

capitalist crises. Only if this prediction failed to find empirical confirmation could one finally reject value theory as unfounded.

One and only one test, a test which is remarkably and singularly absent from post-Sraffian writings can be the final arbiter of theory: the test of practice. As Albert Einstein, whose authority on such matters can hardly be questioned, remarked: 'The sceptic will say "It may well be true that this system of equations is reasonable from a logical standpoint. But this does not prove it corresponds to nature." You are right, dear sceptic. Experience alone can decide on truth.'⁴¹

Notes

Introduction

1. Marx-Engels Archiv 1, Berlin, 1928.
2. The present collection pays too little attention to French contributions to the debate on the 'transformation problem'. Let us mention in passing those of Gilbert Abraham-Froix-Edmond Berrebi, *Théorie de la Valeur, des Prix et de l'Accumulation*, Paris 1976; C. Benetti, *Valeur et Répartition*, Paris, 1974; Dostaler, *Marx, la Valeur et l'Economie Politique*, Paris, 1978; Manuel Perez, 'Valeur et Prix' in *Critiques de l'Economie Politique*, January-March 1980; Gérard Dumeuil, *De la Valeur aux Prix de Production*, Paris, 1980. Mario Cogoy, 'Das Dilemma der Neo-Ricardischen Theorie', *Beiträge zur Marxschen Theorie* 2, Frankfurt, 1974 has likewise received too little attention.
3. Let us however mention that in Chapter 49 of *Capital* Volume 3, Harmondsworth, 1981, Marx notes that the total surplus-value, i.e. *surplus labour contained* in the commodities, *produced* during the process of production is not necessarily *realised*. The identity which he establishes is between realised surplus-value and profits (there do not, of course, exist any other profits than realised ones). In other words surplus-value determines the maximum ceiling for profits. No other source of profits exists but previously produced surplus-value. More than this Marx does not establish as a law.

Chapter Two

1. Michio Morishima, *Marx's Economics*, Cambridge 1977, p. 87.
2. Deleplace, 'Biens a Double Destination' *Cahiers d'Economie Politique*, No. 2, Paris, 1975.
3. Sraffa, p. 1.
4. Steedman, p. 161.
5. *Ibid.*, ch. 11.
6. *Ibid.*, p. 153.
7. Cf. Sraffa, pp. 3-4.
8. *Ibid.*, p. 6.
9. Steedman, p. 68.
10. Sraffa, p. 90.
11. Steedman, p. 187-8, where the existence of zero prices for over-produced commodities is established and p. 204 where it is argued that Von Neumann models nevertheless constitute a good model of accumulation.

12. Ibid., pp. 163, 198.
13. Ibid., p. 187.
14. Ibid., pp. 163, 185.
15. Ibid., p. 163.
16. Ibid., p. 198.
17. Ibid., p. 127.
18. Steedman, p. 152.

Chapter Three

1. For a survey of previous criticisms, see Ben Fine and Laurence Harris, 'Controversial Issues in Marxist Economic Theory', *Socialist Register*, 1977. For my earlier arguments on Marx's theory of value, see 'Marx's Theory of Value and the Transformation Problem', in Jesse Schwartz, (ed.), *The Subtle Anatomy of Capitalism*, Santa Monica, California 1977, pp. 106–137. Finally, for 'The Poverty of Algebra', see *The Value Controversy*, London 1981, pp. 266–300.

2. L. Colletti, *From Rousseau to Lenin*, New York 1972, p. 83.
 3. Karl Marx, *A Contribution to the Critique of Political Economy*, London, 1972, p. 86.
 4. Karl Marx, *Capital*, Volume 3, Harmondsworth 1981, p. 1020.
 5. Karl Marx, *Grundrisse*, Harmondsworth 1973, pp. 196–197.
 6. Karl Marx, letter to Kugelmann, 11 July 1868.
 7. *Capital*, Volume 1, Harmondsworth, 1976, p. 193.
 8. *Capital*, Volume 3, pp. 280–281.
 9. Ibid., p. 300.
 10. Marx notes that this necessary distribution of social labour-time has two distinct aspects, which in turn give rise to two different concepts of socially necessary labour-time. There is in the first place the (abstract) labour-time which under given social conditions is necessary for the production of a given amount of a commodity. This quantity of socially necessary labour-time defines the total value of the commodity-product. It arises from the nature of a commodity as a value, as a bearer of exchange-value.
- Second, from the nature of a commodity as use-value, as an object of social need, there is the question of the correspondence between the total quantity of the commodity-product and the social need for this product. This correspondence is expressed as a quantity of labour-time which is socially necessary to produce the appropriate amount of the product, that is an amount of product which at the regulating price fulfils the effective demand for it. In the first two volumes of *Capital*, Marx assumes that this regulating price is a direct expression of value; in the third volume he develops it into a transformed expression — the price of production.
- The first type of socially necessary labour-time thus determines the unit value of a commodity, and through it the regulating price. The second type of socially necessary labour-time then determines the discrepancy between actual supply and effective demand: it therefore determines the discrepancy between market price and regulating price. (*Capital*, Volume 3, p. 774).
11. Karl Marx, *Theories of Surplus Value*, Moscow 1968, Part II, Ch. XVII, section 8 (pp. 499–507).
 12. Karl Marx, 'Wage Labour and Capital', in Robert C. Tucker, ed., *The Marx-Engels Reader*, New York, 1972, pp. 174–175.
 13. Steedman, pp. 13–14.

14. In my earlier paper (see note 1), I treat the derivation and structure of this problem in great detail. ('Marx's Theory of Value and the Transformation Problem', pp. 106–137).
15. Steedman, pp. 14–15. Steedman's position is not new of course, since it has always been a highly fashionable argument. Both Paul Samuelson and Joan Robinson, for instance, have long held this position.
16. *Capital*, Volume 1, p. 173.
17. For a related criticism of the neo-Ricardian conception of production, see my 'Political Economy and Capitalism: Notes on Dobb's Theory of Crisis', *Cambridge Journal of Economics*, no. 2, 1978, pp. 233–251, and the subsequent debate on these issues in the same journal, no. 4, 1980. For a detailed critique of Steedman and others, see 'The Poverty of Algebra', pp. 266–300.
18. *Capital* Volume 1, p. 291.
19. Even the facility of calculation is not at all equal. Estimation of values requires knowledge of labour flows and flows of means of production used up. Prices of production require in addition knowledge of the real wage bundle and of the stocks of capital advanced. These latter two pieces of information imply a much more detailed knowledge of the structure of the economy.
20. *Capital* Volume 3, p. 134.
21. *Capital* Volume 2, pp. 222–223.
22. M. Dobb, 'Mr Sraffa and the Rehabilitation of Classical Economics', p. 1.
23. It is interesting to note that Marx addresses this problem in connection with the theory of differential rent, not that of prices of production. It is often forgotten by Marxists that the former theory also implies price-value deviations, since it is the marginal conditions which rule price but the average conditions which determine value. As such, all the general phenomena involving price-value deviations appear here too.
24. *Theories of Surplus Value*, Part III, pp. 345.
25. Anwar Shaikh, 'Theories of Value and Theories of Distribution', unpublished PhD dissertation, Columbia University 1973, ch. IV, section 4; and Michio Morishima, *Marx's Economics*, Cambridge 1973, p. 142.
- When the economy is along the von Neumann ray, the rate of profit (in a circulating capital model) is independent of relative prices. But the rate of profit is the ratio of profits to cost-prices. If the sum of prices is constant, and the ratio of profits to cost-price is the same for direct prices and prices of production, then it follows that direct profits equal transformed profits and direct cost-price equals transformed cost-price.
26. The average rate of profit is from T. E. Weisskopf, 'Marxian Crisis Theory and the Rate of Profit in the Post-War us Economy', *Cambridge Journal of Economics*, no. 3, 1979, table 2 (Full Period), p. 351. The average ratio of growth is from 'Long Term Economic Growth, 1860–1970', US Department of Commerce, 1973, chart A, fig. 3, p. 8.
27. 'Theories of Value and Theories of Distribution', ch. IV, section 4; and *Marx's Economics*, p. 64.
28. *Capital* Volume 3, p. 273. Alfredo Medio also argues in favour of viewing what I called the central industry as the industry which satisfies Marx's definition of the sphere of average composition. See Alfredo Medio, 'Profits and Surplus Value: Appearance and Reality in Capitalist Production', in E. K. Hunt and J. G. Schwartz, eds., *A Critique of Economic Theory*, Harmondsworth, 1972.
29. The relation of r to S/V can be derived graphically from *Marx's Economics*, p. 64, fig. 2.
30. Karl Marx to Friedrich Engels, 30 April 1868.
31. *Capital* Volume 3, p. 280. Marx emphasizes that this process takes place over

periods of time defined by the conditions of production in different industries. The equalization process is therefore not a 'short-run' phenomenon.

32. Anwar Shaikh, 'Foreign Trade and the Law of Value', *Science and Society*, Autumn 1979 (part 1) and Spring 1980 (part 2).

33. *The Works and Correspondence of David Ricardo*, Piero Sraffa, ed., Cambridge 1962, vol. 1, p. 34; *Capital* Volume 3, p. 356; and Paul Sweezy, *The Theory of Capitalist Development*, Oxford 1942, ch. 7.

34. *Theories of Surplus Value*, Part II, pp. 193–194. See also *Capital* Volume 3, pp. 266 and 280.

35. L. Pasinetti, *Lectures on the Theory of Production*, London and New York 1977. Pasinetti calls this process 'vertical integration'.

36. Piero Sraffa, *Production of Commodities by Means of Commodities*, Cambridge 1960, p. 8.

37. See appendix B for a formal proof of this.

38. By definition π^T and K^T are the integrated profits and capital advanced, respectively. Define the integrated profit rate as $r^T \equiv \pi^T / K^T$. Then from equation (10) in the text:

$$\pi^T \equiv \pi + \pi^{(1)} + \pi^{(2)} + \dots$$

and

$$\begin{aligned} r^T &= \frac{\pi}{K} \frac{K}{K^T} + \frac{\pi^{(1)}}{K^{(1)}} \frac{K^{(1)}}{K^T} + \frac{\pi^{(2)}}{K^{(2)}} \frac{K^{(2)}}{K^T} \dots \\ &= r \frac{K}{K^T} + r^{(1)} \frac{K^{(1)}}{K^T} + r^{(2)} \frac{K^{(2)}}{K^T} + \dots \end{aligned}$$

Thus each integrated profit rate is a convex combination of individual industry profit rates at various stages in the integration process. Insofar as the competition of capitals tends to equalize industry rates of profit, it will tend to result in individual rates r_i fairly close to each other at any one moment. This in turn means that the integrated rates are likely to be very close indeed. A similar argument can be constructed for integrated wage rates.

39. \bar{r} is from 'Marxian Crisis Theory and the Rate of Profit in the Post-War US Economy', fig. 1, p. 349, and \bar{w} from *National Income and Product Accounts, 1929–1974*, US Department of Commerce, supplement to *Survey of Current Business*, January 1976, p. 211.

It should be noted that Leontief's total capital requirement is in units of \$10000. Converted to these units, $\bar{w} = 0.2612$.

40. The Goldfield-Quardt test for heteroskedasticity was performed by ranking the observations by the size of the independent variable, running separate log-regressions on the first 69 and the last 69 observations, and then performing an F-test on the ratio of the respective sums of the squared residuals (s_1, s_2) to see if the ratio was significantly different from 1. (J. Johnston, *Economic Methods*, New York 1969, p. 219). The test indicates that there is no significant heteroskedasticity in the data.

$$s_1 = 0.84671, s_2 = 0.83568, \frac{s_1}{s_2} = 0.98698 < F_{0.95} = 1.53 \text{ (60 degrees of freedom)}$$

41. Jacob T. Schwartz, *Lectures on the Mathematical Method in Analytical*

Economics, New York 1961, table IIIb, p. 43.

42. For further comments on this issue, see the debate as cited in note 17 above.

Chapter Four

1. The author is grateful for comments on an earlier version of this work from participants at a seminar on political economy at the autonomous Metropolitan University of Iztapalapa, Mexico. Particularly useful were the comments from Elizier Tijerina, Jose Carlos Valenzuela Faijo and Jaime Puyana Ferreira.

2. V. K. Dmitriev, *Economic Essays*, Cambridge, 1974; Ladislav von Bortkiewicz, 'Value and Price in the Marxian System', *International Economic Papers* 2, 1952; L. von Bortkiewicz, 'On the Correction of the Fundamentals of Marx's Theoretical Construction in Volume 3 of *Capital*', in P. Sweezy, ed., Eugen von Bohm-Bawerk, *Karl Marx and the Close of His System*, New York, 1949.

3. Of course Ricardo's concept of classes is as far removed from the Marxist view as is that of the neo-Ricardians.

4. See G. C. Harcourt, *Some Cambridge Controversies in the Theory of Capital*, Cambridge, 1972; G. C. Harcourt and H. F. Laing, eds., *Capital and Growth*, Harmondsworth, 1971; E. K. Hunt and J. G. Schwartz, eds., *A Critique of Economic Theory*, Harmondsworth, 1972.

5. See A. Medio, 'Néo-classiques, néo-Ricardiens et Marx' in *Une Nouvelle Approche en Economie Politique?*, G. Faccarello and P. de Lavergne, eds., Economica, Paris, 1977.

6. R. Meek, *Studies in the Labour Theory of Value*, London 1973, pp. xxviii–xliv.

7. It should be noted that Meek ratifies his position in a more recent work, where moreover he says that 'the idea that profit is exclusively produced by living labour', or that it is 'a deduction from the product of labour' possesses little scientific substance. See 'Whatever Happened to the Labour Theory of Value', *Essays in Economic Analysis*, M. J. Artie and A. R. Nobay, eds., Cambridge, 1975.

8. See Maurice Dobb, *Theories of Value and Distribution Since Adam Smith*, Cambridge 1973. It should be added that Dobb is one of those many economists who include Marx in the ranks of the classical economists. See, for example, Edward Nell, 'Economics: the Resurgence of Political Economy', in *Ideology and the Social Sciences*, Robin Blackburn, ed., Harmondsworth 1979; Joan Robinson, *An Introduction to Modern Economics*, McGraw-Hill, London 1973.

9. See A. Roncaglia, 'Production des Marchandises par des Marchandises. Critique et Dépassement de la Méthode Marginaliste', *Une Nouvelle Approche en Economie Politique?*, pp. 210–221.

10. Meek expresses the same idea when he says 'I see no ideological sin in taking Sraffa's models as components of a general technical base for our analysis in which we need only specify whatever additional institutional data is needed.' 'Whatever Happened to the Labour Theory of Value?', p. 256.

11. Sergio Latouche, 'Quelques Repères pour Analyser la Signification Historique de la Théorie du Professeur Piero Sraffa', *Cahiers d'Economie Politique* no. 3, Amiens, 1976.

12. See Paolo Giussani, 'A propos de la Théorie Marxiste de la Valeur: une Critique de Sraffa', *Communisme* no. 24, September–October 1976.

13. See Pierangelo Garegnani, 'La Realidad de la Explotación I, II y III' and 'Fórmulas Mágicas y Polvo de Arsénico', *Debate sobre la Teoría Marxista del Valor de Pasado y Presente* no. 82, Mexico, 1979, pp. 30–64 and 177–190.

14. Lucio Coletti, 'Valor y Dialéctica en Marx', *Debate sobre la Teoría Marxista*, pp. 75–83.

15. Claudio Napoleoni, 'El Enigma del Valor' and 'El Marx Inútil de Lippi', *Debate sobre la Teoría Marxista*, pp. 15–29 and 133–138.

16. We consider completely erroneous the views of Altwater, Hoffman and Semmler that Sraffa developed a theory of the 'distribution of the net product which presents itself as an alternative to neo-classical theory' and which is explained fundamentally by the 'relation of social forces'. See 'El Valor de Marx' in *Debate sobre la Teoría Marxista*, pp. 97–98.

17. This returns us to the Ricardian hypothesis which treats wages as a part of circulating capital. From this it is equated to a quantity of commodities of short-term durability. That is, the wage is not represented as a sum of money with which certain commodities can be bought.

18. Sraffa, p. 11.

19. 'El Valor de Marx', p. 98.

20. David Ricardo, 'An Essay on the influence of a low price of corn on the profits of stock'.

21. Adam Smith, *The Wealth of Nations*, Harmondsworth, 1970.

22. David Ricardo, *Principles of Political Economy and Taxation*, London, 1972, p. 27.

23. Ricardo, 'Absolute Value and Exchange Value', in P. Sraffa, ed., *The Collected Works of David Ricardo*, Volume 4, Cambridge.

24. This does not mean Sraffa has a theory of income distribution. This question, which is in general an important one, is not important for Sraffa because he is interested only in the relation between prices and the level of the various distributional variables, whatever may be the factors which determine them and affect their variation.

25. Sraffa, p. 18.

26. *Ibid.*

27. *Ibid.*

28. Sraffa, p. 23.

29. Obviously the concrete system he starts from comprises only fundamental branches.

30. H. G. Johnson, review of *Production of Commodities by Means of Commodities*, *Canadian Journal of Economics and Political Science*, Vol. 28, 1962, pp. 464–465.

31. R. F. Harrod, 'Compte Rendu du livre de P. Sraffa, *Production of Commodities by Means of Commodities, Une Nouvelle Approche en Économie Politique*'

32. 'Prelude to a Critique of Economic Theory', *Collected Economic Papers*, Oxford, 1965, vol. 3, p. 9.

33. Remember that for Sraffa, the notion of prices can only be elaborated correctly outwith any restrictive hypothesis on final demand. Equally the influence of final demand on the formation of long-term prices is excluded. These are obtained taking produced quantities as given, that is, prices are determined independently of quantities. The theory of prices of production is radically different from the 'symmetrical' theory of A. Marshall. See P. Sraffa, 'Sulle Relazioni fra Costo e Quantità Prodotto', *Annali di Economia* 1925, vol. 2, no. 1, pp. 277–328. Interesting also is 'The Laws of Return under Competitive Conditions', *The Economic Journal*, December 1926, vol. 36, pp. 535–550.

34. Harrod, 'An Essay in Dynamic Theory', *The Economic Journal*, 1938, p. 18.

35. J. Hicks, *Value and Capital: An Enquiry into Some Fundamental Principles of Economic Theory*, Oxford, 1939.

36. See Jean Cartelier, *Surproduit et Reproduction*, Paris, 1976.

37. Harrod, 'Compte Rendu...', p. 11.

38. See Carlo Benetti, *Valeur et Repartition*, Grenoble et Paris, 1974, pp. 128–129.

39. *Ibid.*, pp. 128–129.

40. 'El Sistema de Sraffa y la Cortica de la Teoría Neoclásica de la Distribución', in *Teoría del Capital y la Distribución*, Ed. Oscar Braun, Madrid, p. 375.

41. F. van de Velde refers to the fact that when the wage forms part of advanced capital, the relation between profit rate and wage rate is inverse, but not linear. See 'Travail et Salaire. Marx-Sraffa', *Cahiers du CEREL*, Centre d'Etude et de Recherches en Epistemologie, Lille.

42. H. Denis, *Cours d'Histoire de la Pensée Économique*, Paris, 1972–73, p. 127.

43. For more details, see C. Benetti, Suzanne de Brunhoff and J. Cartelier, 'Elements pour une Critique Marxiste de P. Sraffa', in *Cahiers d'Economie Politique*, Amiens, 1976; c. Benetti and J. Cartelier 'Prix de Production et Etalon', in *Économie Classique — Économie Vulgaire*, Grenoble-Paris, 1975.

44. Luigi Pasinetti, *Lectures on the Theory of Production*, McGraw-Hill, 1978.

45. Benetti, de Brunhoff and Cartelier, p. 33.

46. Sraffa himself confounds them when he says 'We shall also hereafter assume that the wage is paid *post factum* as a share of the annual product, thus abandoning the classical economists' idea concerning a wage "advanced" from capital'. See Sraffa p. 10.

47. 'In every country where the capitalist mode of production prevails, it is the custom not to pay for labour-power until it has been exercised for the period fixed by the contract, for example, at the end of each week. In all cases, therefore, the worker advances the use-value of his labour-power to the capitalist. He lets the buyer consume it before he receives payment of the price. Everywhere the worker allows credit to the capitalist.' K. Marx, *Capital* Volume 1, Harmondsworth, 1976, p. 278.

48. K. Marx, *Grundrisse*, Harmondsworth, 1973, p. 95.

49. *Grundrisse*, p. 96.

50. Sraffa, p. 33.

51. N. Kaldor, 'A Model of Economic Growth', *The Economic Journal*, 1957; L. Pasinetti, 'Rate of Profit and Income Distribution in Relation to the Rate of Economic Growth', *The Review of Economic Studies*, 1962, p. 267.

52. D. M. Nuti, 'Vulgar Economy in the Theory of Income Distribution', *Science and Society*, vol. 35, no. 1, Spring 1971, pp. 27–33.

53. Thus, for example, Harcourt suggests that 'Bhaduri, J. Robinson and Nell adhere to Marx's theory of exploitation, realised in the form of relative negotiating strengths, to explain the distribution of rent considered as a surplus left over from wage-earners and those who receive profits.' Harcourt, 'Some Cambridge Controversies in the Theory of Capital', quoted by Frank Roosevelt, 'Cambridge Economics and Commodity Fetishism', *The Review of Radical Political Economics*, 1975, p. 21.

54. Thus, for example, one of Marx's 'correctors' says 'magnitudes... are determined in terms of value or measured by the quantity of labour contained in each one of these magnitudes.' Claudio Napoleoni, *Lecciones sobre el Capítulo Sexto (inédito) de Marx*, Mexico 1975, p. 183.

55. Thus Napoleoni, 'Lecciones', p. 195, says that 'we must establish a system of equations such that if values alone are known, that is *quantities of labour*, the system will jointly determine prices and the profit rate.' Von Bortkiewicz himself admits the possibility that units of value can be measured in terms of labour time. In this respect he says, 'In Tugan-Baronovsky's value schema he uses units of labour time for the calculation instead of units of money... This usage is acceptable.' 'Contribution to a correction...', p. 224.

56. See Claudio Napoleoni, 'Lecciones...', p. 199.

57. *Ibid.*, p. 200.

58. *Ibid.*, p. 203.

59. See Marina Bianchi, Editorial *La Teoría de Valor desde los Clásicos a Marx*, Madrid, 1975.

60. 'El Valor de Marx', p. 102. On the neo-Ricardians' incomprehension of money, see Hans Georg Backhaus, 'Dialectique de la Forme Valeur', *Critiques de l'Economie Politique*, Paris, no. 18, Paris, 1975, October–December 1974; Pierre Salama, *Surla Valeur*, David Yaffé, 'Value and Price in Marx's Capital', *Revolutionary Communist* no. 1, London, 1975.

61. For an excellent presentation of the Marxist method see Roman Rosdolsky, *The Making of Marx's 'Capital'*, London, 1978.

62. In this respect Bernstein says that 'whether the Marxist theory of value is exact or not is without importance for the proof of a labour surplus', and that 'the labour theory of value is above all wrong in that it appears systematically as the actual means by which the worker is exploited by the capitalist.' E. Bernstein, *Evolutionary Socialism: The Premises of Socialism and the Tasks of Social Democracy*, New York, 1963.

63. Garegnani, 'La Realidad de la Explotación I, II y III', *Debate sobre la Teoría Marxista*, p. 57.

64. 'Capital did not invent surplus labour. Wherever a part of society possesses the monopoly of the means of production the worker, free or unfree, must add to the labour-time necessary for his own maintenance an extra quantity of labour-time in order to produce the means of subsistence for the owner of the means of production, whether this proprietor be an Athenian καλὸς καὶ ἀγαθὸς, ["Handsome and Good"], an Etruscan theocrat, a *civis romanus*, a Norman Baron, an American slave-owner, a modern landlord, a Wallachian boyar, or a capitalist.' K. Marx, *Capital* Volume 1, p. 344.

65. See Georg Lukacs, *Marxismo Ortodoxo y Materialismo Historico*, Mexico.

66. See Garegnani, 'Fórmulas Mágicas...' pp. 189–190.

67. Sraffa, p. 6.

68. *Ibid.*, p. 3.

69. *Ibid.*, p. 11.

70. Roosevelt, p. 21–23.

71. In Marxist value terms, Sraffa's surplus includes both V and S, while Marx's surplus includes only S.

72. K. Marx, 'Wages, Price and Profit', *Selected Works*, p. 226.

Chapter Five

1. Piero Sraffa's *Production of Commodities by Means of Commodities* is the basis of the neo-Ricardian school's development, but his contribution has probably been exaggerated, since many of his conclusions can be found in the 1904 works of V. K. Dmitriev and L. von Bortkiewicz. The model expounded by J. von Neumann (see, for example, J. von Neumann, 'A Model of General Economic Equilibrium', *Review of Economic Studies*, 1945–6) has also been influential. Marx's criticisms of the Ricardian school appear in *Theories of Surplus Value*, volume 3, ch. 20. For the critique of Ricardo himself see *Theories of Surplus Value*, volume 2 and in particular pp. 373–469.

2. *Capital*, volume 1, Harmondsworth, 1976, p. 165.

3. The neo-Ricardian theoreticians have some trouble distinguishing their own prices from those of neoclassical general equilibrium theory. The latter would, unlike the former, be the only indices of rational resource allocation. If the prices of a linear

system like Sraffa's are not compatible with the redistribution of the social product through bilateral exchange, then of necessity they are indices of a pure allocation of resources, whether or not rational, and not an expression of the commodity character of production. Bob Rowthorn has noted, opportunely enough, that neo-Ricardian theory is compatible with general economic equilibrium in 'Neo-classicism, neo-Ricardianism and Marxism', *New Left Review*, no. 86, London, 1974.

4. On the normalisation question see the last volume of Stamatis, *Sraffa und Sein Verhältnis zu Ricardo und Marx*, Gottingen, 1983.

5. The difficulties encountered in trying to introduce money are well represented in Luigi Pasinetti's attempt in *Structural Change and Economic Growth*, New York, 1975, pp. 156–175.

6. *Theories of Surplus Value*, volume 3, p. 144.

7. One must however be careful of the current view that linear systems based on the input–output technique are the generalisation either of the *Tableau Economique* or of Marx's volume 2 reproduction schemata. Marx's schemata are based on a study of the direct bilateral exchanges needed for reproduction on the basis of already given values. The linear input–output systems make abstraction of this, and therefore cannot be used to study the real conditions for economic equilibrium.

8. It is superfluous to make clear that I do not believe system (16) is an exact representation of production using labour-power as a commodity. Labour-power cannot secure a rate of profit. However the reason it cannot is derived from the theory of labour-values alone. From the neo-Ricardian standpoint, full internal coherence would require a system of this type.

9. As distinct from the values of common commodities, the value of labour-power is a function of two variables: the value of the wage-commodities and the quantity/quality of these same goods. The 'historical and moral' element of the wage of which Marx speaks in *Capital*, Volume 1, means exactly that the wage is in its turn a function of the values of consumer goods, that is of productivity in those industries which produce the goods which workers consume. That transforms, finally, the value of labour-power into a function of a single variable.

10. Ian Steedman's *Marx After Sraffa*, London, 1977, summarises the neo-Ricardians' criticisms of Marx. Many other neo-Ricardian theoreticians have avoided formulating direct criticisms of Marx, not least Sraffa himself. Steedman's assertion, quoted in the text, is the pivot of the book.

11. Brody, *Prices, Proportions and Planning*, Budapest, 1970.

12. It is obviously implicit that at the same time $S_I + S_{II} + \dots + S_{N+1} = \pi_0 + \pi + \dots + \pi_N$.

13. George Stamatis, pp. 404–440, constructs all possible examples on the basis of a system analogous to (26).

14. Sraffa, Appendix B.

15. Marx explains the level of the general rate of profit in a manner apparently analogous to Smith's in Chapter 10 of *Capital*, Volume 3. But there are enormous differences. The point of departure is not an arbitrary spectrum of profit rates, indeed the profit rates obtained when commodities are sold at their values or at prices proportional to values, and these are directly established by conditions of production. In this situation — and in no other — equalisation or demand and supply is possible. Secondly, Marx clarifies that the movement of capitals from sectors of higher organic composition towards those of lower composition is precisely that of a purchase and sale of commodities — not a 'movement of resources' or a pure monetary transfer — and must therefore alter the very phenomenon it has generated.

16. An example of what is said in the text is furnished by the treatment of fixed capital

around the Okishio theorem offered by John Roemer, 'Continuing controversy on the Falling Rate of Profit: Fixed Capital and Other Issues', *Cambridge Journal of Economics*, volume 4, 1979. Roemer identifies in a totally arbitrary manner the criterion of choice of technique of Marx, which Marx attributed to individual capitalists, with the neoclassical criterion of perfect competition. He does not recognise that within each individual sector the competing capitalists struggle directly to conquer growing quotas of produced value and therefore to lower each other's individual rate of profit. For a treatment of the problem of the choice of techniques and the falling rate of profit see Shaikh, 'Political Economy and Capitalism: Notes on Dobb's Theory of Crisis', *Cambridge Journal of Economics*, volume 3, 1978; and P. Giussani, *Competition and the Falling Rate of Profit, the Anti-Okishio Theorem*, unpublished, Milan, 1983.

17. See Eatwell, 'Mr Sraffa's Standard Commodity and the Rate of Exploitation', *Quarterly Journal of Economics*, volume 89.

18. See Pasinetti, *Lezioni di Teoria della Produzione*, Bologna, 1975

Chapter Six

1. Ladislaus von Bortkiewicz, 'Value and Price in the Marxian System', *International Economic Papers* 2, 1952. Von Bortkiewicz's treatment of gold production was criticised in J. Winternitz, 'Values and Prices: a solution of the So-Called 'Transformation Problem'', in *The Economic Journal*, June 1948. See also: Paul M. Sweezy, *The Theory of Capitalist Development*, New York, 1968, Piero Sraffa, *Production of Commodities by Means of Commodities*, London 1960, and Ian Steedman, *Marx after Sraffa*, London, 1977.

2. Marx's general theory of money is developed in *Contribution to a Critique of Political Economy*, London, 1971, ch. 2, and in its original version (the so-called *Urtext*: Marx-Engels-Gesamte-Angabe II/2, Berlin, 1980), and in *Capital*, Vol. I, ch. 3. Marx explicitly states that his theory of money is relevant to conditions of commodity production in general, including pre-capitalist commodity production (and therefore also post-capitalist commodity production) and does not limit itself to the capitalist mode of production only.

3. 'That the latter (money) is in actual fact nothing but a special expression of the social character of labour and its products, which however, as antithetical to the basis of private production, must always present itself in the last instance as a thing, as a particular commodity, alongside other commodities.' Karl Marx, *Capital*, Volume 3, Harmondsworth, 1981, p. 743.

4. The owner of gold does not 'sell' his commodity, which therefore has no price. He 'barter's' it against, say, wheat. The owner of wheat thereby effectively sells his commodity against gold.

5. Marx states that commodities cannot enter the circulation process without having a price, (*Contribution* . . . pp. 86-107).

6. What about paper money, which has hardly any intrinsic value, whose production hardly costs any socially necessary labour? For Marx, paper money is money which 'represents the money commodity' (under present circumstances gold), regardless of government decisions or regulations. Governments are of course free to print bank notes in any quantities they desire. Banks are equally free, under the constraint only of the central banks' practical regulations, to advance as much credit (that is bank money) to their customers as they wish. But neither governments nor banks can suspend the operations of the law of value. If to produce one ounce of gold takes as much average socially necessary labour-time as to produce twenty tons of steel, you can impose a

price of \$35 for twenty tons of steel only if, simultaneously, \$35 enables you to actually buy an ounce of gold. If you have to pay in fact \$350 for an ounce of gold (whether at the mint, the central bank or on the free market), the price of twenty tons of steel will also rise towards \$350, simply because now a banknote of ten dollars now represents not 1/3.5th ounce of gold, but only 1/35th ounce of gold. But this depends not only on the quantity of paper and bank money put into circulation, but also on the relative increases or decreases in the productivity of labour of gold mining on the one hand, and industry and agriculture on the other. In other words, it depends on the relation between the intrinsic value of gold and the intrinsic value of other commodities measured in the labour-time necessary for their production, as well as on the circulation velocity of paper and bank money, on the phase of the business cycle, and so on.

7. When we talk about the value of gold, we always mean its intrinsic value, that is the quantity of social labour necessary for its production, measured in labour-time, and never its purchasing power. This purchasing power can only be deduced from the evolution of the general price level, which is precisely a relation between the value of the commodity gold and the average value of all other commodities.

8. 'Gold must be in principle a *variable* value, if it is to serve as a measure of value, because only as reification of labour-time can it become the equivalent of other commodities, but as a result of changes in the productivity of concrete labour, the same amount of labour-time is embodied in unequal volumes of the same type of use-values.' *Contribution*.

9. I myself also made the mistake, in *Late Capitalism*, London, 1973, of using gold production as a 'department III' of production, confusing gold in general with its particular (and minor) role of luxury good.

10. Rumour has it that the next gold bonanza is starting to take place in Brazil. This remains to be seen. Note that, according to the *International Herald Tribune* of 6 April 1983, Brazilian gold production has increased from 4.4 tons in 1968 to 30 tons in 1982, half of which is in the new supposedly bonanza area of the Madeiras-Topajos, in the Amazon basin.

11. 'In August 1862, Messers Hartley and Reilly arrived at Dunedin with 1.047 oz gold, which they had found by cradling and washing the sands on the beaches of the Clutha River, between the sites of the present towns of Clyde and Cromwell [in New Zealand]. As soon as this became known the excitement was so great that men left lucrative employment and comfortable houses to follow the life of a digger. Prices of agricultural produce and food of all descriptions went up, and the demand for teamsters to take goods and tools to this new Eldorado was so great that £120 per ton was paid for the carriage of goods from Dunedin . . . The demand for sawn timber was also so great that boards were stripped from drays and wagons and sold, the usual price for an empty gin-case being £5. (New Zealand Official Year-Book 1908).

12. A basic reason for apartheid and racist political, civil and labour laws in South Africa is to create a segregated labour market, which has largely insulated for more than half a century the black miners' wages (a significant part of the cost of production of gold) from the ups and downs of the general level of wages in that country, not to mention wages in the imperialist countries, which, during that period, bought practically all the gold produce in South Africa. In fact, according to Francis Wilson, in *Labour in the South African Mines, 1911-1969*, Cambridge, 1972, on the basis of 100 = the average black miners' wages in 1936, black miners' wages were actually in 1969 a bit below those of the 1911 index, 108 as against 111. In the latter nineteen-seventies and the early nineteen-eighties, this trend was reversed, as a result of the new gold boom, the relative shortage of labour-power for the mines given the low wage level

compared to that of black workers in industry and building and the pressure in the independent black states against providing cheap labour-power for South African mines. As a result of these changes, black South African miners' real wages increased by 230% between 1969 and 1983 (*The Economist*, 23 June 1983).

13. Between 1933, when the price of gold was fixed at \$35 an ounce by the US authorities, and 1980, when the free market gold price rose to \$500 an ounce, the cost-of-living index in the USA has multiplied by six, but productivity of labour had increased by twice as much in industry and agriculture as in gold mining. 12 multiplied by 35 gives us 420 as the purchasing power of gold, of which the gold price is the reciprocal. Marx's theory of money hasn't done so badly in offering a basis for explaining the empirical facts.

14. 'With a given development of the production of social labour (as on the one hand the mastering of mechanical or chemical obstacles becomes easier and on the other the relative distance of gold and silver producing countries becomes less important) *the discovery of alternative gold and silver deposits must weigh even more decisively in the scales.*' Urtex of *Zur Kritik...*, MEGA II/2, p. 44.

15. The gold bonanza area attracts *both* labour and capital, be it only because gold digging rapidly requests capital investment. In his book *After the Gold Rush — Society in Grass Valley and Nevada City* (Stanford University Press 1981), Ralph Mann describes how 'by 1850, mining operations had already left gold pans and one-man rockers behind: sluices and long toms (a kind of large rocker) worked by organized companies of miners, dominated the diggings. Coyoteing demanded even more planning and cooperative effort, and new knowledge and technology. Miners had to learn to map the courses of the ancient underground stream beds where the deposits lay, to sink shafts that would not cave in, and to get workers, tools, and fresh air to the bottom of them. Miners also had to raise capital for the expensive work of digging and equipping shafts before any returns were possible... Men arriving at the coyote mines alone and with little cash had to go to work for those with enough of a stake to pay wages' (p. 12). In other words: whatever the specificity of gold and gold production, under capitalism it tends to separate capital and wage labour rapidly, like any other branch of production. Even if gold miners' wages are initially above social average, profits (surplus value) accrue only to the owners of capital.

16. 'Cloth breeches reached 30 pesos, laced boots as much, a black cape, 100 pesos, a quire of paper 10 pesos, an *azumbre* (2 litres) 20 pesos, and a horse 3000, 4000, and even 5000 ducats, which prices persisted for a number of years' (one peso at that time equalled more or less 4 gr of gold) F. L. Gomara, *Historia de las Indias*, cited in Michele and Bernard Gazxier, *Or et Monnaie chez Martin de Azpilcueta*, Paris, 1978, p. 5.

17. Braudel and Spooner, 'Prices in Europe from 1450 to 1750', in *Cambridge Economic History*, Cambridge 1967; Pierre Vilar, *A History of Gold and Money*, London, 1976, pp. 104, 115–116, on gold production, pp. 117–118 and 123–133 on the amalgamation process and the social relations of production in the Potosi silver mines.

18. See *Capital*, Vol. 3, ch. 14, for the countervailing forces braking the tendency of the average rate of profit to decline. For the concrete explanation of the 'upward' turning points of long waves through a combination of these counteracting forces, see *Late Capitalism*, ch. 4, and Ernest Mandel, *The Long Waves of Capitalist Development*, Cambridge, 1980.

19. Engels Ref: p. 367. Herr Eugen Dühring's Revolution in Science (Anti-Dühring) Part III, London 1969, Chapter IV (Distribution). 'From the moment when society enters into possession of the means of production and uses them in direct association for production, the labour of each individual, however varied its specifically

useful character maybe, is immediately and directly social labour. The quantity of social labour contained in a product has then no need to be established in a roundabout way, as daily experience shows in a direct way how much of it is required on the average. Society can calculate simply how many hours of labour are contained in a steam-engine, a bushel of wheat of the last harvest, or a hundred square yards of cloth of a certain quality. *It could therefore never occur to it still to express the quantity of labour put into the products, quantities which it will then know directly and in their absolute amounts, in a third product, and in a measure which besides, is only relative, fluctuating, inadequate, though formerly unavoidable for lack of a better, rather than express them in their natural adequate and absolute measure, time.*

20. Throughout this contribution, I consider gold and paper currencies (banknotes) as identical, assuming paper currencies to be convertible into gold. The problems of inconvertible, constantly depreciating, inflationary paper currencies — moneys with forced course as Marx called them — are outside the realm of this study, as they were outside the realm of the third volume of *Capital*. But they can be easily reduced to Marx's commodity theory of money, on the basis of chapter II of *Contribution to a Critique of Political Economy*.

21. Marx explicitly states that prices differ from values for that reason. But this confirms that when he identifies the sum of values and the sum of prices of production in the third volume of *Capital*, he does make abstraction of money, that is he does not refer to prices in the monetary sense of the word. The important point for him to stress is the fact that value, that is the law of value, regulates the movement of prices, and therefore also the deviations of monetary prices from values.

22. Ernest Mandel, Introduction to *Capital*, vol. 2, Harmondsworth, 1979.

23. A striking confirmation of this thesis of Marx is offered by the way the *international* capitalist system depends today upon the South African *apartheid* regime. In their above-quoted book, Lanning and Mueller indicate that around 1920, South Africa's so-called 'marginal mines' — which constituted roughly one-half of the Rand's gold mining industry — 'had been kept in production only because the mining companies held down wages of Africa mineworkers... In real terms, black wages were 13% lower in 1921 than they had been in 1916. But without a segregated (segmented) labour market, such a decline of real wages could have been impossible. And without such decline, there would have occurred a drastic reduction of gold output, which would have been a real catastrophe for the international capitalist economy!

24. I have insisted on the importance of the time schedule for the transformation problem in previous writings, for instance in my introductions to the second and third volumes of *Capital*. Independently from me, but basing himself on partially similar reasoning, Professor Michel de Vroey of Louvain University, has arrived at similar conclusions ('A restatement of the Marxian Theory of Value', working paper no. 8005, Institut des Sciences Économiques, Université Catholique de Louvain, June 1980), published also as 'Value Production and Exchange' in *The Value Controversy*, London, 1981.

Chapter Seven

1. See, for example, Morishima and Catephores in 'Le Problème de la Transformation: un Processus Markovien' in *Valeur, Exploitation et Croissance*, Economica, 1980. We have also dealt with this in a book and several articles: P. Salama, *Sur la Valeur*, Paris 1979.

2. Note that successive corrections often leave chapter 10 out of their treatment, biasing their mathematical solutions.

3. Von Bortkiewicz reproduces Marx's error when he considers a single coefficient of transformation for each department. Each department is composed of several branches, with different organic compositions. This leads to treating the products of these branches as if they exchanged at their values.

4. We have developed this in our book. See also D. Yaffe: 'Value and Price in Marx's Capital', Revolutionary Communist No. 1, London 1975, and P. Salama 'Transformación Matemática o Metamorfosis del Valor en Precios de Producción', in *Criticas de la Economía Política*, Mexico, 1978, no. 20, where we show that this conception flows from a confusion between Ricardo's theory and Marx's, sometimes to the point of presenting them in a unified way.

5. *Capital*, Vol. 1, Harmondsworth, 1976, p. 126.

6. 'The commodity is an immediate unity of use values and exchange values, that is to say of two opposites. It is thus immediately *contradictory*. This contradiction must develop as soon as we cease, as we have up until now, analysing the commodity now as a use value, now as an exchange value, and consider it in its totality, in its real relation to other commodities. But the real relation between commodities is their exchange.' K. Marx, *Value Studies*, A. Dragstedt, ed., London, 1976, p. 40. Also quoted by Yaffe, p. 39. This paragraph was originally at the end of the first chapter of volume 1 of *Capital* but was removed in the third edition.

7. This point will be further developed in what follows.

8. What is important at this stage of the analysis is this 'something' in common and not the common quantity of something.

9. Coletti, from *Rousseau to Lenin*, New York, 1972. This view is not neutral. It has been the subject of a debate between Rubin and the 'idealists' on one hand and the 'mechanists' on the other in the Soviet Union just after the revolution. See Lomis Baslé, *L'Élaboration de L'Économie Politique du Socialisme*, State Thesis for Paris 10, 1979, p. 128.

10. *Capital* Volume 1, p. 128.

11. *Ibid.*

12. R. Rosdolsky, *The Making of Marx's Capital*, London, 1971.

13. Bachaus, 'Dialectique de la Forme Valeur', *Critiques de L'Économie Politique* (CEP) no. 18, 1974, p. 8, which continues, 'The fact that the 'object in general' as such, that is, value as value, cannot be expressed at all but only 'appears' in a deformed form, as a 'relation' between two use values, is hidden from the reader.' (p. 9).

14. As Fausto rightly stresses: 'what does one analyse when one analyses the simple form of value?' An actual exchange? In fact, actual exchange is not analysed here — this is properly the subject of ch. 2 of the first section. Fausto, 'On the Value Form and Fetishism', CEP, no. 16, Paris 1981.

15. We could permit ourselves an ironical inversion of the footnote in Morishima and Catephores, p. 165: Marx's contribution to mathematical economics has always been underestimated or ignored, giving rise to the annoying tradition which ensures that the aptitudes for formalisation of the Marxist economists are always more limited than those of the orthodox economists', remarking that the use of mathematics in economics, without methodological preliminaries is perilous, when as in this precise case it is not transformed by a simple school exercise.

16. Fausto.

17. *Ibid.*

18. 'Now, however, we have to perform a task never even attempted by bourgeois economics. That is, we have to show the origin of this money-form, we have to trace the

development of the expression of value contained in the value-relation of commodities from its simplest, almost imperceptible outline to the dazzling money-form.' *Capital* volume 1, p. 139.

19. Marx, *Theories of Surplus Value*, London, 1969, volume 2, p. 200.

20. *Capital* volume 1, p. 148.

21. *Ibid.*, p. 150.

22. *Ibid.*

23. J. L. Dallemagne, 'Le Mythe de la Stagflation', in *l'Inflation Capitaliste*, Paris, 1972, p. 163. We should add that a very interesting discussion on the status of money has developed in France in the last ten years or so, with the above work of Dallemagne with the (unpublished) thesis by Cartelier, and more recently the book by Benetti and Cartelier, *Marchands, Salariat et Capitalistes*, Paris 1980, discussed by Guibert in CEP no. 13 and by Fausto, op. cit. The critical presentation of this discussion is beyond the scope of this study.

24. *Capital*, volume 1, p. 202.

25. 'Nevertheless the coat, in relation to the linen, cannot represent value, unless value for the latter simultaneously assumes the form of a coat', unless, in other words, it appears that 'the coat, just as it is, expresses value and is endowed with the form of value by nature itself', Rosdolsky, p. 124 and Marx, *Capital*, volume 1, p. 143.

26. There is a certain similarity between money and labour-power. Both, though they are commodities, are very specific kinds of commodities. They are commodities and they are not commodities. Here we cannot develop this point. We note, however, that a very interesting discussion has broken out on the status of labour-power. Is it a commodity or not? Does it have a value or not? See Benetti and Cartelier.

27. We can thus understand why in Marx's work section 1 of Chapter 1 analyses commodity and value without dealing either with wage-earners or surplus-value. Those who consider that Marx's most important discovery was exploitation have often forgotten his exposure of fetishism, and present exchange value as equivalent to value.

28. Aglietta, 'La Dévalorisation de Capital, Étude des Liens entre Accumulation et Inflation', Cahiers de l'ISMEA, 1980, p. 387.

29. See my *Sur la Valeur* and 'Transformación Matemática'.

30. *Capital* volume 3, Harmondsworth, 1981, p. 274.

31. K. Marx, *Grundrisse*, Harmondsworth, 1977, 3rd edition, p. 761.

32. P. Sweezy, *The Theory of Capitalist Development*, New York, 1968, p. 110, notably when he writes: 'Obviously this would not be a position of equilibrium. The capitalists would all want to go into the production of wage goods [with a low organic composition] in order to share in the higher rate of profit obtainable there. And such a migration of capital out of some industries and into others would clearly upset the whole schema [of value]. A position of equilibrium must be characterised by equality in the rates of profit yielded by all the industries in the system'. Note that numerous economists take a similar position.

33. It is true that one finds this kind of erroneous reasoning in Marx, in contradiction with his more common positions: 'Capital withdraws from a sphere with a low rate of profit and wends its way to others that yield higher profit... this provokes a relationship between supply and demand such that the average profit is the same in the various difference spheres, and values are therefore transformed into prices of production.' *Capital* volume 3, p. 297.

34. *Capital* volume 3, p. 280. See also p. 297.

35. It is understood that the sum of individual values necessarily corresponds to the sum of market values, since several commodities are considered. For more detail see *Capital*, volume 3, pp. 283–285.

36. This opinion is not widely known. It is generally considered that exchange on the market produces this average value, thus mixing up market value and market price. See Rosdolsky's interesting remarks on pp. 88–95.

37. Marx, *ibid.*, p. 285. We should add that there is sometimes confusion in the French version between market value and market price. These confusions seem to be the result of a bad translation of the first edition, as a note on p. 200 [of the French edition: translator] indicates. But sometimes it is very clear, for example: 'If demand falls, for example, and with it the market price, this can lead to a withdrawal of capital and thus a reduction in the supply. But it can also lead to a fall in the market value itself as a result of inventions.' p. 292 (English edition) p. 209 (French edition). 38. This distinction is rarely made. On this point see *Capital*, volume 3, p. 296, for example, and its developments dealing with rent. The importance of this distinction was drawn to our attention by A. Cot and C. Gauchet.

39. For example the work of d'Andreff in *Profit et Structures du Capitalisme Mondial*, pub. Calmann-Levy, 1976; of Christian Palloix, *Procès de Production et Crise du Capitalisme*, Paris 1977.

40. P. Salama, L'État Capitaliste comme Abstraction Réelle', *CEP* nos. 7 and 8, Paris, 1978.

Chapter Nine

1. See 'Positive Profits with Negative Surplus Value', *Economic Journal*, March 1975.

2. See *Marx After Sraffa*, pp. 150–162.

3. The article's scope is strictly limited. In particular, there is no intention of developing a Marxist theory of joint production. It should be noted that the refutation of Steedman's arguments concerning 'negative values' is totally independent of this. I intend to show that Steedman's arguments are wrong. If they are, then this remains true irrespective of the nature of the correct Marxist treatment of joint production.

4. On this whole question, see *Capital*, vol. 3, Harmondsworth, 1981, ch. 10.

5. *Capital* volume 1, Harmondsworth, 1976, p. 129.

6. Steedman, 'Positive Profits with Negative Surplus Value: A Reply', *Economic Journal*, September 1976, p. 607.

7. *Marx After Sraffa*, p. 151.

8. E. Wolfstetter, 'Positive Profits with Negative Surplus Value: A Comment', *Economic Journal*, December 1976.

9. *Marx After Sraffa*, pp. 137–149.

10. *Ibid.*, pp. 142–144.

11. *Ibid.*, pp. 144–146.

12. *Capital* volume 1, p. 314.

13. *Ibid.*

14. *Ibid.*, p. 311.

15. The only modification necessary is the insertion of the machines of different age not on an equal basis but in different proportions. Another very simple case would be that in which a single capitalist (say an absolute monopolist) uses the same means of production over the years.

Chapter Ten

1. Ian Steedman, *Marx After Sraffa*, London 1977, p. 29.

2. *Ibid.*, p. 49.

3. *Ibid.*, p. 49.

4. 'It has been shown that the proximate determinants of the rate of profit, the rate of accumulation, the prices of production, the social allocation of labour, etc., are the physical conditions of production, the real wage and the capitalist drive to accumulate. The next step is then to investigate the social, economic, political, technical, etc., determinants of those proximate determinants... Such study can no doubt draw on much of Marx's work, as one source amongst the many which will be needed. *But it will involve no reference to Marx's value magnitudes*, which are mere derivatives of the things to be explained.' *Ibid.*, p. 207, emphasis in original. This is a complete scientific project involving the reconstruction of political economy, and though it shares the mathematical system of Sraffa it is not the same project. See Sweezy, 'Marxian Value Theory and Crises', *The Value Controversy*, London, 1981, p. 21, who quotes the following remark of Joan Robinson: 'Piero has always stuck close to pure unadulterated Marx and regards my amendments with suspicion.' Robinson, 'The Labour Theory of Value', *Monthly Review*, December 1977, p. 56n.

5. Though value theory is not refuted but confirmed by a proper study of joint production, as Farjoun shows in this volume, joint production nevertheless plays a special role in Sraffian theory which is irrelevant to value theory, and very unsatisfactory in general. Its real purpose is the basis of a strange treatment of fixed capital in which capitalists 'produce' their unused fixed capital and resell it to themselves annually. This is very doubtful since it is at best an accounting transaction and certainly not a real sale; for example the capitalists do not have the option of buying someone else's unused capital instead of their own. Is the entire universe in a permanent frenzy of exchange by virtue of merely existing? This aside, 'genuine' joint production where outputs emerge in fixed proportions is extremely rare, and is confused by the Sraffians with multiple production in which the same factory can produce many different things but there is a choice of what to make. Even in the case of coking and oil fractionation, to which the Sraffians refer in support of their case, study shows that in practice refineries and coking plants can and do vary the proportions of outputs by using different admixtures of varying grades of crude oil or coal, so that in reality virtually all industries can independently control the quantity of every product sold. This is not to say that multiple production is not deserving of study; but it is not what the Sraffians are talking about.

6. A less trivial example is the famous correspondence between Bertrand Russell and the German logician Frege. Frege devised the first complete formalisation of mathematical set theory. Russell sent him a note expressing a very deep paradox in Frege's concise notation, a paradox which turns out to be the archetype of an entire class of logical paradoxes including the famous 'liar' paradox. Frege had unwittingly produced a system in which this could be very concisely expressed, so that when he read Russell's one-line note, he is said to have exclaimed that his life's work was ruined. Yet his system remains the foundation of most modern mathematics and, had it been junked because of this paradox, mathematics as we know it would not exist. This is not to say there are not inherent limitations in the Frege-Russell approach, which derived from the 'corrections' introduced by Russell. But these limitations derive from the attempt to reduce all mathematics to logic, rather than the paradox itself. See Andrzej Mostowski, *Thirty Years of Foundational Studies*, Oxford, 1966.

7. Piero Sraffa, *Production of Commodities by Means of Commodities*, Cambridge, 1960, preface.

8. Steedman, p. 18.

9. It is, of course, possible to exhibit systems in which, for example, a vector of profit rates replaces the single uniform rate, as Steedman does on p. 180. The point is,

however, that when this is done there are no longer the same number of equations as variables and neither prices nor profits can be uniquely determined. See note 20 on Morishima's treatment.

10. K. May, 'Value and Price of Production: A Note on Winternitz's Solution', *Economic Journal*, December 1951, Francis Seton, 'The Transformation Problem', *Review of Economic Studies*, vol. 24, 1957, pp. 149–160.

11. Sraffa, preface.

12. Steedman, p. 184, where he says 'If there are constant returns to scale and if wages are paid in advance...' and adds in his footnote 'Both assumptions will be made throughout this chapter, the former being essential to the argument, the latter merely a convenience.'

13. Steedman, p. 50.

14. Karl Marx, *Grundrisse*, Harmondsworth, 1977, pp. 137–39. See Rosdolsky, *The Making of Marx's Capital*, ch. 4, London, where there is an excellent discussion of this and related passages.

15. Space does not permit a full discussion of the relation between this mechanism and the role of money, which Mandel deals with at greater length. It should be clear with a little thought, however, that the mechanism is possible precisely because goods exchange against a third commodity, money, and not against each other. In a barter or semi-barter society, supply and demand variations would call forth *independent* movements in the ratios of exchange of each commodity against each other commodity so that a price vector in the normal sense would cease to exist.

16. Market price also, of course, diverges from price of production. Value, price of production and market price are three distinct entities, both conceptually and actually.

17. 'Marx's Theory of Value and the "Transformation Problem"', in Jesse Schwartz, ed., *The Subtle Anatomy of Capitalism*, Santa Monica, California, 1977.

18. See, for example, Steedman, p. 128, where he discusses the falling rate of profit under the assumption that all capitalists will adopt the technology which gives optimum profits for society as a whole. He continues 'some writers have been tempted to confuse this straightforward argument by asserting (correctly) that decentralized, individual decisions need not always lead, in aggregate, to the achievement of the commonly pursued objective... This 'argument' is just silly. For unless the previously adopted technique is no longer available, it is being asserted that, after the change, capitalists are no longer maximising the rate of profit attainable with the given wage! Even if a new invention should lead many capitalists mistakenly to adopt it, as soon as it is found to be less profitable than the previously used technique, all capitalists will revert to the latter. With a given real wage, the rate of profit can be lowered only by technical regress, never by technical progress.'

19. 'It has been said that competition equalises profit rates between the different spheres of production to produce an average rate of profit, and that this is precisely the way in which the values of products from these various spheres are transformed into prices of production. This happens, moreover, by the continual transfer of capital from one sphere to another, where profit stands above the average for the time being... This movement of capitals is always brought about in the first place by the state of market prices, which raise profits above the general average level in one place, and reduce it below the average in another.' *Capital*, Volume 3, p. 310. Even more explicitly, 'Market value, (and everything that was said about this applies with the necessary limitations also to price of production) involves a surplus profit for those producing under the best conditions in any particular sphere of production. Excluding all cases of crisis and overproduction, *this holds good for all market prices*, no matter how they might diverge from market values or market prices of production. The concept of market price means

that the same price is paid for all commodities of the same kind, even if these are produced under very different individual conditions and may therefore have very different cost prices.' *Capital*, volume 3, p. 301 (our emphasis). See E. Mandel, *Late Capitalism*, London, 1973, where the role of technological rents as a mechanism of the law of value was first systematically developed.

20. Sraffa, pp. 82–83. An alternative approach is outlined in the final chapter of Morishima, *Marx's Economics*, Cambridge, 1973 — building on the work of J. von Neumann, Steedman uses some of this work in chapter 13 on the determination of labour allocation. The approach uses linear programming methods to determine which of a large number of possible processes will be used under the assumption that society as a whole will try to maximise its rate of profit. However, this does not escape my central point which is that many different techniques of production *simultaneously* in use; furthermore it introduces weird assumptions such as that discussed by Farjoun in this volume, namely that excess products are sold at zero prices. Finally, with the introduction of the completely arbitrary idea that a society of private producers strives consciously to maximise its average rate of profit, all prospect of modelling real economic mechanisms under commodity production are thrown to the winds.

21. Among many reasons for labour-time as the foundation of value is one which receives less allowance than it ought, labour-power is virtually the only commodity whose use-value has strictly speaking, a two-dimensional magnitude, one component being the *time* dimension, the other the number of labourers. If we study speed of any economic change — for example, the rate of new investment in new processes — labour time is the only way we can relate the speed of this process to the rate of creation of new value. Neither 'price' nor 'physical quantities' can do this properly, because neither has a time dimension. See section 8 of this piece and also Mandel's comment in footnote 24.

22. There is a considerable discussion on Marx's analysis of the relation between supply, demand and the formation of market (social) values from individual values, for which see Rosdolsky, pp. 89–93. In the calculations which follow, I treat only Marx's 'intermediate' case in which market value is the average of individual values. The alternative cases can be analysed into the model using the same essential method, but two complications present themselves. First, some assumption must be made (on the basis of empirical observation) as to what relation must exist between supply and demand (i.e. some assumption on the level and rate of change of unrealised commodities seeking realisation) to determine which case applies. Second, if market value is not the average of individual values, then some labour must be counted as more or less productive than the average and the total labour time of society no longer adds up to the total new value created; as with skilled labour, the reduction of concrete to abstract labour then involves quantitative as well as qualitative changes. An alternative, which I prefer, is to treat market value as always being the average of individual values, and deal with Marx's other two cases (which he himself regards as exceptional) as forming prices of production which include a component of rent as well as average profit.

23. Nor does it make the clock accurate, even though as the logical Charles Dodgson remarked, it will be right twice a day.

24. There is a specific reason for separating out the effects of turnover in this way. The model keeps track of the quantity of goods and values tied up in production, and distinguishes this clearly and from the outset from the quantity turned over. This 'minor' distinction is rarely made although it can be done even in the framework of a simultaneous equation model. One consequence is to systematically obscure the discussion on profit rate. Marx calculates profit as the capitalists do, on capital advanced and not on capital turned over. On this basis his derivation of rising organic

composition is a lot clearer. If one takes the total labour of society as approximately constant (i.e. abstracts from population growth) and assumes that a proportion of it is each year invested and not immediately turned over, then the stock of dead value tied up in production must, *ceteris paribus*, increase faster than living value. Of course, advances in productivity will then reduce the values of these stocks but the mechanism will be distinctly different from that assumed in most discussions on the question, because these stocks of fixed capital are not devalued gradually through cheaper replacements, but suddenly and abruptly in the crisis phase of the business cycle, when society discovers their new values through a general surplus of unrealised value seeking realisation. Because value tied up in fixed capital does not seek realisation directly (i.e. the products of these factories), the cheapening of the elements of constant capital is by no means as simple as it appears in models where constant capital is assumed to circulate completely in each production period. See Marx's Letter to Engels, April 30, 1868, in *Letters on 'Capital'*, K. Marx, F. Engels, London, 1983.

25. We write our price-value multipliers in this way in order to emphasise Marx's concept that the transformation process involves *transfers of value* from one sector of the capitalist class to another. The quantities represent the proportion of value transferred in or out of a given capital, per unit of value sold. Marx's proposition that total value equals total price then boils down to the equation $\Sigma\mu_i = 0$.

26. See for example, the series of studies reviewed and often presented in the *Bulletin of the European Productivity Association*, Paris, 1956–61 and the series published by the Bureau of Labour Statistics under the general rubric 'Case Study Data of Productivity and Factory Performance' in the 1950s. There is a considerable bibliography in Zoltan Roman, *Productivity and Economic Growth*, Budapest, 1982. The surge of interest in inter-firm productivity comparisons in the fifties and sixties had died away, partly because firms are unwilling to divulge what is clearly sensitive commercial information in more competitive times. See, however, W.E.G. Salter, *Productivity and Technical Change*, Cambridge, 1969. Note that the quantity 'specific productivity' we have defined above is not identical in magnitude to labour productivity since it includes a contribution from constant capital, i.e. from dead labour.

27. US Bureau of Labour Statistics, *Relationship Between Productivity Measurements*, undated. The BLS is simply replying to the charge that, by considering only the productivity of labour it is considering only one 'factor of production'. It is virtually compelled to admit that in comparative studies, labour presents itself as the real basis of all so-called factors of production: Marx's entire point in a nutshell, confirmation of his view that in controversies amongst bourgeois economists, the statisticians turn out to be right against the theoreticians ninety-nine times out of a hundred.

28. 'As long as we were dealing with capital's value production and the value of its product individually, the natural form of the commodity product was a matter of complete indifference for the analysis, whether it was machines or corn or mirrors... Insofar as the reproduction of capital came into consideration, it was sufficient to assume that the opportunity arose within the circulation sphere for the part of the product that represented capital value to be transformed back into its elements of production, and therefore into its shape as productive capital, just as we could assume that worker and capitalist found on the market the commodities on which they spent their wages and surplus-value. But this purely formal manner of presentation is no longer sufficient once we consider the total social capital and the value of its product. The transformation of one portion of the product's value back into capital, the entry of another part into the individual consumption of the capitalist and working classes, forms a movement within the value of the product in which the total capital has

resulted; and this movement is not only a replacement of values, but a replacement of materials, and is therefore conditioned not just by the mutual relations of the value components of the social product but equally by their use-values, by their material shape.' *Capital*, volume 2, Harmondsworth, 1978, p. 470.

29. 'The "social need" which governs the principle of demand is basically conditioned by the relationship of the different classes and their respective economic positions; in the first place, therefore, particularly by the proportion between the total surplus-value and wages, and secondly, by the proportion between the various parts into which surplus-value is itself divided (profit, interest, ground-rent, taxes, etc.)' *Capital*, volume 3, p. 282. 'Demand and supply, on further analysis, imply the existence of various different classes and segments of classes which distribute the total social revenue amongst themselves and consume it as such, thus making up a demand created out of revenue'. p. 296.

30. Most clearly in his summary statement: 'that [Sraffa's] critique is in no way destructive of the project of providing a materialist account of the capitalist mode of production; nor is it in the least inconsistent with the attempt to build a fully articulated social, political and economic account of particular capitalist social formations. More specifically, many aspects of Marx's political economy, because they are independent of his reasoning in terms of value magnitudes, are unaffected by the Sraffa-based critique.' Steedman, p. 206. The point is that value magnitudes supply the hinge, the buckle, the pivotal point which relate class analysis to economic analysis, and cannot be prised loose from the frame without destroying the edifice.

31. See in particular Marx's letter to Engels of April 30, 1868 (quoted above) in which the whole argument is summarised very clearly and concisely.

32. 'If we find that the cost of base-year purchases at current prices is greater than the value of current purchases at current prices; while the cost of current purchases at base-year prices is also greater than the cost of base-year purchases at base-year prices; then we are unable to say whether the standard of living has increased or not, since the current quantities were not available in the base year, and the base year quantities are not available now. This is the index number problem.' G. Bannock, R. E. Baxter and R. Rees, *The Penguin Dictionary of Economics*, Harmondsworth, 1977, p. 211.

33. *Capital*, volume 3, p. 274, my emphasis.

34. 'But precisely because the circuit $C \dots C'$ presupposes in its description the existence of another industrial form $C (= L + mp)$ (and mp comprises other capitals of various kinds, e.g. in our case machines, coal, oil, etc.) it itself demands to be considered not only as the *general* form of the circuit, i.e. as a social form in which every individual industrial capital can be considered (except in the case of its first investment) hence not only as a form of motion common to all individual industrial capitals, but at the same time as the form of motion of the sum of individual capitals, i.e. of the total social capital of the capitalist class, a movement in which the movement of any individual industrial capital simply appears as a partial one, intertwined with the others and conditioned by them... $C \dots C'$ is the basis of Quesnay's *Tableau Economique*, and it shows great discernment on his part that he selected this form in opposition to $M \dots M'$ (the form fixed on and isolated by the Mercantile System), and not $P \dots P'$. *Capital*, volume 2, p. 179.

35. Steedman, p. 202.

36. Indeed Kuhn, *The Structure of Scientific Revolutions*, Chicago, 1962, remarks that optics is one of the few sciences whose basic techniques have remained virtually static and untouched by the continuous revolutions in its foundations. From time to time post-Sraffians attempt to place themselves in a Kuhnian framework, arguing that they are participating in a 'scientific revolution' following the discovery of

inconsistencies in Marx. It is hard for anyone with a background in the natural sciences to stifle a sense of outrage at this idea: Kuhn's entire work is devoted to explaining how science progresses through inconsistencies between theory and *empirically observed fact*, to which virtually no-one on the post-Sraffian side of the debate makes the slightest reference. It is difficult to see what conceivable relation can exist between observed reality and Steedman's closing remark which I quoted in footnote 17, since every single capitalist observer now concedes that the rate of profit world has been systematically declining *in fact* since the late 1960s, far faster than can be accounted for by changes in the real wage.

37. Hodgson, *Capitalism, Value and Exploitation — A Radical Theory*, Oxford, 1981, p. 95–97, acknowledges that the post-Sraffian system does not have an adequate causal theory, but falls back on the argument that neither has Marxism. We have just seen that Marxism does have a causal theory: the argument is therefore in the post-Sraffian court.

38. This is yet another reason why Steedman is entirely wrong to consign Marx's concept of fetishism to a *separate* department of political economy from value theory, or even relegate it to philosophy, outside of political economy altogether. The concept of fetishism is integral to Marx's value theory because it expresses the precise fact that the form in which economic laws come into the consciousness of economic agents is not transparent; they are not immediately conscious of the laws which nevertheless govern their actions. This does not mean they are like headless chickens with no consciousness at all, or a consciousness imparted to them by the tabloid newspapers. Crucial determinants of their consciousness are also the expression of laws; the *same* laws. As Marx progresses from volume 1 to volume 3, from abstract to concrete, he also demonstrates the way in which capitalists perceive economic categories, while still showing that, even on the basis of their false perceptions, they can be the agents of the law of value *because their consciousness is also a function of the law of value*. If the disciples of von Neumann had troubled themselves to study his contributions to cybernetics, they would have found out that formal theory is perfectly content with systems, such as cellular automata, in which individual components of the system possess 'consciousness' distinct from the aggregate effects of their interaction, and nevertheless governed by the same law as those same aggregate effects.

39. *Capital*, volume 2, p. 571.

40. *Capital*, volume 2, p. 472.

41. Albert Einstein, *Über die Allgemeine Gravitationslehre*, in *Ideas and Opinions*, New York, 1960, p. 355.