriously interested in "institutional considerations." The focus on static equilibrium has been much greater on the part of those who attempted to answer Mises and Hayek, while, contrary to Lippincott's suggestion, institutions have been of vital importance to Austrian theory since its inception with Menger's writings. That such theorists can be accused of stressing static equilibrium at the expense of institutions is a testament to the complexity of economic argumentation and the extent to which statements in our science—when not carefully related to the fundamental paradigm from which they were conceived—can be totally misunderstood.¹¹⁵

What is even more mysterious in Lippincott's case is that he goes on to argue that these criticisms of "orthodox" economics do not apply to all orthodox economists, and then cites as "exceptions" precisely the theorists who did in fact focus primarily on equilibrium in their economic analysis: Pareto, Barone, Taylor, Knight, and Pigou.¹¹⁶

Lippincott repeats Lange's statement that Hayek and Robbins were retreating from Mises' theoretical argument to a mere denial that socialism can work in practice, stressing as usual their comments about solving numerous simultaneous equations.¹¹⁷ He considers the trial and error solution of Taylor and Lange to provide a conclusive demonstration that "the process of price determination in a socialist economy is quite like that in a competitive one."¹¹⁸ We contend, on the other hand, that while this trial and error method of adjusting prices may bear great similarity to the neoclassical auctioneer adjustment process, it has little to do with the way prices are determined in competitive markets. Yet Lippincott asserts that, with this demonstration of the formal similarity of market-socialism to the Walrasian model, "the burden of proof has been shifted to the capitalist economy, which must now show why it should not be replaced by a socialist one, in view of its evident feasibility and superiority."¹¹⁹

We would contend that an elaborate description of the equilibrium conditions for socialism supplemented by a few remarks about adjusting prices by trial and error until this equilibrium is found does not constitute a case for the "evident feasibility" of socialist institutions in the real disequilibrium world, much less their superiority.

Alan R. Sweezy. Sweezy's 1936 essay on the debate represents one of the most explicit early statements of the standard account we have been describing. The Mises-Hayek argument "that socialist pricing would of necessity be purely arbitrary and hence meaningless," he says, "has been refuted in a way that should be definitive for informed students of economics by Dr. Lange."¹²⁰ Once again we find that the argument Lange is seen to be refuting has been first distorted by being translated into neoclassical terms. Sweezy asserts that in his book *Collectivist Economic Planning* Hayek "stages a battle between the mythical knight of a purely competitive capital-

ism, in which everything works out for the best by definition, and the straw dragon of a patently unworkable type of planned economy. One is scarcely surprised to find that the knight wins."¹²¹

Sweezy suggests here both that Hayek's critique of socialism was formulated in terms of the perfect competition model and that it was directed at a straw man construction of socialism that lacks money and prices. Neither suggestion is accurate. It was no less a socialist than Karl Marx, hardly a straw man, who viewed socialism as logically requiring the abolition of money and prices, and it was the *responses* to Hayek and Mises that were framed in terms of the "mythical knight of purely competitive capitalism." Hayek was, himself, highly critical of these responses precisely on the grounds that this model is inadequate as a description of real-world capitalism.

In fact it is economists such as Sweezy who pay an inordinate amount of attention to the equilibrium state, and in particular to the perfect knowledge assumptions that underlie it, rather than to workable economic processes.

All economists would agree... that when new productive capacity is being planned it should be extended to the point where the output thus provided for can be sold at a price just sufficient to cover the cost of producing that output, the best known organization of the factors of production being assumed.¹²²

This last assumption begs the whole question of the calculation argument which asks whether the best organization of factors of production *can* in fact be known without the operation of a competitive process in the capital markets. Sweezy acknowledges that putting such economic formulae to work in practice would pose some difficulties, at least at first, but seems to have an inflated view of the practicability of the market-socialist model when he concludes that

even with their present knowledge and analytical equipment, economists and production managers could formulate price-output policies which would be more in the social interest than those adopted by enterprises in the capitalist world.¹²³

As Hayek pointed out, the matter of applying formal equilibrium theory to economics is being "treated as if the cost curves were objectively given facts." In actual markets any tendency to adopt minimum costs is only due to a continuous competitive discovery process.¹²⁴ An indispensable aspect of this process is that different owners with divergent knowledge and expectations concerning production methods contend with each other in a rivalrous market, struggling to outbid one another for the use of scarce resources. This discovery process is thoroughly absent from equilibrium constructions and from "trial and error" price adjustment methods. Sweezy writes:

There would be [under socialism] no exchange of ownership in the market for means of production. But as an accounting device it would be necessary to register the demands for and supplies of all commodities at their going prices and to compare these supplies and demands as a check on the correctness of existing price and output schedules.¹²⁵

The crucial question is whether this planning technique of "registering" demands and supplies while centrally adjusting prices can be substituted for competitive bidding by private owners. Will the non-owners who cooperatively attempt to implement the central plan in accordance with Lange's rules have the requisite knowledge to express rational demands of the various factors of production if they are not actively contending with one another for these factors? Such questions are necessarily avoided under the knowledge assumptions of the neoclassical model.

Alan Sweezy does however offer some interesting insights on the important problem of uncertainty with respect to central planning theory. He points out: "In a completely stationary economy . . . there would be by definition no problem of planning," and, if we assume perfect foresight or instantaneous and perfectly fluid adaptation to change, there would be no substantial problem of planning. Such unrealistic models, he says, are "of little use in a discussion of socialism, which must take as its point of departure the economic world as it actually is."¹²⁶

Exactly, but Sweezy does not seem to understand the extent to which the introduction of these more realistic assumptions undermines the market-socialists' "refutation" of Mises. We can agree that "in actual practice the task of organizing knowledge and coordinating policies in an advanced industrial economy is bound to be so stupendous that success can never be more than relative."¹²⁷ Certainly the market is an imperfect mechanism of such coordination. But it remains to be shown that central planning can in practice do anything but hinder this imperfect coordinating mechanism.

Maurice Dobb. We have already had two occasions to discuss Dobb as a participant of the calculation debate, in noting Bergson's treatment of Dobb's more centralized alternative to market-socialism, and Ward's analysis of his critique of the static market-socialist model. From these discussions, Dobb might be expected, as the historian of the debate, to have a sharply divergent view of the controversy, unlike either Austrian or neoclassical interpretations. However, in many ways Dobb's interpretation of the controversy is strikingly similar to the standard account, and his approach to the question of going beyond the static nature of the market-socialist model has its counterpart in a large body of modern neoclassical central planning theory.

Dobb clearly interprets Mises as having made a static equilibrium argument and agrees with the usual view that on this level he was effectively answered by the market-socialists.¹²⁸ He also subscribes to the "second line of defence" interpretation of Hayek, as well as the view that this "impractic-

cability" argument can be disposed of by reference to modern computing techniques, linear programming methods, and the like. Indeed, despite his at times brilliant critique of the static nature of neoclassical economics, he seems to have quite uncritically adopted the standard neoclassical view as an answer to the Austrian challenge.¹²⁹

Although we have been critical of this standard view for having trivialized the problem of imputation, Dobb's view is that imputation is even *more* simple than the market-socialists in the debate were willing to admit.

There was a simple answer to those who maintained the necessity of a market for intermediate goods and for capital, to which surprisingly little attention was paid. It was that on their own showing the prices of such goods were derived from those of the finished goods that the former helped to make. If there was a retail market for consumption goods, why have a market for intermediate goods as well? If the latter could anyhow only acquire a price by an elaborate process of imputation, after they had been allocated in a certain way, why not allocate them according to the principle of directing them to the use where their productivity (at the margin) was greatest, without the added complication of pricing them?¹³⁰

Thus Dobb accepted Lange's argument that it would be possible to have rational economic calculation without markets in capital goods and took this one step further in arguing that it would be possible even without prices for capital goods. Dobb does not explain how a plant manager could know whether his marginal productivity for any factor was optimized without knowing the prices of the various resources he is attempting to combine efficiently. He believes, in any case, that the complexity of this task has been greatly exaggerated and can be overcome by breaking down decisions into a hierarchy so that the CPB need only make broad macroeconomic decisions and delegate more microeconomic decisions to subordinates in the hierarchy.

The present reviewer has never been convinced that the complexity would be as great as is alleged, provided that scope were given for decentralization of *particular* decisions inside the limits set by the shape of a *general* plan.¹³¹

This idea of allowing discretion over particular details while maintaining a central plan for macroeconomic direction of the economy requires that the nature of these decisions be such as to permit this hierarchy. However, the details Dobb is relinquishing to lower levels are crucial matters of which the CPB would have to be continually aware if they intend to genuinely control social production. The CPB cannot first decide how much steel to have produced and then allow individual plant managers to choose what kind of steel for which specific purpose, since the former decision depends on the latter. In effect the retreat to the "planning" of broad macroecono-

mic categories is the retreat from economic planning to interventionism. The day-to-day particular decisions about specific economic goods are the choices which must be guided by rational economic calculation if society is to produce with a modicum of efficiency. If these are relinquished to the separate choices of decentralized plant managers the whole rationale for central planning goes with it.

Though it is Dobb's intention to get beyond the level of static analysis that he condemns the neoclassical economists for stressing, his own analysis retains the fundamental static assumptions of the neoclassical outlook (for example when he takes technology as "given" to each plant manager). His proposed theoretical path to escape static analysis is to adopt macroeconomic growth theory and pay less attention to the static efficiency ideal of welfare economics.

Dobb argues that since under dynamic assumptions it is quite impossible to achieve the perfection of equilibrium under either capitalism or socialism, it is not necessary for the CPB to try to strictly approximate this ideal. Considerations of static microeconomic efficiency, though certainly not entirely irrelevant, do not comprise the paramount issue for socialist economics. He charges market-socialists with what he calls the "Perfectibility Fallacy." He recommends that, rather than pursue this unattainable goal of Pareto-optimality, the CPB should focus on selecting and bringing about a higher overall rate of growth of the economy. In this way, he believes, socialism could attain such a high macroeconomic rate of growth that it could more than compensate for any deviations from microeconomic optima.

However, as Lerner pointed out in response to Dobb, this argument presupposes "that the two kinds of loss are alternative instead of additive" or, in other words, that growth can be improved by neglecting microeconomic efficiency.¹³² The argument that perfect microeconomic efficiency as imagined in a general equilibrium model is unattainable does not yield the conclusion that processes of equilibration can be abandoned. Economic growth that is not closely linked with microeconomic efficiency considerations is an illusory goal.¹³³

Frank Knight. One of the most significant features of the standard view of the calculation debate has been the conclusion usually drawn from it that "economic theory" *per se* cannot decide between capitalism and socialism. As Eduard Heimann put it in his *History of Economic Doctrines*, the debate about economic calculation "has confirmed once more the fact that the difference between the two systems is in social arrangements and psychological incentives rather than in purely economic issues."¹³⁴ Frank Knight was to make this the central point of his 1936 article on the calculation debate, where he contends that "The Place of Marginal Economics in an Collectivist System" is "not essentially different from its place in an economy of 'competitive individualism.'" This means that "the problems of collectivism

are not problems of economic theory, but political problems, and that the economic theorist, as such, has little or nothing to say about them."¹³⁵

Knight's view of the debate is especially interesting in that, while he was one of the most important developers and advocates of the perfect competition model, he was also one of the first to clearly point out its limitations. While "Part Two" of his *Risk, Uncertainty and Profit* is generally cited as Knight's great contribution to formal equilibrium analysis, his largely forgotten "Part Three" consists of an elucidation of what is missing in that formal theory. Equilibrium for Knight is that state in which no genuine uncertainty remains, and which thus contains no pure profit opportunities. The real world, by contrast, contains ineradicable elements of uncertainty, and thus numerous profit opportunities.

It is significant that Stigler in his introduction to this book discounts Knight's distinction between insurable risk and genuine uncertainty, a distinction that Austrian economists (and Knight himself) have considered a cornerstone of this work. Stigler is correct that "modern analysis no longer views the two classes as different in kind,"¹³⁶ but contemporary Austrians have specifically challenged modern economics on these grounds.¹³⁷ If all uncertainty were reducible to actuarial risk there could be no error, no learning, and thus no equilibrating process. All ignorance would be the result of a conscious decision to abstain from undergoing the known costs of acquiring missing pieces of information. Since we know that action in the real world is constrained by genuine ignorance of the future and, in particular, of one another's plans, the neoclassical model of choice as a maximization of given opportunities (or given probability distributions about such opportunities) is incomplete.¹³⁸ The element of action that is missing from this view has been called "entrepreneurship" by Mises and Kirzner, and an important rudimentary form of this idea is clearly contained in Knight's work.

Yet despite his important recognition of the difference between the perfect competition model and the real world, Knight insisted on identifying "economic theory" with such static equilibrium analyses. When he makes the statement that the "starting point" of his book was the "general conclusion that the existence of profit follows from a divergence between the conditions of theory and those of fact,"¹³⁹ one is led to consider the nature of that statement itself, or of his entire Part Three. Are these not theoretical statements? They are not formal equilibrium propositions; rather they describe the relationship between profit (a theoretical category) and such analysis. And we would argue also that they are clearly not matters entirely outside of economics (*i.e.*, belonging to the realm of politics, ethics, history, or some other discipline). This, however, is exactly how Knight treats these questions in his influential article on the calculation debate.

In that article, after having shown in the familiar manner how with given conditions a determinate stationary equilibrium can be proven for

socialism as well as for capitalism, he points out that "reasoning on the assumption of stationary conditions can yield no conclusions of practical significance for economic policy, whatever the general pattern of economic organization." On this point, as we have shown, Mises and Hayek completely agree with Knight. But he goes on to say that "the facts of progressive change... take the discussion out of the realm of economics into that of politics."¹⁴⁰ While he has demonstrated why such facts take us out of the realm of static economics, he has not shown why economic theory must confine itself to static exercises, especially when Knight himself has not so confined his own contributions to economics.

This is not merely a question of semantics about what we call "economic theory." It involves a fundamental contrast between Knight and the Austrians over the proper theoretical role of equilibrium constructions. For Knight (at least in 1936) economic theory *is* equilibrium theory. In this view, which is implicit in many neoclassical discussions of the calculation debate, a "theoretical" economic argument against socialism, as Mises claimed he was making, will necessarily be interpreted as Lange interpreted it, as a static equilibrium argument, despite Mises' specific statement to the contrary.

Indeed, this was how Knight read Mises. Knight referred to Mises as "the academic opponent of socialism most conspicuous for the extremism of his position,"¹⁴¹ and explicitly cited Mises as having asserted the existence of economic problems of socialism even under stationary conditions.¹⁴²

For Mises and the Austrians in general, however, "economic theory" is a wider category that includes, but is by no means limited to, equilibrium analysis. After all, as Knight himself remarked on a different occasion, we are not directly concerned with equilibrium as a state of rest, but rather with "a process in equilibrium.... The system never really is in equilibrium ('moving equilibrium') at any point; but its tendency toward such a state is the main feature to be made clear in a scientific description of it."¹⁴³ The static description of the equilibrium state of rest may be a useful analytical tool for explaining this "tendency," but it is the latter which is of primary concern.

For socialism to be theoretically sound from an economic point of view it must do more than fulfill Schumpeter's "logical credentials" under static assumptions. It must be theoretically demonstrated that socialist institutions can impel an equilibrating tendency without the existence of private ownership of capital.

In a later essay, while he still forcefully reiterates his point that "economic theory, as such, involves no disproof or rejection of socialism,"¹⁴⁴ Knight nevertheless finds himself in agreement with Mises' theoretical argument when he relaxes his static assumptions:

Thus the contention of Professor von Mises, and other opponents of socialism, that there would be no objective rationale for the organization

of production under socialism, while adequately refuted by Professor Lange (and others) for the routine operations of a stationary economy, is after all essentially correct for the really serious problem of organization. This is the problem of anticipating substantial changes in the given conditions of economic life and in making necessary adaptations and/or of bringing about such changes.¹⁴⁵

This comment, unfortunately buried in a footnote at the end of an article ostensibly about the ethics of socialism, actually concedes Mises' whole point. Once it is recognized that Mises never intended to challenge the static "logical credentials" of socialism, Knight must be seen as a supporter of Mises' argument under the dynamic conditions of the real world. But, due to his stress on the formal similarity of capitalism and socialism under static conditions, Knight has been widely considered an opponent of Mises in the calculation debate.

Conclusion

In all of these accounts we repeatedly find the same neoclassical misinterpretation of Mises' challenge, the same emphasis on static equilibrium analysis, the same allegation of a "retreat" by Hayek and Robbins, the same conclusion that socialism is unassailable from the standpoint of "economic theory." However, the theory that is impotent in discussing the economics of central planning is the static neoclassical theory of the market-socialists and of the chroniclers of the debate we have been examining. The debate has been given a "non-innocent reading" by neoclassical theorists who have not yet appreciated the important differences between themselves and Austrian economists. When the Austrian challenge to socialism has been read by those who are familiar with the unique, dynamic quality of Austrian economic theory it has been recognized as a potent argument against central planning.

NOTES

1. See Ludwig von Mises, "Economic Calculation in the Socialist Commonwealth" (1920), trans. S. Adler, reprinted in F. A. Hayek, ed., *Collectivist Economic Planning: Critical Studies on the Possibilities of Socialism* (London: George Routledge and Sons, 1935); *idem*, *Socialism: An Economic and Sociological Analysis*, trans. J. Kahane (1922; London: Jonathan Cape, 1936); Hayek, "The Nature and History of the Problem" (1935), reprinted in Hayek, *Individualism and Economic Order* (Chicago: University of Chicago Press, 1948); *idem*, "The Present State of the Debate" (1935), reprinted in *Individualism and Economic Order*; *idem*, "The Competitive 'Solution'" (1940), reprinted in *Individualism and Economic Order*; Lionel Robbins, *The Great Depression* (New York: Macmillan, 1934) and *idem*, *Economic Planning and International Order* (London: Macmillan, 1937). Other early contributions which made arguments similar to Mises' include: N. G. Pierson, "The Problem of Value in the Socialist Community" (1902), trans. G. Gardiner, in Hayek, *Collectivist Economic Planning*; Max Weber, *Wirtschaft und Gesellschaft* (Tubingen, 1921); and B. Brutzkus, *Economic Planning in Soviet Russia* (1922; London: Routledge, 1935). We will concentrate mainly on the

central Austrian contributions both because the market-socialist responses did so and because we find them to represent a more complete argument.

2. See Oskar Lange, "On the Economic Theory of Socialism" (1936), reprinted in Benjamin E. Lippincott, ed., *On the Economic Theory of Socialism* (1938; New York: McGraw Hill, 1964); H. D. Dickinson, "Price Formation in a Socialist Community," *Economic Journal* (June 1933); *idem*, *Economics of Socialism* (London: Oxford University Press, 1939); Fred M. Taylor, "The Guidance of Production in a Socialist State" (1929), reprinted in Lippincott, *On the Economic Theory*; Abba P. Lerner, "Economic Theory and Socialist Economy," *Review of Economic Studies* 2 (October 1934); *idem*, "A Note on Socialist Economics," *Review of Economic Studies* (October 1936); *idem*, "Statics and Dynamics in Socialist Economics," *Economic Journal* (June 1937); *idem*, *The Economics of Control: Principles of Welfare Economics* (New York: Macmillan, 1944); E. F. M. Durbin, "Economic Calculus in a Planned Economy," *Economic Journal* 46 (December 1936); *idem*, *Problems of Economic Planning* (London: 1949); Maurice Dobb, "Economic Theory and the Problems of a Socialist Economy," *Economic Journal* 43 (December 1933); and *idem*, "Saving and Investment in a Socialist Economy," *Economic Journal* 49 (December 1939).
3. See Taylor, "The Guidance of Production."
4. See Israel M. Kirzner, *Competition and Entrepreneurship* (Chicago: University of Chicago Press, 1973); *idem*, *Perception, Opportunity and Profit: Studies in the Theory of Entrepreneurship* (Chicago: University of Chicago Press, 1979). It should be made clear at the outset that the terms "Austrian" and "neoclassical" used in this study may not be consistent with common usage. For example, Schumpeter is not considered an "Austrian" for the purposes of this paper despite the Austrian flavor of much of his work, since on the issue of the calculation debate he adopts what we call a neoclassical view. Similarly the "flaws" in the "neoclassical" perspective cannot be attributed to every contemporary theorist who considers himself an heir to Walras and Marshall, and indeed may not have been contained in the original neoclassical theorists themselves. Rather we are referring to a tendency of many economists, notably the market-socialists, to take the formal equilibrium theory too seriously. Those neoclassical economists who see this formal theory as providing heuristic aids to economics may be closer to what we call the Austrian point of view. Most histories of thought treat this Austrian tradition—including Menger, Wieser, and Böhm-Bawerk—as a parallel development of marginalist/subjectivist economics with Jevons and Walras, and it seems that this was the view of the Austrians themselves at the time of the debate. However, much of what appeared to be subtle differences of expression has evolved into major issues of contention between Austrian and neoclassical perspectives.
5. For the best overall summary to date of the debate from this alternative perspective in English, see T. J. B. Hoff, *Economic Calculation in the Socialist Society* (London: William Hodge, 1949). Elements of this interpretation can be found in: D. T. Armentano, "Resource Allocation Problems Under Socialism," in William P. Snavely, ed., *Theory of Economic Systems: Capitalism, Socialism, and Corporatism* (Columbus, Ohio: Charles E. Merrill, 1969); James M. Buchanan, *Cost and Choice: An Inquiry in Economic Theory* (Chicago: University of Chicago Press, 1969); Michael Ellman, "The Fundamental Problem of Socialist Planning," *Oxford Economic Papers*; Georg Halm, "Further Considerations on the Possibility of Adequate Calculation in a Socialist Community," trans. H. E. Batson, in Hayek, *Collectivist Economic Planning*; *idem*, *Economic Systems: A Comparative Analysis* (New York: Holt, Rinehart and Winston, 1951); Hayek, *Collectivist Economic Planning*; *idem*, *New Studies in Philosophy, Politics, Economics and the History of Ideas* (Chicago: University of Chicago Press, 1978), pp. 232–46; W. H. Hutt, "Economic Institutions and the New Socialism," *Economica* (November 1940); Don Lavoie, "Rivalry and Central Planning: Toward a Reexamination of the Socialist Calculation Debate" (unpublished manuscript, New York University, 1980); G. Warren Nutter, "Markets Without Property: A Grand Illusion" (1968), reprinted in E. G. Furobotn and S. Pejovich, eds., *The Economics of Property Rights* (Cambridge, Mass.: Ballinger Publishing, 1974); Gerald P. O'Driscoll, Jr., *Economics as*

a *Coordination Problem: The Contributions of Friedrich A. Hayek* (Kansas City: Sheed, Andrews, and McMeel, 1977); Vincent Ostrom, "Some Paradoxes for Planners: Human Knowledge and Its Limitation," in *The Politics of Planning: A Review and Critique of Centralized Economic Planning* (San Francisco: Institute for Contemporary Studies, 1976); Svetozar Pejovich, "The End of Planning: The Soviet Union and East European Experiences," in *ibid.*; Sir Arnold Plant, "Centralize or Decentralize" (1937), reprinted in Plant, *Selected Economic Essays and Addresses* (London: Routledge and Kegan Paul, 1974); Paul Craig Roberts, *Alienation and the Soviet Economy* (Albuquerque, N.M.: University of New Mexico Press, 1971); Murray N. Rothbard, *Man, Economy, and State: A Treatise on Economic Principles* (Los Angeles: Nash Publishing, 1962); *idem*, "Ludwig von Mises and Economic Calculation under Socialism," in Laurence S. Moss, ed., *The Economics of Ludwig von Mises: Toward a Critical Reappraisal* (Kansas City: Sheed and Ward, 1976); David Ramsay Steele, "The Impossibility of Communism" (unpublished manuscript, University of Hull, England, 1978); G. F. Thirlby, "The Ruler" (1946), reprinted in J. M. Buchanan and G. F. Thirlby, eds., *L.S.E. Essays on Cost* (London: Weidenfeld and Nicolson, 1973); Karen Vaughn, "Economic Calculation under Socialism: The Austrian Contribution," *Economic Inquiry* (Summer 1980); Jack Wiseman, "Uncertainty, Costs, and Collectivist Economic Planning" (1953), reprinted in Buchanan and Thirlby, *L.S.E. Essays*; *idem*, "The Theory of Public Utility Price—An Empty Box" (1957), reprinted in *ibid.*

6. Lekachman's comment that early Marxism "gave no notion of how the future socialist society would be organized" reflects the standard view on this issue (Robert Lekachman, *A History of Economic Ideas* [New York: Harper and Bros., 1959], p. 394).
7. Although the fact of the failure of War Communism is rarely denied, many accounts blame this on exogenous causes rather than on the deliberate policy of the Lenin regime to destroy market relations and the use of money. Köhler, for example, refers to War Communism as "a period of general confusion, civil war, and popular unrest about the widespread use of brutal force" (H. Köhler, *Welfare and Planning: An Analysis of Capitalism versus Socialism* [New York: John Wiley and Sons, 1966], p. 124). But the view that is more often expressed is that the Soviet regime was in error, at least with respect to the attempt to abolish money. Thus Dobb conceded that "it can be taken as tolerably certain that the difficulties of 'War Communism,' amounting in some cases almost to disaster, which were so vividly in evidence in 1920, were not merely incidental to the system," and he refers to the destruction of money as a key factor in this failure (Dobb, *Russian Economic Development Since the Revolution* [New York: Dutton, 1928], pp. 130–31). Other writers who were not at all sympathetic to the Mises-Hayek argument nevertheless admit that a completely moneyless economy cannot work and cite this period in Russian history to illustrate the point. See for example: Barbara Wootton, *Plan or No Plan* (New York: Farrar and Rinehart, 1935); and Baidyanath Misra, *Capitalism, Socialism and Planning* (New Delhi: Oxford and IBH Publishing, 1972), p. 139. For an excellent account of the period that is consistent with our interpretation of the calculation debate, see the contributions by Roberts, "War Communism: A Re-examination," *Slavic Review* (June 1970); and *idem*, *Alienation and the Soviet Economy*.
8. Lavigne contends that the idea that "plan and market are mutually exclusive... was developed mainly by contemporary liberal economists during the early period of socialism in Soviet Russia" and refers to Mises and Hayek in this regard. See Marie Lavigne, *The Socialist Economies of the Soviet Union and Europe*, trans. T. G. Waywell (White Plains, N.Y.: I.A.S.P., 1974), pp. xii, 377. Others have also tried to deny that this model of socialism is implicit in Marx, including: Ernest Mandel, *Marxist Economic Theory*, trans. Brian Pearce (1962; New York: Monthly Review Press, 1970), pp. 632–33; Lange, "Marxian Economics and Modern Economic Theory," *Review of Economic Studies* 2 (1934–1935); and *idem*, "Marxian Economics in the Soviet Union," *American Economic Review* 35 (March 1945). We would argue, however, that they have not been very convincing. See for example: Lavoie, "Marx's Socialism and Mises' Challenge" (unpublished manuscript, New York University, 1980); Roberts, *Alienation and the Soviet Economy*; and Steele, "The Impossibility of Communism."

9. A common Marxist interpretation of Karl Marx's comments on the two "phases" of communism as discussed in his 1891 "Critique of the Gotha Programme" (reprinted in *The First International and After: Political Writings*, vol. 3, ed. D. Fernbach [New York: Random House, 1974]), is that the first phase, now called "socialism," employs money, market exchange, and a price system; while the second phase, full communism, in which the slogan "from each according to his ability, to each according to his needs" can be realized, no longer faces the problem of scarcity. We would argue that this interpretation is fundamentally mistaken about Marx's first phase, which, by our account, explicitly eschews the use of money. Thus we contend that a substantial literature on the "transition period" in contemporary Marxism is entirely misconceived, since it starts from the mistaken idea that Marxian socialism in its first phase has already arrived in twentieth-century "socialist" countries. See Adam Buick, "The Myth of the Transitional Society" (1975), *Critique*, no. 5.
10. An exception to this common view is Blodgett, who argues that Mises' claim that planning without a market would be arbitrary has become accepted by "ever so many economists" (Ralph H. Blodgett, *Comparative Economic Systems* [1944; New York: Macmillan, 1979], pp. 133-47). It seems that Blodgett has in mind the first "retreat" of the debate (from Marxism to market-socialism), while most commentators on the controversy are referring to the second "retreat" (from Mises' "theoretical" to Hayek's "practical" argument against socialism), when they say Mises was wrong.
11. The usual method by which Mises' ideas are presented is to first briefly state his argument and to then offer a detailed digression on equilibrium theory and welfare economics. Thus Howard J. Sherman (*The Soviet Economy* [Boston: Little, Brown & Co., 1969], pp. 262-63, 268) writes: "An evaluation of Mises' objection requires a brief explanation of how economists define 'rational' prices and 'rational' planning. Rational prices are defined as those which lead to an 'optimal' pattern of outputs and inputs, by the accurate representation of the marginal utility of each output and the marginal cost of each input. As early as 1897 the economist Pareto made explicit the conditions necessary to obtain an optimum welfare situation for all individuals, given the existing technology and the existing distribution of income.
 "We should be aware that Mises and Hayek attack the actual or realized operation of an imperfect planned socialist system from the viewpoint of a pure and perfect competitive private enterprise system."
 C. Bliss ("Prices, Markets, and Planning," *Economic Journal* [March 1972], p. 91) and Carl Landauer (*Theory of National Economic Planning* [Berkeley: University of California Press, 1947], pp. 56-57) similarly translate Mises' argument into Walrasian terms, while the perfect competition assumption that all agents are price-takers is attributed to the Mises-Hayek position by Köhler (*Welfare and Planning*, p. 72) and Misra (*Capitalism*, pp. 140-45). The word "efficiency" is invariably understood by neoclassical theorists to mean "Pareto-optimality," as, for example, in: R. Eidem and Staffan Viotti, *Economic Systems* (New York: John Wiley and Sons, 1978), p. 76; and Shanti S. Tangri, ed., *Command versus Demand: Systems for Economic Growth* (Boston: D. C. Heath, 1967), pp. vi-vii.
12. See for example: R. A. Dahl and D. E. Lindblom, *Politics, Economics, and Welfare: Planning and Politico-Economic Systems Resolved into Basic Social Processes* (New York: Harper & Row, 1953), pp. 210-11; Jan Drewnowski, "The Economic Theory of Socialism: A Suggestion for Reconsideration," *Journal of Political Economy* (August 1961); John E. Elliot, *Comparative Economic Systems* (Englewood Cliffs, N. J.: Prentice-Hall, 1973), p. 243; Köhler, *Welfare and Planning*, p. 68; Landauer, *Theory of National*, p. 52; Tangri, *Command versus Demand*, p. vi. The impulse to so interpret Mises is so strong that it sometimes persists alongside powerful contradictory evidence. Thus, Snively's *Theory of Economic Systems* contains a clear essay by Armentano ("Resource Allocation Problems Under Socialism") that explains how Mises "notes... that economic calculation ceases to be a problem in the stationary state or in equilibrium. But he considers this fact to be quite irrelevant to the problem of economic calculation under socialism, since 'equilibrium' is an imaginary construct and certainly

not obtainable in a real world where economic data change and uncertainty exists."

Nonetheless, Snively proceeds to repeat the same neoclassical version of Mises ten pages later in the book: "Lange next turned his attention to the arguments of Hayek and Robbins who, unlike Mises, accepted the theoretical possibility of Barone's approach...."

Similarly, Marshall I. Goldman, in *Comparative Economic Systems: A Reader* (1964; New York: Random House, 1971), p. 11, repeats the standard account despite his inclusion four pages later of excerpts from Mises' *Socialism* (pp. 119-22, 137-42), in which the latter expressly states that socialism could work in theory under static conditions.

13. For example, see Misra, *Capitalism*, p. 188; and Tangri, *Command versus Demand*, pp. vii-viii.
14. Elliot (*Comparative Economic Systems*, p. 293) refers to the contemporary consensus that Mises was wrong, citing Joseph A. Schumpeter, *Capitalism, Socialism and Democracy* (New York: Harper & Row, 1942), in this regard, and concludes: "Private ownership is not now regarded as a logically necessary requisite for the existence of a pricing system as a social process for economic calculation." Referring to Lange's model, Dahl and Lindblom (*Politics, Economics, and Welfare*, p. 211) say: "As an analytical model in economic theory, this picture of a socialist price system is valid; the consensus of economists is that Von Mises was wrong in not granting at least this much." Köhler (*Welfare and Planning*, p. 69) agrees that "clearly... Von Mises had gone too far."
15. The standard view of the significance of Barone's argument is contained in such works as: Köhler, *Welfare and Planning*, p. 69; Lekachman, *A History of Economic Ideas*, pp. 394-95; Ban B. Seligman, *Main Currents in Modern Economics* (1962; Chicago: Quadrangle, 1971), 1:107-108; and Sherman, *The Soviet Economy*, p. 264.
16. Goldman (*Comparative Economic Systems*, p. 11) writes: "Initially the argument focused around the feasibility of one system versus another. It was eventually accepted that both the Lange-Lerner and input-output systems could theoretically answer the economic question about the allocation of resources and manpower. Then the debate shifted to a dispute over which solution would be the most efficient one."

Misra (*Capitalism*, pp. 131, 140) is unclear in his interpretation of Mises, but implies the standard view on the second "retreat" when he explains that Hayek and Robbins "have pointed out that while a mathematical solution is theoretically correct, it does not provide a practical method of deciding how to use capital equipment."

Landauer (*Theory of National*, p. 57) writes: "Hayek, relinquishing the old Mises position, conceded the formal possibility of planning, but maintained that the planning board would never finish solving the innumerable equations through which the value of individual commodities would have to be calculated."

Sherman (*The Soviet Economy*, p. 265): "In the next stage of the debate, Hayek admits that in theory the planners might accumulate all the millions of pieces of necessary information and might then solve all the millions of equations necessary to make an optimal decision. In practice, Hayek argues, no conceivable force of planners could actually gather all of the various kinds of information from every factory and farm, and from every private and public consumer. Furthermore, in practice, even with all of the information, it would take hundreds of years to solve correctly all of the equations for just one year's plan."

See also Elliot, *Comparative Economic Systems*, p. 243; Seymour E. Harris, *Economic Planning: The Plans of Fourteen Countries with Analysis of the Plans* (New York: Alfred A. Knopf, 1949), p. 5; Köhler, *Welfare and Planning*, p. 79; and Tangri, *Command versus Demand*, p. vi.

17. Goldman (*Comparative Economic Systems*, p. 10) argues that Lange and Lerner provided "an answer acceptable to economists" when they "decided to meet von Mises on his own terms." I. M. D. Little (*Critique of Welfare Economics* [Oxford: Clarendon Press, 1950], p. 254) concurs: "Thus, and with some irony, the static welfare-theory armament of the supporters of *laissez-faire* was seized by their opponents, and effectively used against them."

18. Harris (*Economic Planning*, p. 4) and G. M. Pickersgill and J. E. Pickersgill (*Contemporary Economic Systems: A Comparative View* [Englewood Cliffs, N.J.: Prentice-Hall, 1974], p. 306) use the word "demonstrated" to describe Lange's answer to the Mises argument. Seligman (*Main Currents*, p. 109) calls the market-socialist approach "the definitive response," while I. H. Rima (*Development of Economic Analysis* [Homewood, Ill.: Richard D. Irwin, 1972], pp. 350-51) refers to Lange's "proof." Little (*Critique of Welfare Economics*, p. 253) contends that "at a logical level [Mises'] challenge was completely answered by socialist economists, principally Mr. Lange and Professor Lerner."

Lekachman (*A History*, pp. 396-97): "Oskar Lange... proved that a Central Planning Board could impose rules upon socialist managers which allocated resources and set prices as efficiently as a capitalist society of the purest stripe, and much more efficiently than the capitalist communities of experience."

Landauer (*Theory of National*, p. 51): "These socialist authors, primarily Oskar Lange and H. D. Dickinson, have done an excellent job in refuting some of the arguments by which the possibility of value calculation without the institution of a market had been denied. They showed clearly that the 'real' process through which the market arrives at an equilibrium price and the calculating process which a central agency must apply for the same purpose have traits in common which make it impossible to question the practicability of advance calculation of values by a planning board."

Heilbroner (*Between Capitalism and Socialism: Essays in Political Economics* [New York: Random House, 1970], p. 88), after summarizing the Mises-Hayek argument, concludes that "This line of attack against socialism did not fare very well. In the mid-1930s it was effectively demolished by Oscar Lange, the brilliant Polish economist then at Harvard."

"Lange demonstrated... that a Central Planning Board could indeed plan rationally for the simple reason that it would receive exactly the same information from a socialized economic system as did entrepreneurs under a market system."

19. Although confident assertions that the Lange model is valid "in theory" or "as a model"—such as Dahl and Lindblom, *Politics, Economics and Welfare*, p. 211; and Köhler, *Welfare and Planning*, pp. 69, 71—abound in comparative economics texts, it is frequently admitted that this model may not be workable in reality. Earl R. Sikes (*Contemporary Economic Systems—Their Analysis and Historical Background* [New York: Henry Holt and Company, 1940], p. 280) remarks that Lange's solution "may be a basis for economic calculation, but it is scarcely a basis for effective economic planning." Lekachman (*A History*, p. 397), after having expressed the view that Mises had been proven wrong, goes on to say that: "It need scarcely be said that economic planning in Russia, or anywhere else, fails rather completely to conform to [Lange's] model," as if the evident impracticability of this solution was irrelevant to its potency against Mises.
20. Because the standard view of the debate stresses the formal similarity of capitalism and socialism under static assumptions, and believes this to have been the analytical framework of the whole controversy, the conclusion is usually expressed that both economic systems are equally valid "in theory." Thus Herbert Hugo Liebhafsky (*The Nature of Price Theory* [Homewood, Ill.: Dorsey, 1963]) emphasizes the idea that exactly the same (static) welfare conditions apply to each; and G. Dalton (*Economic Systems and Society: Capitalism, Communism and the Third World* [Harmondsworth: Penguin, 1974], p. 135) says that Lange, Lerner, and Taylor showed that the rules for optimization are general. Sherman, in *The Soviet Economy* (pp. 267-68) writes: "If there is pure and perfect competition under market socialism, it turns out that the resulting allocation of resources is exactly as efficient as under pure and perfect competition in private enterprise."

"When we examine the pure and perfect form of each of these, we find that *in theory* they are equally capable of reaching a Pareto optimum condition."

Jesse Markham, in his short "editor's introduction" to Alan G. Gruchy's *Comparative Economic Systems: Competing Ways to Stability and Growth* (Boston: Houghton Mifflin, 1966), p. v (that book's only reference to the calculation debate), can find little

of value in the controversy's "rather bland intellectual diet of 'theoretical' capitalism and socialism," in which "Advocates of private enterprise typically argued that, in theory, a freely functioning market economy could assure society of economic efficiency without exacting the price of bureaucratic bungling, caprice, or plain stupidity, the inevitable concomitants of socialistic central planning. Proponents of socialism, with equal irrelevance, argued that the smoothly functioning blueprint of central planning boards eliminated the injustices and inefficiencies of private monopoly power and restraints on trade, the inescapable features of capitalistic economies. Since almost any system in theory can be made to appear superior to another system in practice, the debate was at best unrewarding and at worst misleading."

Theo Suranyi-Unger (*Comparative Economic Systems*, [New York: McGraw-Hill, 1952], p. 40) remarks that in the debate "some of the abstract results have been splendid. Yet they have been largely confined to the realm of economic theory." Similar comments that pure theory is sterile can be found in the accounts of the debate by Blodgett, *Comparative Economic Systems*, p. 147; Dahl and Lindblom, *Politics, Economics, and Welfare*, p. 20; Eidem and Viotti, *Economic Systems*, pp. 92-93; Elliot, *Comparative Economic Systems*, p. 233; and Köhler, *Welfare and Planning*, pp. 4-5.

21. Two interesting critiques of welfare economics from Austrian and Marxian perspectives can be found in Murray N. Rothbard, "Toward a Reconstruction of Utility and Welfare Economics," *Occasional Paper Series*, no. 3 (New York: Center for Libertarian Studies, 1977); and Dobb, *Welfare Economics and the Economics of Socialism: Toward a Commonsense Critique* (Cambridge: Cambridge University Press, 1969). Attempts have been made to develop a "measure" of static efficiency in Gerard Debreu, "The Coefficient of Resource Utilization," *Econometrica* 19 (July 1951); and T. C. Koopmans and J. M. Montias, "On the Description and Comparison of Economic Systems," in Alexander Eckstein, ed., *Comparison of Economic Systems: Theoretical and Methodological Approaches* (Berkeley: University of California Press, 1971), p. 44.
22. See Paul A. Baran, "National Economic Planning," in B. F. Haley, ed., *A Survey of Contemporary Economics* (Homewood, Ill.: Richard D. Irwin, 1952), 2:386; Bliss, "Prices, Markets, and Planning," pp. 95-99; Dahl and Lindblom, *Politics, Economics, and Welfare*, p. 211; Dobb, *On Economic Theory and Socialism: Collected Papers* (London, 1955), pp. 60, 241-43; E. K. Hunt and J. G. Schwartz, eds., *Critique of Economic Theory* (London: Penguin, 1972); Köhler, *Welfare and Planning*, p. 78; William N. Loucks, *Comparative Economic Systems* (New York: Harper and Bros., 1957), p. 263; Edward J. Nell, "The Fall of the House of Efficiency," *Annals of the American Academy of Political and Social Science* 409 (September 1973); Roy Radner, "Competitive Equilibrium under Uncertainty," *Econometrica* 36 (1968); Alex Rubner, *Three Sacred Cows of Economics* (London: MacGibbon and Kee, 1970), pp. 206-208; G. L. S. Shackle, *Epistemics and Economics: A Critique of Economic Doctrines* (Cambridge: Cambridge University Press, 1972), p. 270; and Thorstein Veblen, *The Place of Science in Modern Civilization, and Other Essays* (New York: Viking Press, 1919).
23. Sikes (*Contemporary Economic Systems*, p. 281) asserts that "planning... has possibilities of regularizing production not present under capitalism"; and Misra (*Capitalism, Socialism and Planning*, p. 151) claims more specifically that the socialist state "has greater capacity to forecast" and "control uncertainty."

Robert A. Solo (*Economic Organizations and Social Systems* [Indianapolis, Ind.: Bobbs-Merrill, 1967], pp. 48-50, 66-67) develops the notion of "internal uncertainty" which is due to the decentralization of decision-making, and which can therefore be potentially eliminated under centralized economic schema. Solo writes: "Under decentralized market-direction, components of related economic processes are organized as separate, independent decision-making agencies. Although the activities of these agencies are interdependent, each must chart its course of action without knowing the anticipations, intentions, and plans of the others. Thus decentralized decision-making generates pervasive and costly uncertainties. The centralization of choice eliminates the necessity for internal uncertainty." He does admit, however, (*ibid.*, p. 48), that there are

some kinds of uncertainties which "escape prediction and elude foresight under any form of economic organization." In particular he points out that the central planning apparatus may be ill-suited for the kind of experimentation entrepreneurs engage in under a decentralized system: "The plan is the antithesis of experiment. The plan arranges, fixes, gears all the parts together. Experiment disarranges. Experiment is an exercise in the uncertain, a rendezvous with the unknown. But the virtue of the plan is that it is known, that it is clearly, cleanly intermeshed, that it rolls out uncertainties" (*ibid.*, pp. 149-50). To reach the conclusion that central planning may be less capable than capitalism of coping with uncertainty, it need only be added to Solo's discussion that economic production in an advanced economy is essentially a network of continuous experimentation.

E. Neuberger and W. Duffy (*Comparative Economic Systems: A Decision-Making Approach* [Boston: Allyn and Bacon, 1976], p. 96) argue that the advantage of more centralized over less centralized systems is that in the former "the optimal solution can be reached more rapidly, thereby avoiding a waste of resources and the possibility of disequilibrating dynamic processes leading to divergence rather than convergence."

Landauer (*Theory of National*, pp. 64-63) has a similar idea in mind when he contends: "It is a crude method to search for an equilibrium by experimentally varying all the determinants until they fit together, and . . . it is infinitely more economical to carry out these variations on paper than in reality." He argues that "in an unplanned economy we cannot get very far by paper calculation, because we know too little about the reactions of others to the same problem" (*ibid.*, p. 60). Only when these reactions are constrained by a prior conscious plan can such "internal uncertainties" be eliminated. But, as Solo pointed out, this can only be accomplished at the expense of experimental discovery.

24. Many discussions, after pronouncing economic theory incapable of judging capitalism versus socialism, resort to ethical and psychological issues such as whether bureaucrats will be given enough "incentives" or "motivation" to fulfill the rule-following tasks Lange assigns them. See Timothy W. Costello, "Psychological Aspects: The Soft Side of Policy Formation," *Policy Sciences* 1 (1970); Köhler, *Welfare and Planning*, pp. 78-79; and Pickersgill and Pickersgill, *Contemporary Economic Systems*, p. 310. Although the question of incentives is closely connected to the calculation argument, it is related in a way that is quite distinct from matters of psychology and more appropriately considered matters of the theory of ownership in economics and law.

A similar reaction to the presumed impotence of economic theory is the insistence that economists turn their attention to "empirical" work instead. For example, when Bela A. Balassa (*The Hungarian Experience in Economic Planning* [New Haven, Conn.: Yale University Press, 1959], p. 17) concludes that "economic arguments are not sufficient to make a choice between economic systems," he suggests that we study the facts instead. We would agree with the spirit of this remark, but when theoretical confusion runs as deep as it does in the calculation debate there is not the barest analytical framework with which to begin a study of the "facts." The result in practice is that empirical studies smuggle implicit theoretical assumptions into their work.

25. The following comment by Bliss ("Prices, Markets, and Planning," p. 92) is typical: "The protagonists on both sides were debating, without realizing it, about the Economics of Fairyland, and different Fairylands at that."
26. See Dahl and Lindblom, *Politics, Economics and Welfare*, p. 4; Dalton, *Economic Systems and Society*, p. 112; and Eugene O. Golob, *The "ISMS", a History and Evaluation* (New York: Harper and Bros., 1954). Eckstein (*Comparison of Economic Systems*, p. 3) concludes that the calculation debate led to an increasing recognition that the preoccupation with comparisons based on "isms" was likely to yield overly simple and simplistic insights into the character of economic systems. In contrast, comparisons of models and realities tended to focus on the complexity and variety of living systems and their departure from the theoretical ideal.

Suranyi-Unger, in *Comparative Economic Systems*, goes so far as to call for "A Crusade against 'Isms'" (the title of his section one, chapter five).

A very diverse group of economists, from transition-Marxists to post-Keynesians to neoclassical welfare economists, agree that central planning consists of a judicious mixture of centralized decision-making with market institutions. Janos Korani (*Overcentralization in Economic Administration: A Critical Analysis Based on Experience in Hungarian Light Industry*, trans. John Knapp [Oxford: Oxford University Press, 1959], p. 255) makes a typical comment: "In principle it is possible to sketch out a system in which all economic choices, including even the distribution of consumer goods to individuals and people's choices of occupation, are governed by instructions from the centre. It is also possible to imagine a system in which the central authorities of the State refrain completely from all interference in economic life, everything being governed by the market mechanism. In practice, some mixture of these two is the inevitable rule. . . . This is also true in regard to socialist economies based on public ownership of the means of production."

See, for example, Morris Bornstein, ed., *Plan and Market* (New Haven, Conn.: Yale University Press, 1973); W. Brus, *The Market in a Socialist Economy* (London: Routledge and Kegan Paul, 1972); *idem*, *Socialist Ownership and Political Systems*, trans. R. A. Clarke (London: Routledge and Kegan Paul, 1975); J. T. Dunlop and N. P. Fedorenko, eds., *Planning and Markets: Modern Trends in Various Economic Systems* (New York: McGraw-Hill, 1969); W. Friedman, *Public and Private Enterprise in Mixed Economies* (New York: Columbia University Press, 1974); Eduard Heimann, "Planning and the Market System," in Findlay MacKenzie, ed., *Planned Society: Yesterday, Today, Tomorrow* (New York: Prentice-Hall, 1937); M. Kaser and R. Portes, eds., *Planning and Market Relations* (London: Macmillan, 1971); I. Konnik, "Plan and Market in the Socialist Economy," *Problems of Economics* (December 1966); Landauer, *Theories of National*, pp. 36-40; *idem*, *Contemporary Economic Systems: A Comparative Analysis* (Philadelphia: J. B. Lippincott, 1964); Lange, ed., *Problems of Political Economy of Socialism* (New Delhi, 1962); Wayne A. Leeman, ed., *Capitalism, Market Socialism and Central Planning* (Boston: Houghton Mifflin, 1963); Eugen Loeb, *Humanomics: How We Can Make the Economy Serve Us—Not Destroy Us* (New York: Random House, 1976); Mandel, *Marxist Economic Theory*, p. 636; Herbert Marcuse, *Soviet Marxism: A Critical Analysis* (1958; New York: Random House, 1961), p. 151; John Michael Montias, "Socialist Price Systems," *American Economic Review* 53 (March and December 1963); Gunnar Myrdal, *Beyond the Welfare State: Economic Planning and Its International Implications* (New Haven, Conn.: Yale University Press, 1960), p. 15; Krzysztof Porwit, *Central Planning: Evaluation of Variants*, trans. Jozef Stadler (Oxford: Pergamon Press, 1967); Ota Sik, *Plan and Market Under Socialism* (White Plains, N.Y.: IASP, 1967); *idem*, "Socialist Market Relations," in C. H. Feinstein, ed., *Socialism, Capitalism, and Economic Growth: Essays Presented to Maurice Dobb* (Cambridge: Cambridge University Press, 1967); *idem*, *The Third Way: Marxist-Leninist Theory and the Modern Industrial Society*, trans. M. Sling (1972; White Plains, N.Y.: IASP, 1976), pp. 193-95; Sh. Turetskii, "Price and Its Role in the System of Economic Methods of Management," *Problems of Economics* (May 1967); Alesky Wakar and J. G. Zielinsky, "Socialist Price Systems," *American Economic Review* 52 (March-December 1963); Wootton, *Plan or No Plan*, pp. 127-28; and J. A. Yunkar, "A Survey of Market-Socialist Forms," *Annals of Public and Co-operative Economy* (April-June 1975).

28. A voluminous literature in both the East and West has grown on this subject, the most notable Soviet contribution being L. V. Kantorovich, *The Best Use of Economic Resources* (Cambridge, Mass.: Harvard University Press, 1965). See also K. J. Arrow, L. Hurwicz, and H. Uzawa, *Studies in Linear and Non-linear Programming* (Stanford: Stanford University Press, 1958); William J. Baumol, "Activity Analysis in One Lesson," *American Economic Review* (December 1958); *idem*, *Economic Theory and Operations Analysis* (Englewood Cliffs, N.J.: Prentice-Hall, 1972), pp. 70-190, 294-318, 515-35; Mark Blaug, *Economic Theory in Retrospect* (London: Heinemann Educational Books, 1968), pp. 410-12; Robert W. Campbell, "Marx, Kantorovich, Novozhilov: 'Stoimost' versus Reality," *Slavic Review* (October 1961); H. B. Chenery and P. G. Clark, *Interindustry Economics* (New York: John Wiley and Sons, 1959); H. B. Chenery and K.

- Kretschmer, "Resource Allocation for Economic Development," *Econometrica* 24 (1956); G. B. Dantzig and P. Wolfe, "Decomposition Principle for Linear Programming," *Operations Research* 8 (1960); *idem*, "The Decomposition Algorithm for Linear Programs," *Economica* 29 (1961); Dobb, "Kantorovich on Optimal Planning and Prices," in Dobb, *Papers on Capitalism, Development and Planning* (New York: International Publishers, 1967); Robert Dorfman, "Mathematical or 'Linear' Programming: a Nonmathematical Exposition," *American Economic Review* 43 (December 1953); R. Dorfman, P. Samuelson, and Solow, *Linear Programming and Economic Analysis* (New York: McGraw-Hill, 1958); V. N. Fadееva, *Computational Methods of Linear Algebra*, trans. C. Benster (New York: Dover, 1959), pp. 99-102; N. P. Fedorenko, *Optimal Functioning for a Socialist Economy* (Moscow: Progress Publishers, 1974); Jere L. Felker, *Soviet Economic Controversies: The Emerging Marketing Concept and Changes in Planning, 1960-1965* (Cambridge, Mass.: The M.I.T. Press, 1966); W. Fellner, *Emergence and Content of Modern Economic Analysis* (New York: McGraw-Hill, 1960); David Gale, *The Theory of Linear Economic Models* (New York: McGraw-Hill, 1960); Sir John R. Hicks, "Foundations of Welfare Economics," *Economic Journal* 49 (December 1939); H. S. Houthakker, "The Pareto Distribution and the Cobb-Douglas Production Function in Activity Analysis," *Econometrica* 23 (1956); Köhler, *Welfare and Planning*, pp. 106-22; Tjalling C. Koopmans, ed., *Activity Analysis of Production and Allocation*, (New York, 1951); Kornai, *Mathematical Planning of Structural Decisions* (1967; Amsterdam: North-Holland, 1974); *idem*, "Man-Machine Planning," *Economics of Planning* 9 (1969); *idem*, "A General Descriptive Model of Planning Processes," *Economics of Planning* 10 (1970); I. Kotov, "Some Problems in Applying Mathematical Methods to Economics, and the Political Economy of Socialism," *Problems of Economics* (August 1966); H. Makower, *Activity Analysis and the Theory of Economic Equilibrium* (London, 1957); Edmond Malinvaud, "On Decentralization in National Planning," *Working Paper* 36 (Berkeley: University of California, 1961); E. Malinvaud and M. O. L. Bacharach, *Activity Analysis in the Theory of Growth and Planning* (London: Macmillan, 1967); Stephen A. Marglin, *Approaches to Dynamic Investment Planning* (Amsterdam: North-Holland, 1963); Thomas Marshak, "Centralization and Decentralization in Economic Organizations," *Technical Report* 42 (Stanford: Stanford University Economics Department, 1957); Takashi Negishi, "The Stability of Competitive Economy: A Survey Article," *Econometrica* 30 (1962); V. S. Nemchinov, ed., *The Use of Mathematics in Economics*, trans. Alec Nove (Edinburgh: Oliver and Boyd, 1964); V. V. Novozhilov, *Problems of Measuring Outlays and Results Under Optimal Planning* (New York: IASP, 1969); D. Pekelman and S. Sen, "Mathematical Programming Models for the Determination of Attribute Weights," *Management Science* 20 (1974); Pickersgill and Pickersgill, *Contemporary Economic Systems*, pp. 224-28; M. Rakovskii, "Introducing Economic-Mathematical Methods in Planning Practice," *Problems of Economics* (January 1968); Herbert E. Scarf, "Some Examples of Global Instability of the Competitive Equilibrium," *International Economic Review* 1 (1960); *idem*, "An Example of an Algorithm for Calculating General Equilibrium Prices," *American Economic Review* 59 (1969); Jati K. Sengupta, *Stochastic Programming: Methods and Applications* (Amsterdam: North-Holland, 1972); Sherman, *The Soviet Economy*, pp. 280-302; Sik, *The Third Way*, p. 200; M. J. Swann, "On the Theory of Optimal Planning in the Soviet Union," *Australian Economic Papers* (June 1975); Benjamin N. Ward, "Kantorovich on Economic Calculation," *Journal of Political Economy* (December 1960); *idem*, "Organization and Comparative Economics: Some Approaches," in Eckstein, *Comparison of Economic Systems*, p. 132; J. Wilczynski, *The Economics of Socialism: Principles Governing the Operation of the Centrally Planned Economies in the USSR and Eastern Europe Under the New System* (London: Allen and Unwin, 1970), pp. 24, 41; Alfred Zauberman, *Mathematical Theory in Soviet Planning: Concepts, Methods, Techniques* (London: Oxford University Press, 1976); and A. Zauberman et al., *Aspects of Planometrics* (New Haven, Conn.: Yale University Press, 1967).
29. See B. P. Beckwith, *The Economic Theory of a Socialist Economy* (Stanford, 1949);

- idem*, *Marginal Cost Price Output Control* (New York: Columbia University Press, 1955); L. Ya. Berri, ed., *Planning Socialist Economy*, trans. Jenny Warren (1973; Moscow: Progress Publishers, 1977), pp. 115–47; H. Brems, *Output Employment, Capital and Growth* (New York, 1959); Brus, *Socialist Ownership*, p. 74; A. Chilosi, "The Theory of Growth of a Socialist Economy of M. Kalecki," *Economics of Planning* (1971); Dobb, "Saving and Investment"; *idem*, *An Essay on Economic Growth and Planning* (London, 1960); *idem*, *Papers on Capitalism*; *idem*, *Welfare Economics*, pp. 153–82; E. Domar, *Essays in the Theory of Economic Growth* (New York, 1957); Feinstein, *Socialism*; Goldman, *Comparative Economic Systems*; S. Gomulka, *Inventive Activity, Diffusion and the Stages of Economic Growth* (Aarhus, 1971); Gregory Grossman, "Soviet Growth: Routine, Inertia, and Pressure," *American Economic Review* (May 1960); G. C. Harcourt and N. F. Laing, eds., *Capital and Growth* (London: Penguin, 1971); Michael Harrington, *The Twilight of Capitalism* (New York: Simon and Schuster, 1976); A. R. G. Heesterman, *Allocation Models for National Economic Planning* (Dordrecht, Holland: D. Reidel, 1970); *idem*, *Forecasting Models for National Economic Planning* (Dordrecht, Holland: D. Reidel, 1970); Vaclav Holesovsky, "Karl Marx and Soviet National Income Theory," *American Economic Review* (May 1961); B. Horvat, "The Optimum Rate of Investment," *Economic Journal* (1958); *idem*, *Towards a Theory of Planned Economy* (Belgrade, 1964); *idem*, "The Optimum Rate of Investment Reconsidered," *Economic Journal* (1965); Michal Kalecki, *Selected Essays on the Economic Growth of the Socialist and the Mixed Economy* (Cambridge, 1972); T. Khachaturov, *Methods of Long-Term Planning and Forecasting* (London: Macmillan, 1976); Kornai, *Rush Versus Harmonic Growth* (Amsterdam: North-Holland, 1972); J. Kornai and T. Liptak, "Two-level Planning," *Econometrica* (January 1965); J. A. Mirrlees and N. H. Stern, eds., *Models of Economic Growth* (1970; New York: Wiley, 1973); Michio Morishima, *Marx's Economics: A Dual Theory of Value and Growth* (Cambridge: Cambridge University Press, 1973); *The Rate and Direction of Inventive Activity*, National Bureau of Economic Research (Princeton: Princeton University Press, 1962); G. Warren Nutter, *The Growth of Industrial Production in the Soviet Union* (Princeton: Princeton University Press, 1962); A. Parker, "On the Application of Mathematics in Soviet Economics," *Yale Economic Essays* 3 (Fall 1963); Sherman, *The Soviet Economy*, pp. 215–31, 266, 275; Sik, *Plan and Market*, p. 262; *idem*, *The Third Way*, p. 201; Vernon L. Smith, *Investment and Production: A Study in the Theory of Capital-using Enterprise* (Cambridge, Mass.: Harvard University Press, 1961); R. Stone and G. Stone, *National Income and Expenditure* (London: Bowes and Bowes, 1972); and J. Tinbergen and H. C. Bos, *Mathematical Models of Economic Growth* (New York: McGraw-Hill, 1962).
30. See Schumpeter, *History of Economic Analysis* (New York: Oxford University Press, 1954); and *idem*, *Capitalism, Socialism and Democracy*.
 31. *Ibid.*, p. 172.
 32. *Ibid.* It is worth noting that although many authorities who support the standard view of the debate cite these three writers—Pareto, Barone, and Wieser—as early expositors of the Lange position, all three in fact seriously questioned the practicability of socialist planning. See for example: Friedrich von Wieser, *Social Economics* (1914; London: Allen and Unwin, 1927), pp. 376–97.
 33. Schumpeter, *Capitalism, Socialism and Democracy*, p. 175.
 34. Schumpeter, *History of Economic Analysis*, p. 988. We will argue that the process by which the demand for factors is "derived" from the demand for consumers' goods is far more complex and problematic than the previous two somewhat naive quotes in the text imply. Schumpeter seems to believe that the derivation in practice is as trivial a matter as it is in formal equilibrium theory.
 35. Schumpeter, *Capitalism, Socialism and Democracy*, pp. 175–76.
 36. *Ibid.*, p. 177.
 37. *Ibid.*, pp. 177, 180–81.
 38. *Ibid.*, pp. 185–86.
 39. Schumpeter, *History of Economic Analysis*, pp. 989–90.

40. Schumpeter, *Capitalism, Socialism and Democracy*, p. 184.
41. *Ibid.*, p. 188.
42. Schumpeter, *History of Economic Analysis*, p. 989.
43. *Ibid.*, p. 987.
44. Benjamin N. Ward, *The Socialist Economy: A Study of Organizational Alternatives* (New York: Random House, 1967), p. 30.
45. Abram Bergson, "Socialist Economics," in Howard S. Ellis, ed., *A Survey of Contemporary Economics* (Homewood, Ill.: Richard D. Irwin, 1948), 1:412.
46. *Ibid.*, pp. 412-13.
47. *Ibid.*, pp. 413-20.
48. *Ibid.*, p. 420.
49. *Ibid.*
50. *Ibid.*, p. 421.
51. Bergson, "A Reformulation of Certain Aspects of Welfare Economics," *Quarterly Journal of Economics* 52 (February 1938). Also see F. M. Bator, "The Simple Analytics of Welfare Maximization," *American Economic Review* (March 1957); William J. Baumol, "Activity Analysis in One Lesson"; Bergson, "A Reformulation"; Peter Bohm, *Social Efficiency: A Concise Introduction to Welfare Economics* (New York: John Wiley and Sons, 1973); James M. Buchanan, "Knut Wicksell on Marginal Cost Pricing," *Southern Economic Journal* (October 1951); Ronald H. Coase, "The Marginal Cost Controversy," *Economica* 13 (August 1946); J. de V. Graaf, *Theoretical Welfare Economics* (Cambridge: Cambridge University Press, 1957); Hicks, "Foundations of Welfare Economics"; Harold Hotelling, "The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates," *Econometrica* 6 (1938); Michael Kaser, "Welfare Criteria," in Jane Degras, ed., *Soviet Planning: Essays in Honour of Naum Jasny* (Oxford: Basil Blackwell, 1964); Köhler, *Welfare and Planning*; Lange, "Foundations of Welfare Economics," *Econometrica* 10 (July-October 1942); Little, *Critique of Welfare Economics*; S. C. Littlechild, "The Problem of Social Cost," in Louis M. Spadaro, ed., *New Directions in Austrian Economics* (Kansas City: Sheed, Andrews and McMeel, 1978); James E. Meade, *The Just Economy: Principles of Political Economy* (London: Allen and Unwin, 1976); A. C. Pigou, *Economics of Welfare* (London, 1929); Nancy Ruggles, "The Welfare Basis of the Marginal Cost Pricing Principle," *Review of Economic Studies* 17 (1950); Thirlby, "The Marginal Cost Controversy: A Note on Mr. Coase's Model," *Economica* 14 (February 1947); *idem*, "Economists' Cost Rules and Equilibrium Theory," in Buchanan and Thirlby, *L.S.E. Essays*; P. Wiles, *Economic Institutions Compared* (New York: John Wiley and Sons, 1977); and Wiseman, "Uncertainty, Costs, and Collectivist Economic Planning."
52. Bergson, "Socialist Economics," pp. 428-29.
53. *Ibid.*, p. 433.
54. However, the question arises whether agents in such a world would even require anything like a "price system" in order to coordinate their almost entirely routine behavior with one another.
55. Hayek, "The Competitive 'Solution,'" p. 188.
56. Bergson, "Socialist Economics," p. 440.
57. Bergson, "Market Socialism Revisited," *Journal of Political Economy* 75 (October 1967): 662.
58. Mises, *Human Action: A Treatise on Economics* (London: William Hodge, 1949), p. 704. For the Austrians the coordination of plans resident in separate minds throughout an economy is the equilibrium which the "trial and error" procedure would have to attempt to "find," whereas the neoclassical conception of equilibrium is simply a quantitative matching of "supplies" to "demands."
59. Bergson, "Socialist Economics," p. 431.
60. Bergson is here quoting from Hayek's "The Use of Knowledge in Society," reprinted in Hayek, *Individualism*, p. 83.
61. Bergson, "Socialist Economics," pp. 436-37.
62. *Ibid.*, p. 435.

63. *Ibid.*, p. 443.

64. For example, it is not helpful to the plant manager of a copper pipe factory to know that the average proportion of the total output of copper mines during a twenty-year span which was used in the "manufacturing" industry has been relatively stable. He is concerned with much narrower and more particular issues than input-output tables convey, whatever their value for economic theory and history may be.

65. "And as soon as one gives up the conception of a freely established monetary price for goods of a higher order, rational production becomes completely impossible. Every step that takes us away from private ownership of the means of production also takes us away from rational economics. . . .

"The administration [of the socialist state] may know exactly what goods are most urgently needed. But in so doing, it has only found what is, in fact, but one of the two necessary prerequisites for economic calculation. In the nature of the case, however, it must dispense with the other—the valuation of the means of production. . . .

"Where there is no free market there is no pricing mechanism; without a pricing mechanism, there is no economic calculation. . . .

"Exchange relations between production goods can only be established on the basis of private ownership of the means of production" (Mises, "Economic Calculation," pp. 104–11).

66. *Ibid.*, p. 109.

67. Bergson, "Socialist Economics," pp. 445–46.

68. Mises, *Human Action*, p. 710.

69. Bergson, "Socialist Economics," p. 446.

70. *Ibid.*, p. 447.

71. That is, given the highly restrictive meaning that is being attached to the phrases "economic theory" and "practicability in principle," such were not in dispute by Mises or Hayek at any stage of the debate. Putting the argument in terms of "relative efficiency" implicitly understates the seriousness of the calculation problem.

72. Bergson, "Market Socialism Revisited," p. 657.

73. Bergson, "Socialist Economics," p. 435.

74. Bergson, "Market Socialism Revisited," p. 658.

75. Ward, *The Socialist Economy*.

76. *Ibid.*, p. 12.

77. *Ibid.*, p. 14.

78. *Ibid.*, pp. 14–15.

79. *Ibid.*, p. 17.

80. Enrico Barone, "The Ministry of Production in the Collectivist State" (1908), reprinted in Hayek, *Collectivist Economic Planning*.

81. Ward, *The Socialist Economy*, p. 18.

82. *Ibid.*, p. 19.

83. *Ibid.*, pp. 21–22.

84. Hayek, "The Competitive 'Solution.'"

85. Ward's interpretation of Mises is in some respects better than the standard account. The standard account would view Barone's argument as a refutation of Mises' calculation argument, while Ward would view Barone's argument as an earlier and more systematic version of Mises' challenge. Both, however, see Mises as dealing with static equilibrium, in the one case denying and in the other case repeating Barone's formal argument. In our interpretation Mises' argument is consistent with, but not limited to Barone's.

86. Ward, *The Socialist Economy*, p. 22.

87. *Ibid.*, p. 25.

88. The distinction between insurable risk, to which can be assigned a definite cost, and "true" uncertainty will be discussed in the section on Knight.

89. In a number of places Dobb (see his "Economic Theory and the Problems of a Socialist Economy," "Saving and Investment in a Socialist Economy," *An Essay on Economic Growth, and Welfare Economics and the Economics of Socialism*) develops a critique of the manner in which choices with respect to the future are made under the capitalist mode

of production. He contends that such decisions are made irrationally (in particular, shortsightedly) and that they could be rationalized under socialism by consciously planning the rate of new investment. In contrast the Austrians have argued that a spontaneously generated rate of investment, determined by the voluntary consumption/savings ratios of individuals in the market, is more rational than attempts to interfere with it have been. The Austrian business cycle theory, for example, concerns exactly this view, arguing that the policy of credit expansion to manipulate the interest rate in fact introduces the very coordination problems that Dobb believes are inherent to capitalism.

90. Ward, *The Socialist Economy*, p. 26.
91. That is, a centralized socialist economy which lacks a rivalrous market process would also lack an equilibrating tendency. But if decentralization of price decisions is permitted, then the question becomes whether the equilibrating tendency is obstructed by interventionist government policy or allowed to freely influence the price system. Mises formulated different arguments against this "interventionist" system, but the close relationship of these arguments to the calculation argument has been lucidly described by Kirzner. See Israel M. Kirzner, "The Perils of Regulation: A Market-Process Approach," *Law and Economics Center: Occasional Paper* (Coral Gables, Fla.: University of Miami School of Law, 1978).
92. Ward, *The Socialist Economy*, p. 24.
93. See, for example, Mises, *Socialism: An Economic and Sociological Analysis*, p. 140 (added to the 1932 edition) on risk, and *ibid.*, p. 117 on information.
94. Ward, *The Socialist Economy*, p. 25.
95. *Ibid.*, p. 24.
96. *Ibid.*, p. 25.
97. Hayek, "The Present State of the Debate"; and *idem*, "The Competitive 'Solution.'"
98. Ward, *The Socialist Economy*, p. 28.
99. Lerner, *Economics of Control*, p. 3.
100. Ward, *The Socialist Economy*, p. 29.
101. Lerner, *Economics of Control*, p. viii. Ward concurs with our interpretation that Lerner is essentially arguing in static terms, although at times Lerner himself is ambiguous on this. See, for example, Lerner, "Statics and Dynamics in Socialist Economics."
102. See Ward, *The Socialist Economy*, pp. 37, 70, 73.
103. *Ibid.*, p. 30.
104. Ward specifically refers to Debreu, *Theory of Value* (New York: Wiley, 1959) in this respect, whose model introduces "time" without uncertainty.
105. A large "price adjustment" literature has been produced, much of it more recent than the survey by Negishi ("The Stability of a Competitive Economy") which Ward cites; but we would argue that this approach has not been successful in advancing economics beyond the constraints of static analysis. Indeed, Ward, in "Organization and Comparative Economics," seems to see the major drawback of this kind of approach when he remarks that "stability analysis is typically very crudely mechanistic in its assumptions."
106. While getting beyond "tâtonnement" processes is the aim of Austrian "market process" analysis, the article by F. Hahn and Negishi, "A Theorem of Non-tâtonnement Stability," *Econometrica* 30 (July 1962), which Ward cites, does little to enlighten this path.
107. Edgeworth was only able to overcome this difficulty by inventing another fiction, "recontracting," which, by permitting contracts to be perfectly revokable, makes genuine contractual exchange relations inexplicable.
108. Ward, *The Socialist Economy*, pp. 32-33.
109. See Montias, "Planning with Material Balances in Soviet-type Economics," *American Economic Review* 49 (December 1959); Malinvaud, "On Decentralization in National Planning"; G. B. Dantzig, *Linear Programming and Extensions* (Princeton: Princeton University Press, 1963).
110. In his *The Socialist Economy*, Ward does make some brief references to mathematical "oversimplifications" of these schemes—e.g., that they are static and usually linear (pp. 58-59)—but he underestimates some other potential difficulties. He claims that the

"communication between sectors and plan bureau . . . cannot be a bottleneck to extension of the schemes" (p. 61). Such communication "involves at each round sets of numbers that should not exceed n^2 for any one unit, where n is the number of sectors, and is generally much less." (Although Ward speaks here of "sectors," for this to be a workable procedure " n " would have to be the number of separately priced items in the economy, a number which when squared and then multiplied by the number of necessary rounds could constitute a considerable bottleneck for the most advanced communication system.) But if, as seems quite likely, "time prevents completion of the iterations needed to generate an optimum," for the more sophisticated of these schemes "the process can be stopped at an intermediate round and will produce a plan which is consistent and an improvement over the starting feasible plan" (p. 61). With this comment Ward is abandoning the major *raison d'être* of the auctioneer-type process. If producers are to hold up all economic activity while the linear programming experts compute an equilibrium, only to achieve a "feasible" but non-optimal configuration of prices, why wait for such costly computation in the first place? The nontâtonnement processes of a decentralized market under an appropriate legal system can accomplish this imperfect result without the intervention of planometricians.

111. Lippincott, *On the Economic Theory of Socialism*, p. 12.
112. *Ibid.*, p. 9.
113. This lumping together of the three traditions stemming from the marginalist revolution of the 1870's is common in the literature on the debate. For example, Lerner argued that "a reasonable account of modern economic theory by any one of the three methods of exposition will contain the identical doctrine" ("Statics and Dynamics," p. 54).
114. Lippincott, *On the Economic Theory of Socialism*, p. 6.
115. Heimann takes this misinterpretation of Mises to an extreme when he refers to Mises as the theorist "who more than any other economist regards laissez-faire as the system of equilibrium." (Heimann, *History of Economic Doctrines: An Introduction to Economic Theory* [New York: Oxford University Press, 1945]). On the contrary, we contend that Mises was less concerned than almost any other economist with static equilibrium and repeatedly denied that *any* system could *ever* be in equilibrium.
116. Lippincott, *On the Economic Theory of Socialism*, p. 7.
117. *Ibid.*, p. 13.
118. *Ibid.*, p. 17.
119. *Ibid.*, p. 24.
120. Alan Sweezy, "The Economist in a Socialist Economy," in *Explorations in Economics: Notes and Essays Contributed in Honor of F. W. Taussig* (London: McGraw-Hill, 1936), p. 424.
121. *Ibid.*, p. 423.
122. *Ibid.*, pp. 424-25.
123. *Ibid.*, p. 425.
124. Hayek, "The Competitive 'Solution,'" p. 196.
125. Sweezy, *Explorations in Economics*, p. 432.
126. *Ibid.*, pp. 428-29.
127. *Ibid.*, p. 432.
128. Dobb, *Welfare Economics and the Economics of Socialism*, p. 183: "There can remain scarcely any doubt that the von Mises objection in the form in which he stated it cannot be sustained."
129. *Ibid.*, pp. 184, 203-207. Dobb's interpretation of the debate is fully consistent with the standard account, as illustrated by this statement: "The debate . . . was concerned essentially with positions of equilibrium, and with the choice of one among many possible equilibrium positions as the optimum. As such it was conducted in terms of the theory of static equilibrium" (*On Economic Theory and Socialism*, p. 74).
130. Dobb, "Economists and the Economics of Socialism" (1939), reprinted in *ibid.*, p. 242.
131. *Ibid.*
132. Lerner, "Economic Theory and Socialist Economy," p. 58.

133. Dobb frequently cites, rather uncritically, Soviet growth statistics to support his argument, but besides the point that these growth rates are not as impressive as the Soviet press likes to pretend, even if they were they would prove nothing. The question is how impressive could that economy have been—in terms of the real standard of living of the people—if it had not forced a great deal of productive activity to ignore considerations of microeconomic efficiency.
134. Heimann, *History of Economic Doctrines*, p. 208.
135. Frank H. Knight, "The Place of Marginal Economics in a Collectivist System," *American Economic Review* 26, Supplement (March 1936), p. 255.
136. See Stigler's introduction to the 1971 edition of Knight, *Risk, Uncertainty and Profit* (1921; Chicago: University of Chicago Press, 1971), p. xiv.
137. See Kirzner, *Perception, Opportunity and Profit*. See also the papers by Jack High, "Disequilibrium Economics: Survey and Analyses" (preliminary draft, economics diss., U.C.L.A.); Mario J. Rizzo, "Knight's Theory of Uncertainty: A Reconsideration" (Paper delivered to the American Economic Association, Chicago, August 1978); and Lawrence H. White, "Entrepreneurial Price Adjustment" (Paper delivered to the Southern Economic Association, Washington, D.C., November 1978).
138. Both Shackle, in *Epistemics and Economics*, and Kirzner, in *Competition and Entrepreneurship*, two of the most significant "Austrian" contributions in the 1970's, make this their main point in criticism of neoclassical choice theory.
139. Knight, *Risk, Uncertainty and Profit*, p. 30.
140. Knight, "The Place of Marginal Economics," p. 264.
141. Knight, "'What is Truth' in Economics?" (1940), reprinted in Knight, *On the History and Method of Economics: Selected Essays* (Chicago: University of Chicago Press, 1956).
142. Knight, "The Place of Marginal Economics," p. 263.
143. Knight, "Statics and Dynamics: Some Queries Regarding the Mechanical Analogy in Economics" (1930), reprinted in Knight, *On the History*, p. 187. Knight's wording "process in equilibrium" is misleading here, since the whole point is that the process is in disequilibrium, as the rest of the quotation indicates.
144. Knight, "Socialism: The Nature of the Problem," *Ethics* 50 (April 1940): 258.
145. *Ibid.*, p. 285.