THE LEGACY OF RICARDO

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I. THE INTERPRETATION OF RICARDO

A characteristic feature of economic knowledge is that the contributions of distinguished economists of the past are often interpreted in alternative, and seemingly incompatible, ways. Separate research lines tend to originate in the work of the same few 'classical' writers [1]. Interpretations of Ricardo represent an important example of the way in which the existence of alternative research lines have influenced the economists' reconstruction of the history of economic thought.

Malthus explicitly associated Ricardo's contribution with a "new school of political economy", which was characterized by a treatment of value, demand and supply, and profit, essentially different from that of Adam Smith [Malthus, 1824, pp. 307-8]. This interpretation was taken up, almost a century later, by Jacob Hollander, who maintained that it would be "unreal and insufficient [...] to describe Ricardo's influence as a mere addition to or amendment of existing doctrine" [Hollander, 1910, p. 129] [2].

In contrast with this view stands John Stuart Mill's interpretation of Ricardo's theory of value as compatible with Smith's theory of natural price. Mill argued that Ricardo's labour theory of value is in fact a <u>special case</u> of the theory of price determination put forward by Adam Smith [1776]. Mill reacting to Malthus's description of the 'new school of political economy' pointed out that the labour theory of value, which was considered by Malthus as the most important among Ricardian doctrines, was the least important of Ricardo's contributions to economic analysis [Mill, 1825] [3]. Mill's argument suggests an interpretation of Ricardo which is considerably different from the one which is associated with Malthus and Jacob Hollander. For in Mill's view, the features that most clearly distinguish Ricardo's work from that of his predecessors and contemporaries are ascribed to expository practice rather than to substantial differences regarding the foundations of political economy. This point of view was again expressed by Marshall [1890] and has formed the basis of much later writing on Ricardo's theory [Stigler, 1958].

The publication of Ricardo's collected works under the editorship of Piero Sraffa (Ricardo, 1951-73), Sraffa's own introduction to Ricardo's

Principles [Sraffa. 1951] and his later publication of Production of Commodities by Means of Commodities [Sraffa, 1960] have revived the old controversy concerning Ricardo's contribution to economic theory. In particular, Sraffa has challenged the view that Ricardo's theory of value belongs to the same intellectual tradition as those of Smith and Mill, and that the Ricardian natural price is in fact a cost-of-production price brought about by the interaction of demand and supply in commodity markets. This latter interpretation was often associated with the view that the formulation by Ricardo of a pure labour theory of value, in which relative commodity prices reflect the relative amounts of labour-time needed in their production, had been a detour from Ricardo's main line of thought, and that the textual changes introduced in the chapter On Value of editions 2 and 3 of Ricardo's Principles show a weakening of the value theory originally held in edition 1 . (See Hollander, 1904 and Cannan, 1929, p. 176.)

Sraffa rejected this view and stressed the inherent consistency of Ricardo's approach by noting that, in fact, Ricardo never withdrew his fundamental propositions on value (Sraffa, 1951, p. xxxviii). The consideration of the alterations of the pure labour theory of value associated with the case of different proportions between fixed and circulating capital in different industries suggests to Sraffa a rational reconstruction of Ricardo's theory based on the notion of interdependence between production processes and on the analysis of price movements which this interdependence brings about when there are changes in income distribution. As a result, the analysis of exceptions to the labour theory of value appears to be a strength rather than a weakness of Ricardo's approach, and his theory of value is presented as a consistent endeavour to outline a technology-based explanation of relative prices. (Sraffa's interpretation of Ricardo had been anticipated by a number of scholars who had stressed that the discovery of exceptions to the labour theory of value should be considered Ricardo's most original contribution. See Nazzani, 1883; Loria, 1889; Graziani, 1926).

It is no surprise that Sraffa's revival of a somewhat neglected tradition in Ricardian scholarship elicited criticism and discussion from many different corners of the economic profession. In particular, a number of scholars have found it difficult to accept a rational reconstruction of Ricardian doctrine which seems to detach Ricardo's contribution from the line of analytical development which leads from Smith to modern theories of the demand-and- supply kind. The Legacy of Ricardo edited by Giovanni Caravale originated from a seminar held in Perugia, Italy, in May 1981 with the aim of assessing the current state of controversy about the interpretation of Ricardo. The volume publishes revised drafts of the papers originally presented at the seminar. It can be read either as a study of the conflicting views that characterize contemporary Ricardian scholarship or as an opportunity to assess the sources of disagreement over the objective characteristics of Ricardo's work. As a result, the volume reflects the current state of Ricardian scholarship both in its controversial aspect and in its constructive aspect.

II. DEMAND, SUPPLY AND DYNAMIC EQUILIBRIUM

The book begins with a methodological overview by Blaug in Part I (Blaug,1985) Blaug attempts to set the stage for the rest of the book by urging reliance on Stigler's 'rule' of textual exegesis, according to which problems of interpretation of past economists may be reconciled by adopting that interpretation which permits us to obtain the maximum number of an author's main results. Part II of the book deals with the neoclassical interpretations of Ricardo. Here we find papers in which the rational reconstruction of Ricardo's theory which was originally proposed by Sraffa (Sraffa, 1951) and subsequently upheld and extended by Garegnani (1960,1981) an Pasinetti (1960, 1982) is criticized from the point of view of the demand and supply approach. In the first paper of this part, Samuel Hollander examines the views of economic organization underlying the Ricardian and Neoclassical theories. He argues that Ricardian economics - which he associates with the work of both Ricardo and J.S.Mill - includes an exchange system fully consistent with marginalist theory. In particular, Ricardian cost-price analysis is described as an analysis of the allocation of scarce resources in terms of general equilibrium, in which final demand and the interdependence of factor and commodity markets are explicitly considered. According to Hollander, Ricardo accepted Jean-Baptiste Say's view of the "mutual interdependence between product and factor markets incorporating the principle of opportunity cost and of imputing the values of factors from the values of their products" (Hollander, 1985, p. 19).

A similar view of economic organization is found in J.S.Mill's Principles and in Léon Walras's analysis of the cost-price relationship. In this latter case, Hollander points out that Walras himself makes use of the 'Marshallian' adjustment mechanism, based on comparison of demand and supply prices and deeply rooted in the 'Smith-Ricardo-Mill tradition', rather than of the 'Walrasian' adjustment mechanism based on comparison of demand and supply quantities, once the assumption of a pure exchange economy is dropped and a production economy is considered. (See Hollander, 1985, p. 35.)

The idea that there was substantial agreement between Ricardo and Say on economic organization is the basis of Hollander's contention that Ricardo's work fully belongs to the intellectual tradition of Smith, Mill, Marshall and Walras. From this point of view, Ricardo appears to be sharing Say's view about the interaction of demand and supply in the process of market allocation, and the Ricardian adjustment mechanism is then based on the existence of a Marshall-like functional relation between cost and output. (See Hollander, 1985, p. 18.)

Hollander's interpretation of Ricardo places great emphasis on the allocative dimension of Ricardo's theory and on the role of the market mechanism in bringing about many important results of that theory. This point of view is shared by the two following papers in Part II, by Casarosa and Costa respectively.

Casarosa maintains that the 'fix-wage' interpretation of Ricardo (the assumption that the wage rate is constantly at its 'natural' or subsistence level) is incompatible with Ricardo's statement that the wage rate remains above its natural level in the process of economic growth, and that both the wage rate and the rate of profit fall in a growing economy that is approaching the stationary state, provided the economic system has moved away from the early stages of growth. (See Casarosa, 1985, pp. 45-6.)

Casarosa proposes a formulation of Ricardo's dynamic theory based on the idea that "the wage rate over time is determined by the contemporaneous working of the population mechanism and of the process of capital accumulation" (Casarosa, 1985, p. 46). In this case, "there is a general interdependence among the economic variables" and "the wage rate, the rate of profit and the rates of growth of population and capital are simultaneously determined by the interplay between the distributive variables, population growth and the accumulation of capital" (Casarosa, 1985, p. 46). This analytical framework, which has certain features in common with modern steady-state growth models, permits Casarosa to argue that Ricardo's results can be best approximated by assuming that the economic system moves along a dynamic or balanced equilibrium growth path in which capital and population change at the same rate. However, the rate of change of the market wage rate is defined by Casarosa in terms of the difference between the rate of change of capital and the rate of change of population. This implies that, in dynamic equilibrium, the market wage rate is constant while the 'dynamic equilibrium wage rate', which is equal to the marginal product of labour, is declining owing to the decreasing productivity of the wage-good industry (agriculture). Casarosa proposes that we should keep the dynamic equilibrium assumption by also assuming that "...the marginal productivity of labour in agriculture decreases not continuously but in steps, and that the steps are sufficiently long" (Casarosa, 1985, p. 53). In the end Casarosa argues that the dynamic equilibrium formulation of the Ricardian model may account for certain results of Ricardo that are not compatible with the 'natural equilibrium' interpretation of his theory, so that "the new formulation of the Ricardian system should supersede the traditional one on the ground of its greater explanatory capacity" (Casarosa, 1985, p. 57).

A more extreme departure from the 'natural equilibrium' interpretation is proposed in Costa's paper. Costa explicitly deals with various features of market equilibrium within the framework of Ricardian theory. Natural equilibrium is defined as a special type of market equilibrium in which the values taken up by the initial capital stock and total employment allow equality between market real wage and natural real wage. (See Costa, 1985, p. 67 After presenting a proof of the existence and uniqueness of market equilibrium in a two-sector market equilibrium Ricardian model, Costa shows the stability of the stationary state when this model is formulated in continuous time. A one-sector model is then introduced and its dynamic features compared with those of the two-sector model. The one-sector model is shown to exhibit a feature absent in the two-sector model, that is a tendency to periodic over-accumulation of capital and fall in interest rate. (See Costa, 1985, p. 61.) (This feature is attributed to the existence of unproductive labour in the two-sector but not in the one-sector model; see Costa, 1985, p. 72.) Costa's approach results in his contention that the Ricardian growth process cannot be described as a "sequence of natural rather than market equilibria" and that this "should imply a shift in emphasis from natural to market equilibrium in the presentation of the Ricardian theory of value and distribution" (Costa, 1985, p. 78.)

III. NATURAL PRICES AND NATURAL WAGE

Parts III and IV of the book deal with various issues arising from the interpretation of Ricardo presented by Sraffa in his Introduction to the Works and Correspondence [Ricardo, 1951-73]. In the Preface, Caravale suggests that common features of the Sraffa-based interpretations of Ricardo are the stress on natural rather than market equilibrium, and the idea that the real wage rate is exogeneously determined. However, Caravale also thinks that it is possible to distinguish between two different approaches among Sraffa-based interpretations, depending on whether the 'core' of Ricardo's theory is found, (i) in the theory of the distribution of a given social product with given methods of production, or, (ii) in the relationship between capital accumulation and diminishing returns.

The former approach stresses Ricardo's contribution to the analysis of the wage-profit relation, thereby concentrating its attention on the distribution of a given social product and on class antagonism between workers and capitalists. (See Caravale, 1985 a, pp. vii-viii.) The latter approach, on the other hand, focusses on the inverse relation between rate of profit and money wage which is determined in the long-run by the rising price of "corn". This natural equilibrium interpretation of Ricardo's theory is described by Caravale as encompassing problems of value, distribution and growth, so that the 'separation' between quantities and prices, which is an important feature of the Sraffa-based interpretations of the former kind, is no longer considered as a distinctive characteristic of the 'natural equilibrium' interpretations of Ricardo.

An important implication of Caravale's approach is that the root of cla antagonism is identified with the conflictual relationship between rentiers and capitalists, rather than with that between capitalists and workers . (See Caravale, 1985 a, p. viii.)

In the first paper of Part III Garegnani reassesses Sraffa's view that Ricardo, in his early Essay on the Influence of a Low Price of Corn on the Profits of Stock /Ricardo, 1815/, had maintained that, in the case of agriculture, the rate of net product for the process carried out on the zero-rent type of land can be determined independently of prices, "merely by comparing the physical quantity on the side of the means of production to that on the side of the product, both of which consist of the same commodity" /Sraffa, 1960, p. 93/.

Garegnani argues that "the basis of Ricardo's argument /that 'the profits of the farmer /.../ can regulate the profits of all other trades'/ lay in the physical corn quantities of agriculture and therefore, implicitly, on the simplification of wages consisting entirely of corn with its approximate correspondence to reality" (Garegnani, 1985, p. 93). This interpretation is defended against criticism from Samuel Hollander (S. Hollander, 1973, 1975, 1983) on the basis of the textual evidence provided by Malthus's letter to Ricardo of 5 August 1814, in which Malthus attributes to Ricardo the idea of a 'material rate of produce', and by the Ricardo-Malthus correspondence of the Spring 1815 [4].

This view of Ricardo based on an analytical core independent of the quantity system is also supported by Roncaglia, who points out that, once the relationships among variables within the single-period 'core' are made clear, "the way is open to the identification of causal chains, even to the recognition of the historical evolution of economic variables: many consider the 'openness to history' a decisive virtue of the 'surplus' approach over the marginalist one" [Roncaglia, 1985, p. 107].

Roncaglia also criticizes recent contributions in which the dynamic evolution of the distributive variables in Ricardo's theory is analyzed by means of functional relationships connecting the rate of population growth to the wage rate and the rate of capital accumulation to the rate of profit. In fact Roncaglia, while admitting that in Ricardo the real wage rate may be higher than the subsistence wage rate for an indefinite length of time, also points out that "Ricardo does <u>not</u> state that the greater the difference between actual and subsistence wage rates, the higher the growth of population: he avoids even a hint at a precise functional relationship between the real wage and population growth" [Roncaglia, 1985, p. 114].

The separation of prices and quantities is dropped in Part IV of the book, in which Ricardo's theory of capital accumulation and diminishing returns becomes the main focus of attention. Caravale's paper begins by presenting a reformulation of the Ricardian system which assigns special importance to the relationship between capital accumulation and diminishing agricultural productivity. In Caravale's view, the purpose of Ricardo's inquiry, as it is expounded in a well known passage of the 'Preface' to the <u>Principles</u>, is to examine the laws of motion of rent, profit and wages along the natural equilibrium path . The analysis of value is thus instrumental rather than essential [see Caravale, 1985 b , p. 129]. As a result, Ricardo's analytical framework is reconstructed by placing special emphasis on the notion of natural equilibrium and on the 'natural' dynamics of the economic system, as it is brought about by the increasing cost of producing agricultural commodities. In this case, the evolution of the economic system may be described as "a sequence of natural equilibrium positions along a path generated by non-accidental and non-temporary causes" [Caravale, 1985 b , p. 132].

This approach leads Caravale to center on the relationship between changes in production technique and changes in distribution, and to stress the analytical role of the natural wage as an economic variable which is independent of demand and supply and is determined by exogeneous factors. (See Caravale, 1985 b , p. 133-4.). Caravale points out that, in Ricardo, the natural wage is defined as that wage rate which is associated with the dynamic path on which the rates of growth of capital and population coincide. He also calls attention to the fact that in this special case only "the real wages can remain constant at their natural level, and the working of the permanent and dominant factor of agricultural diminishing returns can come into full light as the cause of the progressive fall in the general rate of profits" [Caravale, 1985 b, p. 136]. However, as Caravale points out, this interpretation of Ricardo's natural wage, although consistent with Ricardo's analysis in chapter VI, 'On Profits' and XXI, 'Effects of Accumulation on Profits and Interest', of the Principles, is not compatible with the definition of 'natural wage' given by Ricardo in chapter V, 'On Wages', in which the natural wage is defined in terms of a constant population. Caravale calls attention to this difficulty, while arguing that only the former notion of natural wage permits an adequate analysis of the relationship between the dynamics of the rate of profit and diminishing returns in agriculture. More generally, it is argued that "no distinction can be drawn, in Ricardo, between a realm of statics (to which the problem of alternative distributive setups would belong) and a realm of dynamics (to which the question of the effects on growth of changes in agricultural productive methods would belong)" [Caravale, 1985 b, p. 150].

The special relationship between capital accumulation and diminishing returns in Ricardo suggests to Tosato an interpretation of the evolution of Ricardo's thought which is at variance with the interpretation presented by Sraffa in the Introduction to Ricardo's Principles. The objective of Tosato's paper is to refute the idea that Ricardo and Sraffa addressed themselves to substantially identical issues and that Ricardo's theory may adequately be reconstructed in terms of the separate determination of prices and quantities. Sraffa had suggested that, with the adoption of a labour theory of value, "it became possible for Ricardo to demonstrate the determination of the rate of profit in society as a whole instead of through the microcosm of one special branch of production [the agricultural sector considered in the early Essay on Profits]" [Sraffa, 1951, p. xxxii]. Tosato argues that Sraffa's interpretation had probably been suggested by the fact that no difference arises between the sectoral and the macro-approach when the labour theory of value is adopted and the inverse, single period, wage-profit relationship is considered. However, "the macro-economic approach tends to turn the attention away from a dynamic analysis and to direct it, instead, towards a static theory of profit rate determination" [Tosato, 1985, p. 197]. A shortcoming of Sraffa's interpretation, according to Tosato, is that the connection between diminishing returns, which are an intrinsically dynamic phenomenon, and profit rate determination tends to be set aside. Tosato points out that Ricardo never lost interest in the dynamic relationship between distributive variables when technology is changing under the influence of land shortage and diminishing agricultural productivity. He also argues that the role of the invariable standard of value in Ricardo is that of measuring changes in the difficulty of production independently of the rise or fall of wages, rather than that of making the value of net output independent of distribution for any given technique.

In the final section of his paper, Tosato takes up a suggestion formulated by Ricardo in the late essay on 'Absolute Value and Exchangeable Value' and maintains that, if the standard of value is gold produced with labour employed for a year, and a year is also the period of production of the commoditie that enter the workers' wage basket, then a change in the value of the wage basket could be unambiguously attributed to a change in production technique. In this special case, the rate of profit in the production of necessaries is independent of the system of relative prices and determines in turn the general rate of profit in the whole economic system [See Tosato, 1985, pp. 208-15].

The fundamental role of the relationship between profit rate determination and diminishing agricultural productivity is also stressed in the essay by Porta. Sraffa's interpretation of Ricardo, which Porta attributes to the influence of Marx's reading of Ricardo and Smith, is criticized on the ground that Sraffa would be overlooking Ricardo's application of the principle of diminishing returns. Porta also criticizes the view, which is often associated with Sraffa's interpretation, that the analytical core of Ricardo's price theory is independent of activity levels and capital accumulation [See Porta, 1985, pp. 224-7].

The general issue of the interpretation of Ricardo is then reconsidered by Porta in the light of recent debates and it is argued that Ricardo's contribution "does contain the raw seeds of opposite theories" [Porta, 1985, p. 233]. As a result, it would be inappropriate to read Ricardo's work bearing in mind theoretical formulations which took shape much later in the evolution of economic thought. This feature of Ricardian contributions applies to various themes considered in recent debates. In particular, Porta criticizes Samuel Hollander's view that the 'fix-wage' interpretation of Ricardo ought to be abandoned in order to allow demand and supply to play a role in the determination of the wage rate. According to Porta, the so-called fix-wage model allows for the endogeneous determination of the wage rate not less than the model based on the interaction of demand and supply [Porta, 1985, p. 228]. On the other hand, it is argued that Ricardo's concentration upon profit rate determination in agriculture is due to his interest in diminishing returns rather than to a propensity to think of the rate of profit as a 'material rate of produce', i.e. as a rate of surplus in pure quantity terms [See Porta, 1985, pp. 230-1]. Finally, Porta criticizes Sraffa's view that Ricardo had objected to

Smith's 'adding-up' theory of price determination: "...Here again we have a case of overreaction, when Sraffa reads into Ricardo a criticism of the adding-up approach [...] An adding-up theory makes its appearance largely as an alternative to the Marxian approach to value, and historically can bear no relationship with the Ricardian system" [Porta, 1985, p. 233].

The concluding paper of Part IV, by Rosselli considers the relationship between 'market' and 'natural' variables in wage determination. After assessing the origin of the Ricardian notion of natural wage and its role in the Ricardian system, Rosselli argues that Ricardo's definition of natural wage as the price of labour "which is necessary to enable the labourers, one with another, to persist and to perpetuate their race, without either increase or diminution" [Ricardo, 1951, p. 93] involves a complex adjustment mechanism brought about by the actions of economic agents reacting to market signals [See Rosselli, 1985, p. 247]. Two alternative formulations of this adjustment mechanism are then considered: the one followed by Hicks and Hollander, in which the natural wage is defined as the minimum subsistence wage [Hicks, and Hollander, 1977], and the one adopted by authors such as Levy [1976] and Casarosa [1978], according to which the natural wage is the wage level that allows the supply and demand for labour to grow at the same rate [Rosselli, 1985, pp. 250-2]. It is then argued that an increasing money wage, and a falling rate of profit, are compatible both with fix-wage and flex-wage models [Rosselli, 1985, p. 252]. Rosselli's interpretation of Ricardian theory is related to a line of argument which goes back to Malthus's exchanges with Ricardo, as is shown by Rosselli's idea that the Ricardian definition of natural wage "implies a very implausible description of the accumulation process" and appears to be "useless outside the stationary state, when the rate of accumulation is zero and the demand for labour no longer grows" [Rosselli, 1985, p. 247]. There is in fact a strong similarity between Rosselli's view and the opinion expressed by Malthus in a passage she quotes that Ricardo's natural wage is "a most unnatural price; because in a natural state of things [...] such a price could not generally occur for hundreds of years" [Malthus, 1951, pp. 227-8; 1st edn 1820]. Rosselli's interpretation is clearly associated with the idea that the operational meaning of Ricardo's 'natural' variables is that of long-run equilibrium values, so that the actual specification of Ricardo's allocation mechanism becomes of fundamental importance.

IV. THE STRUCTURE OF CAPITAL AND ECONOMIC DYNAMICS

Ricardo dealt with the issue of the 'proportion' of circulating to fixed capital within two different contexts. On the one hand, he examined the exceptions to the pure labour theory of value which would be associated with different proportions across the various industries. [See, in particular, Ricardo, 1951, chapter I, sections IV and V; 1st edn 1817-21]. On the other hand, he considered this proportion as a particularly important factor in determining the character of 'temporary reverses and contingencies, produced by the removal of capital from one employment to another' (Ricardo, 1951, p. 263; 1st edn 1817) as well as the level and composition of the demand for labour. The issue of a *change* in the proportion of circulating to fixed capital naturally comes up when the introduction of machinery is considered [See, in particular, chapter XXXI of Ricardo's *Principles*, 'On Machinery'].

Part V of the book deals with Ricardo's treatment of the machinery question. Eltis presents a rational reconstruction of Ricardo's statements concerning "the tendency of machinery to reduce the demand for labour and to cause technological unemployment" [Eltis, 1985, p.257]. Eltis calls attention to the "considerable resemblance" between Ricardo's arithmetical example in chapter XXXI of the *Principles* and an arithmetical example presented by Barton [Barton, 1817]. But Ricardo also pointed out that "extra capital will always raise employment" [Eltis, 1985, p. 261]. However, a reduction in employment may result from the conversion of part of the *existing* stock of capital from circulating capital to fixed capital (machinery). Eltis argues that, in Ricardo, mechanization results from rising wages, so that "[t]here are [...] two trends that go on continuously: (1) mechanization all the time raises the investible surplus; (2) at the same time, it raises the amount of new capital that is needed to create a job" [Eltis, 1985, p. 273]. The final effect on employment would naturally depend on which influence is the stronger. Ricardo does not seem to provide a conclusive argument on this issue [Eltis, 1985, p. 274]. On the other hand John Stuart Mill, while following Ricardo's argument closely, maintained that the mechanization process, by providing new opportunities for investment, would push ahead the stationary state, thus showing "the ultimate benefit to labourers of mechanical inventions" [Mill, 1965, pp. 98-99; 1st edn 1848]. Marx's view on this issue is radically different, for in his work the adverse effect on employment is considered to be dominant as productivity advances, on condition that the proportion of the means of production to direct labour is continuously raised. Eltis provides an analytical discussion of Marx's argument and shows that mechanization may be "lethal for employment" if an "ever-rising capital-output ratio" is combined with increasing returns to scale [Eltis, 1985, p. 279] .

Meacci also deals with the machinery question but differently from Eltis in that he provides a conceptual framework which is aimed at the analysis of mechanization from the point of view of social rather than individual capital. An essential element in Meacci's rational reconstruction of Ricardo appears to be Jevons's distinction between 'fixed capital' and 'capital that is fixed' [Jevons, 1879, p. 264]. As Meacci points out, " [t]he past participle does here emphasize that capital, once fixed or invested, is lost in its 'right' form, namely as funds destined for the maintenance of labour: these funds can support labour only once" [Meacci, 1985, pp. 287-8]. If the point of view of social capital is adopted, an important distinction emerges between fixed and circulating capital which is often blurred when the point of view of private capital is taken. This is that circulating capital is reproduced in a shorter period than fixed capital in the economic system as a whole. According to Meacci, the effects of mechanization on employment may be examined by concentrating the attention either on individual or on social capital. In the former case, the focus will be on the individual technical process and on its changing technical coefficients; in the latter case, the focus will be on the reproduction of social capital and its prerequisites [Meacci, 1985, pp. 291-2]. From the point of view of social capital, mechanization "is simply a lengthening of the reproduction period of free capital [...] for society as a whole" [Meacci, 1985, p. 294]. This perspective leads Meacci to criticize Marx's view that there is an inevitable long-run association between growing unemployment and growing mechanization. For, "so long as constant capital is to be produced within a closed system and reproduced on an enlarged scale" growing mechanization involves the substitution of "a particular kind of labour for another kind in the general structure of production" [Meacci, 1985, p. 295]. In terms of the conceptual framework presented in Hicks's Capital and Time [Hicks, 1973] , this process may also be described as a substitution of 'construction' for 'operation' labour, and therefore as a change in the composition of the labour time which is annually spent in the economy [Meacci, 1985, p. 295]. It follows that mechanization presents itself in two rather different ways depending on which perspective is adopted. In the 'private economy' approach, mechanization is necessarily associated with the substitution of machines for labour. In the 'social economy' approach, mechanization is associated with changing time-profile of labour requirements. If we assume, as Böhm-Bawerk did [Böhm-Bawerk, 1889], that the frequency of inventions lengthening the production process is greater than that of inventions shortening this process , it follows that, as a result of mechanization, "more and more living labour, instead of being expelled from the sphere of production, is invested into it in the form of what the Austrians would call 'indirect' or increasingly indirect labour" [Meacci, 1985, p. 295].

V. THE STRUCTURE OF PRODUCTION IN RICARDO'S THEORY

In the final essay of the collection, Hicks examines which 'structure' of the productive system is involved in the formulation of Ricardo's theory. Here Hicks calls attention to the importance of the way in which the productive structure is specified in bringing about certain essential features of economic models. The distinction between the 'vertically integrated' structure of production (in which no intermediate products are explicitly considered) and the input-output structure leads Hicks to reject Sraffa's interpretation of Ricardo on the ground that Ricardo's 'industries' "are not interlinked" [Hicks, 1985, p. 306]. In Ricardo's times, Hicks points out, "[t]hough horses were intermediate products in the production of corn, the production of horses could be regarded as a stage in corn production; the production of looms as a stage in the production of cotton goods; and so on. It was a fair simplification, in Ricardo's time, to think of all industries as vertically integrated" [Hicks, 1985, p. 309]. An important implication of this description is that there is no reason to distinguish between produced commodities used as means of production and produced commodities used as final consumption goods: "final products are all on a par. There is no basic-non basic distinction. It follows directly, without complication, that the (equilibrium) prices of all products will be higher, relatively to the wage, if the rate of profit is higher" [Hicks, 1985, p. 310]. The inverse relation between the real wage and the rate of profit is thus obtained as a consequence of the fact that an increase in the prices of wage-goods is associated with a decrease in the real wage if money-wage is given.

Hicks's view that Ricardo's theory may not be immediately reformulated in terms of a 'fully interlinked' input-output model (in which commodities are produced by means of other commodities) is an important contribution to Ricardian scholarship. Indeed, it might be quite consistent with the fact that Sraffa himself associated the "picture of the system of production and consumption as a circular process", to be found in <u>Production of Commodities by Means of Commodities</u> [Sraffa, 1960], with the description of the productive system to be found in Quesnay's <u>Tableau Economique</u> rather than with that of Ricardo's <u>Principles</u>. However, it is worth considering that, once it is admitted that wage-goods consist of <u>heterogeneous</u> commodities produced in different industries, a special type of linkage is introduced between consumption goods entering the wage-basket. For a new type of 'industry' could now in principle be added to the economic system: the 'industry' which is delivering an essential input (labour) by using as its own inputs the consumption goods entering the workers' wage-basket. In this case, the description of the economic system as a set of vertically integrate 'industries' <u>a' la</u> Hicks is compatible with the adoption of a fully 'circular view of the system of production and consumption, such as the one involved in Ricardo's description of wages as the "proportion of the annual labour of the country [which] is devoted to the support of the labourers" [Ricardo, 1951, p. 49; 1st edn 1817].

Hicks's analysis of the 'structure of production' implicit in Ricardo's theory is a warning against a too extreme interpretation of Ricardo in terms of a circular model of the pure 'commodity' type. Former Ricardian scholarship had sometimes pointed out the possibility of interpreting the Ricardian description of the productive system in terms of the 'vertical integration' of productive activities. (For example, the Russian scholar N.I.Ziber wrote that, in Ricardo, "[t]he <u>series of operations</u> performed on skin by the butcher, the tanner, the shoemaker, from the point of view of the social economy are nothing but a direct, <u>single operation of boot production</u>" [Ziber, 1871, p. 228] [5]).

Ricardo's concentration upon the final consumption goods entering the workers' wage-basket suggests a possible way of integrating the description of the productive system in terms of vertically integrated industries within a 'circular' view of the 'social economy'. Hicks had previously pointed out that "[W]hat has caused so much trouble in the interpretation of Ricardo is that he has several models, and moves from one to another without much warning" [Hicks, 1983, p. 28]. The possibility of describing Ricardo's 'production structure' either in terms of vertically integrated industries or in terms of an input-output model shows the flexibility of Ricardian thought. The mutual compatibility between these two descriptions has been recently demonstrated by work in economic theory [Pasinetti, 1981, pp. 109-14] Interpretations of Ricardo will certainly benefit from the discovery that seemingly opposite economic models are rooted in alternative descriptions of the productive system, and that economic theory is able to elucidate the relationship between such alternative descriptions.

VI. CONCLUSION

The existence of 'competing' interpretations of the classics such as Ricardo, appears to be one aspect of the existence of distinct lines of inquiry in economic theorizing. This feature of economic knowledge may be related to the fact that the process of theory-formation in economics is often characterized by the specialized use of ordinary economic language, so that each theory generally derives its primitive terms from ordinary language through what we might call 'semantic specialization'. From this follows the special position of the history of economic theories in economic studies. For awareness of the history of economic concepts is essential to the interpretation of current economic theories. On the other hand, history of economic thought should be based upon explicit recognition that alternative patterns of 'semantic specialization' do exist in economic analysis and that distinct lines of inquiry are derived therefrom. Explicit recognition that disagreement is possible is an essential prerequisite for 'dialogues' between distinct lines of research.

The collection edited by Caravale is an important contribution along that direction since it provides impressive evidence of the fundamental role that theoretical beliefs do play even in matters of textual interpretation. As such the book would be essential reading both to Ricardian scholars and to economists interested in the general issue of how analytical work and intellectual history interact upon each other in the formation of economic knowledge.

FOOTNOTES

(*) Giovanni A. Caravale, ed, The Legacy of Ricardo, Oxford and New York, Basil Blackwell, 1985,

(1) A research line may be defined as "a sequence of theories sharing certain thematic concepts and hypotheses, such that each theory can be located as a step on a given trajectory" (Baranzini and Scazzieri, 1986, p. 1 n). If this view is taken, each theory can be considered to be dependent on theories previously formulated along the same line, or to be essential in the formulation of the subsequent theories in that line (See Baranzini and Scazzieri, 1986, p. 1 n). The view that the evolution of economic theory may be reconstructed as a case of multilineal evolution with many points in common between the major research lines is examined in Quadrio-Curzio and Scazzieri, 1985 and 1986.

(2) In this passage, Jacob Hollander also makes a reference to Malthus's appraisal of Ricardo in the Quarterly Review (see above).

(3) The attitude of the young Mill to Ricardo's theory of value is considered, from different points of view, in Robbins (1967) and De Vivo (1984).

(4) In the 1815 correspondence, Ricardo is initially attached to his early 'physical' theory of the agricultural net product, and only in the last letters of the exchange he appears to be moving toward a labour theory of value, which would allow him to measure total product and necessary consumption in terms of labour quantities.

(5) English translation of this passage in Scazzieri (1987).

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