

On the Origins of Classical Economics

Distribution and value from
William Petty to Adam Smith

Tony Aspromourgos



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ON THE ORIGINS OF CLASSICAL ECONOMICS

Where and how did classical economics originate?

It is often assumed that modern economics began with Adam Smith and the publication of *The Wealth of Nations*. Here, Tony Aspromourgos takes issue with this assumption and shows that the origins of classical economic theory have much deeper roots. The book:

- deals with the origin and early development of the classical theory of distribution up to 1767;
- stresses the concept of economic ‘surplus’ as a key determinant of economic phenomena, especially income distribution and commodity exchange rates;
- finds the source of this concept in the work of Sir William Petty and shows the transmission of ideas from Petty to the Classical School through such writers as Cantillon, Quesnay and Steuart;
- relates the formative history to mature classical economics and modern developments, with particular reference to Keynes and Sraffa, thus showing how the classical tradition presents a viable alternative to the modern marginalist approach.

The work is designed to meet the need for an understanding of the central elements of the early history of the classical tradition. In so doing, it presents a thorough examination of Petty’s economics and his influence on later economic thought.

Tony Aspromourgos is currently Senior Lecturer in Economics at the University of Sydney. He has research experience in Australia, the USA and Europe. He has published widely on aspects of the history of economic thought.

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*To the memory of my Father
and
for my Mother*

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PREFACE

My research on William Petty began some fourteen years ago at the University of Chicago; but the greater part of it was undertaken in the framework of a doctoral thesis on seventeenth-century English economics, under the supervision of P.D.Groenewegen at the University of Sydney and completed in 1985. It may be added that the present work bears little resemblance to that thesis.

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TONY ASPROMOURGOS

Sydney

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NOTE ON CITATION PRACTICE

Throughout what follows, all quotations from Petty's writings are verbatim except that the extensive use of italicization has been omitted. Some unpublished papers of Petty—drawn from the 'Literary and Personal Papers of Sir William Petty, at Bowood House, Calne, Wiltshire'—are also cited and quoted below. These are cited as *Papers*, in the manner in which they are catalogued in Slatter (1980): by volume or box, and item number. For example, *Papers* ii.71:2 refers to volume ii, item 71, page 2; *Papers* G.27:14 refers to box G, item 27, page 14. These papers are now in the possession of the British Library.

1

INTRODUCTION

The unifying purpose of this study is to provide an account of the origin and formation of the classical theory of distribution, to 1767. More specifically, the aim of what follows is to trace the formative history of a central idea in economic theory: the concept of economic or social ‘surplus’ as a fundamental determinant of a range of economic phenomena, especially income distribution and commodity exchange values. This conception of surplus as a basic organizing principle for economic analysis belongs to the history of ideas—not only in the obvious sense, as a creature of human invention or discovery, but also in the sense that during the latter half of the nineteenth century it was replaced as the dominant framework for theorizing economic phenomena in general and income distribution in particular, by the marginalist theories of Jevons (1871), Marshall (1890), Menger (1871) and Walras (1874; 1877), notwithstanding precursors. The tradition of surplus analysis persisted as a living theory only in the thought of Marx and the more or less incoherent forms a residual classicism took in post-Marxian Marxism. A rigorous and coherent reconstruction of the surplus approach, at least with regard to income distribution and values, only fully emerges in Piero Sraffa’s *Production of Commodities by Means of Commodities: prelude to a critique of economic theory* (1960)—notwithstanding, as almost always, the existence of some notable precursors. This study is designed to restore an understanding of the early history of this tradition—a history which was largely ‘submerged and forgotten’ (Sraffa 1960:v) as a result of the success of the marginalist theories which remained dominant until Keynes, and indeed beyond.

1.1 WHAT IS CLASSICAL ECONOMICS?

This naturally raises the preliminary question of what ‘classical economics’—or to use the essentially equivalent and more traditional nomenclature, ‘classical political economy’—is understood to be, as a phenomenon of intellectual history, fundamentally distinct from the tradition of marginalist theory. The defining character of the marginalist

theory is not difficult to discern, partly because of the peculiarly unified character of that theory—a unity best exemplified by Walrasian and neo-Walrasian general equilibrium theory.¹ That unity proceeds from the fundamental and comprehensive role of a single principle, for the simultaneous explanation of the range of real variables which must be accounted for in any plausible account of modern economic life—the principle of constrained individual optimization with autonomous preferences, in the presence of at least some degree of well-behaved substitution in consumption and/or production. If one thinks in terms of the generic components of a theory of economic society—theories of production, income distribution, exchange ratios or values, outputs, employments, consumption and saving, accumulation, money—the same set of fundamental principles is applied to all of these subjects, in the marginalist framework. The quite accurately descriptive nomenclature, ‘marginalism’, to describe this approach is a reasonable nomenclature because it captures the optimization conditions embodied in marginal equations or inequalities.

The concept of a ‘classical political economy’ is not so straightforward. The notion was invented by Marx, who delineated it as beginning with Sir William Petty in England and Pierre le Pesant de Boisguilbert in France, and ending with David Ricardo and J.-C.-L. Simonde de Sismondi (Marx 1970:52). Since Petty’s works date from some forty years prior to those of Boisguilbert, this implies that Petty is the founder of classical political economy—and indeed, Marx (1970:53–4) comments that Petty’s ‘political arithmetic [is] the first form in which political economy is treated as a separate science’, further describing him as ‘the Father of Political Economy as such’ (Marx 1967: vol. I, 272–3).² The Physiocrats are pinpointed as providing the first systematic analysis of specifically *capitalist* production: ‘It is this service that makes them the true fathers of modern political economy’ (Marx 1963:44; also Marx 1967: vol. II, 360; vol. III, 784). The scope of political economy was first comprehensively established by Smith—albeit both for scientific and vulgar political economy (Marx 1968:165–6); and ‘Ricardo...gave to classical political economy its final shape’ (Marx 1970:61). James Mill is the beginning of its end and the disintegration of the Ricardian system is ‘the twilight of classical economy,...its very death-bed’ (Marx 1967: vol. III, 786; Marx 1971:84).

This summary statement suggests the broad contours of Marx’s conception of classical political economy and indicates that he understands it to have a modern and pre-modern (identified with pre-capitalist) theoretical form; within which disjuncture Physiocracy constitutes the decisive watershed. The ‘older economists’—Petty and Cantillon are mentioned explicitly—merely began the analysis of the ‘still undeveloped’ capitalist mode of production (Marx 1967: vol. III, 783–4). But this classification of the classical economists does not amount to a substantive definition of classical political economy; and it is in fact impossible to find a clear and

INTRODUCTION

straight forward definition anywhere in Marx's writings. Nevertheless, it is possible to infer from the multitude of his references to classical political economy that for Marx the core is the tradition of theories of surplus value (for example, Marx 1967: vol. I, 509; vol. III, 783–4). There are other overtones: classical economy seeks to grasp 'the inner connection' rather than 'the multiplicity of outward forms', a characteristic itself related to the recognition of production (or labour) as the source of surplus value (Marx 1971:500; 1967: vol. I, 81 n, vol. II, 360, vol. III, 830). It is essentially a critical economics (Marx 1971:502–3; 1963:299). The fundamental defect of classical political economy identified by Marx is its failure to recognize that its object and thereby its analytical categories, are historically specific rather than natural; so, for example, 'the physiocratic illusion, that rents grow out of the soil and not out of society' (Marx 1967: vol. I, 83).

The fate of the idea of a classical economics in the century following Marx's formulation is bound up with the emergence of marginalist theory as the dominant approach to economics—and in particular, the eventually emerging view that marginalism is the natural and legitimate heir of classical theory and, therefore, appropriately describable as *neoclassical*. Notwithstanding changes and differences in the meaning ascribed to classical political economy, there has persisted quite considerable agreement as to who the classical economists are. In the modern literature Smith and Ricardo remain the central figures of the classical tradition. However, there has been little interest in classifying Marx's pre-modern classical economists in the classical school—even among those fundamentally sympathetic to Marx's conception of classical economics, though there is evidence of change in this respect (Roncaglia 1985:90–1; Bharadwaj 1978a, 10–11; Garegnani 1984:292, with 1987:560). Further, Quesnay's status in relation to the classical school is at least ambiguous in the modern literature and J.S.Mill now generally finds a place in the tradition, a view with which Marx would have been at odds. Certainly the classification which places Smith, Ricardo and J.S.Mill at the centre of classical political economy is the most common and widely accepted one. This view seems to have originated with James Bonar's entry in Palgrave's *Dictionary of Political Economy* (1894: vol. I, 303) and Cannan's important *History* (1893), subsequently being utilized by many modern writers. If there is a *substantive* unity underlying this modern conception of classical economics, it is not altogether clear what it is—rather, this notion appears to be merely a classificatory device. However, to the extent that the modern classification is associated with adherents of marginalist economics, there is commonly a conception of classical economics—articulated to varying degrees—as a collection of more or less imperfect anticipations of demand and supply theories. Perhaps an implicitly 'minimal' definition also operates, in terms of the classical epoch establishing the formal agenda or scope of economic science—production, distribution, value, accumulation and so on.

The conception of classicism as primitive anticipations of marginalism was implicitly rejected in the introductory comments to this chapter, where it was noted that the tradition and history of surplus theories were submerged and forgotten as a result of the marginalist ascendancy of the late nineteenth century. This presupposes that classicism is not primitive marginalism. Accepting this for the moment for the sake of argument, even if one were to suppose that the history of classical/surplus theories was the history of a great error—an error corrected by the different and eventually dominant points of departure severally taken by the marginalist founders—this would provide no explanation (or justification) for distorting the history of classical economics, though it might explain a certain later lack of interest in classical economics. Indeed, the latter qualification points to the fact that much renewed interest in classical economics proceeds from a conviction of the plausibility of Sraffa's reconstruction of the surplus approach to distribution and value, as an approach to the analysis of modern economic society. In a sense, Sraffa's own theoretical contribution has revived the classical tradition. On the other hand, the 'revision' of the history of classical economics, which resulted in its being conceived as anticipations of marginalist theory, was due to something additional. That something additional primarily was Alfred Marshall. Among the marginalist founders, it was Marshall who sought to project a continuity with classical economics, or more particularly, Ricardo. In this attempt, J.S.Mill's muddy eclecticism could provide the appearance of a bridge between Ricardo and Marshall—and hence a semblance of continuity between classicism and Marshallian marginalism (*vide* Groenewegen 1993a; Bharadwaj 1978b). Indeed, the very nomenclature of 'neoclassicism' to describe marginalism—a nomenclature which became widespread after World War Two—arose out of Marshall's characterization of continuity between classicism and his own version of marginalism; or more particularly, it arose out of Thorstein Veblen's acquiescence to the Marshallian conception (Aspromourgos 1986a).

To the extent that the above considerations are based upon the supposition that classical economics is not primitive marginalism, is this contention valid? Similarly, is there validity in the supposition that rather than being such, classical economics has running through it the lines of a different theory—at least with regard to distribution and certain analytically related topics?³ Whether the view of classical economics associated with Marx, Sraffa and those who have followed their leads is more plausible and satisfying than the 'incipient-marginalism' interpretation is a question to which the following chapters provide at least a partial (and positive) answer. No precise characterization of 'surplus' or 'the surplus approach' will be offered in this introductory chapter.⁴ Rather, the contours of the surplus approach, from its genesis in Petty, through Cantillon to Quesnay, will be revealed in their historical context—culminating in a general treatment of surplus in Chapter 7. But it must be emphasized that it is not the motivating

purpose of this work to provide a critique of the classicism-as-primitive-marginalism conception; nor to provide an elaborate rationale for the views of Marx or Sraffa. With regard to the former, little will be said except in passing. With regard to the latter, it may be noted in particular that the significance, or otherwise, of the contributions to economics of Marx and Sraffa in no way depends upon their interpretations of classical economics—their own contributions can be judged only on the merits of those contributions. For example—to take the case of a well-known controversy in interpretation—whether or not Ricardo’s *Essay on...Profits...*(1815) is founded upon a physical-ratio theory of agricultural profits does not in even the remotest manner touch upon the validity of Sraffa’s own 1960 system. Logically, the situation could not be otherwise. At the risk of repetition, no amount (or lack) of intellectual pedigree could in any degree add to (or subtract from) the validity of the contributions of Marx or Sraffa (cf. Blaug 1987:440, 442). The animating purpose of what follows is to uncover the early development of the classical approach to distribution because of its intrinsic interest as an approach alternative to the now dominant marginalist framework. Though it happens that schools of thought—especially if built upon the writings of one person—exhibit some natural, albeit regrettable, tendency to ‘ancestor worship’, the primary motivation for most Sraffa-influenced history of classical economics is not to provide Sraffa or Marx-Sraffa with an intellectual pedigree, but rather, to rediscover a classical tradition which is of more than antiquarian interest. So it is here.

1.2 THE FORMATION OF THE SURPLUS APPROACH

In intellectual history it is often the case that an idea is independently invented by more than one thinker more or less simultaneously. This is not the case with the idea of social surplus: it has a singular origin and that origin is to be found in the person of William Petty (1623–87). It is also often, not to say usually, the case in intellectual history that ideas have a pedigree: there are precursors who anticipate any particular idea or doctrine, even if only obscurely and confusedly. This is also not the case with Petty’s theory of surplus: he has no significant intellectual debts to economic literature, with regard to this fundamental aspect of his politico-economic thought. Because of the singular character of Petty’s achievement, as well as the relative neglect of his thought, in what follows particular weight is given to him. Three of the following nine chapters are devoted to clarifying his position in intellectual history. The account of his life focuses upon what it was about Petty which inclined him to devote his intellectual energies and scientific capacities overwhelmingly to economic subjects, in a manner unique in the seventeenth century (Chapter 2). This is followed by an interpretation of the particular forms his surplus theory took and how they informed his wider thought. The central elements of this account are a theory of the ratio

between society's necessary and total employment, and its relationship to Petty's views on economic and social reform, foreign trade and money, material progress and the content of 'political arithmetic' (Chapter 3). Though Petty has no significant debts to earlier economic literature, he does have an intellectual pedigree. Petty's views on scientific method and politics—which both incline him towards economics and shape the particular character of his economics—primarily derive from Hobbes's philosophy and political science (Chapter 4).

The following three chapters examine the cumulative development and application of the idea of surplus, from Petty to Richard Cantillon to Quesnay. Chapter 5 provides an interpretation of Cantillon's theory of production and allocation, and distribution and value, demonstrating the key causal role played by a concept of 'rural' surplus (not necessarily to be identified with agricultural surplus), which is connected by Cantillon with the ratio of necessary to total social labour—as it had been in Petty, though not with the sophistication and system of Cantillon. Chapter 6 takes up the concept of 'Value parity' which had been proposed by Petty and reconstructed by Cantillon in a much more coherent form. The principal purpose of this inquiry is to further clarify the significance and limitations of value theory in Petty and Cantillon; and also to draw out one element of the influence of Petty upon Cantillon. Chapter 7 draws these arguments together by presenting an account of the development of surplus notions and related subjects in Petty, Cantillon and Quesnay. The emphasis here is upon *cumulative* development, in the sense that Petty does not merely 'anticipate' Cantillon, and Cantillon does not merely anticipate Quesnay. Rather, Petty contributes to Cantillon's economics in a substantial way, and likewise Cantillon with respect to Quesnay. In this sense Petty-Cantillon-Quesnay constitute a formative 'tradition' of theory. Furthermore, Petty-Cantillon-Quesnay constitutes the decisive element of the formation of the surplus approach to income distribution and related issues of labour and commodity allocation. An important theme here, first raised in Chapter 5, is the uneasy transition from theorizing of an essentially pre-capitalist economy (Petty), to theorizing of at least quasi-capitalist economies, exemplified by the ambiguous status of profits in the economics of Cantillon and Quesnay.

Given the analytical richness of James Steuart's economics, he has been undeservedly neglected—certainly relative to his contemporary Adam Smith. With respect to distribution (and more), Steuart stands firmly in the surplus tradition of Petty-Cantillon-Quesnay. Chapter 8 examines the theory of distribution and value in Steuart's *Principles* (1767), which comes closer to capturing the essential characteristics of a capitalist economy—at least than Petty and Cantillon—though still falling short of Smith's achievement in this respect. But in carrying the theory of wages beyond Petty, Cantillon and Quesnay, Steuart is drawn into a difficulty: a lack of any determinate principle

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for explaining distribution of the surplus. The penultimate Chapter 9 brings the account of the formation of the classical surplus approach to distribution to a culmination, first by recapitulating and assessing the line of cumulative intellectual development and influence which runs through Petty, Cantillon, Quesnay, Steuart. Though this is the most important element of the formation, it is by no means the only one. This chapter also examines some other aspects of seventeenth- and eighteenth-century economics which are pertinent to the central theme: some influences of Petty, Cantillon, Quesnay and Steuart upon others, and some other significant contributions—though there is no claim made (or implied) for the completeness of this account. The final chapter outlines the aftermath of the formation detailed in the preceding chapters, by sketching major developments in the surplus approach to distribution from Adam Smith to the late twentieth century. Hence this study concludes with an account of how the classical surplus approach may be reconstructed and augmented, for the purposes of modern economic analysis; thereby, at the same time, both exposing the limitations and revealing the enduring significance of the classical approach.

In his well-known essay on ‘The End of *Laissez-Faire*’ Keynes (1926:277) at one point argues that the contemporaneous understanding of the doctrine of *laissez-faire* is defective due to a lack of understanding of its intellectual history:

We have not read these authors; we should consider their arguments preposterous if they were to fall into our hands. Nevertheless we should not, I fancy, think as we do, if Hobbes, Locke, Hume, Rousseau, Paley, Adam Smith, Bentham, and Miss Martineau had not thought and written as they did.

He goes on to make a perceptive point about the relation between conservatism in the generic sense and historical knowledge: ‘I do not know which makes a man more conservative—to know nothing but the present, or nothing but the past.’ This provides a sound justification, of a general kind, for the usefulness of understanding the historical origin and development of ideas. But there is a more direct purpose of such knowledge, which has been suggested by Harrod (1952:vi), among others, albeit in a somewhat different context:

those responsible for teaching economics have become somewhat puzzled about what they can purvey even as a first approximation to the truth. In this transitional phase, existing controversies cannot be disassociated from history of the doctrines in dispute. It would be a counsel of despair to recommend that a wholly fresh start should be made; if existing doctrines are to be revised, it is important to understand their origin; this may make clear at what point error has crept in and give a clue to the character of the revision required.

This is particularly relevant to economic science, which has been racked by a number of fundamental controversies since the 1930s—in particular, with regard to the theory of outputs and effective demand (the so-called Keynesian revolution), and the theory of capital and distribution (the so-called Cambridge controversies). As a result, no consensus exists concerning the validity of marginalism—the dominant twentieth-century theory—and it is contested from a variety of sometimes complementary, sometimes contradictory, standpoints. From this vantage point the present study may be understood as a contribution to reconstructing the origin and early development of the classical approach which was later to be superseded by marginalism. It is animated by a conviction that the classical approach provides a superior foundation for the analysis of modern economic society; but it may be emphasized in closing this introductory chapter that the validity of what follows (at least up to Chapter 10.1) in no way depends upon this supposition, and therefore does not require that the reader share it.

THE LIFE OF PETTY IN RELATION TO HIS ECONOMICS

Petty's death at Christmas 1687 witnessed the passing of a man of many and diverse achievements: inventor, anatomist, physician, devotee of the Bacon-inspired experimental natural philosophy, surveyor of Ireland, writer on mechanical arts and originator of 'political arithmetic'. He stood squarely in the progressive intellectual movement of his time. The movement in England was concretely embodied in the Royal Society, in which Petty had been an active participant even well before its formal incorporation. His intellectual temper was a product of the academic training and intellectual company of his formative years, from his departure for Holland in 1643 to his departure for Ireland in 1652. If that were all that could be said of him, Petty would now be remembered as an engaging minor character in the intellectual life of Restoration England. Indeed, he would be remembered largely because he was a friend of the three writers whose accounts of the period so much inform the modern perception of it (John Aubrey, John Evelyn, Samuel Pepys). Petty acquires a greater stature because of his writings upon economic subjects—and they constitute the great bulk of his writings. If at all, Petty's claim to a significant and permanent place in intellectual history rests on his contributions to economics. With regard to the relation between Petty's life and activities and his seminal intellectual efforts in economics, the historical conundrum which presents itself is this: Petty was just one notable member of the scientific coterie of Restoration England: why did he, uniquely, devote his intellectual energies overwhelmingly to economic studies and thereby provide the foundations for the formation of classical economics?

2.1 EARLY LIFE¹

William Petty was born on 26 May 1623 at Romsey in Hampshire, some five miles north-west of Southampton, the eldest surviving child of a clothier of moderate means, Anthony Petty (d.1644) and mother, Francesca (d.1663). During his first thirteen years in Romsey Petty acquired a rudimentary education and solid practical knowledge in a variety of trades. He went to

sea as a cabin boy early in 1637; but ten months later, after breaking a leg, was put ashore on the coast of Normandy near the village of Caen in early 1638. This apparent misfortune gave Petty the opportunity to advance his education at a Jesuit College in Caen, acquiring training in Latin, Greek, French and a wide range of mathematical studies. He returned to England in 1638 or 1639. In 1640, apparently on the strength of his mathematical skills, he entered the Royal Navy for a period of about three years, a period about which he has nothing to say in any of his reminiscences. With the imminent prospect of civil war in England and the desire to further his education, Petty departed for Holland in 1643.

The three years spent on the Continent introduced the young sailor-turned-anatomist to the outstanding philosophers of the age. He studied medicine, with particular reference to anatomy, and attended the Dutch universities of Amsterdam, Leyden and Utrecht, and the Paris School of Anatomy. Leyden, then one of the leading progressive universities, particularly attracted him, probably because of its famous school of anatomy. By way of the English mathematician Dr John Pell, recently appointed professor of mathematics at Amsterdam, Petty gained a letter of introduction to Thomas Hobbes, himself in self-imposed exile from the Civil War and resident in Paris. Through Hobbes, Petty met other leading contemporary thinkers who were then living in Paris: René Descartes, Marin Mersenne, Pierre Gassendi, and others. But sublime intellectual company proved no security against poverty: Aubrey records that for one particular week he subsisted on two pennyworth of walnuts (Dick 1972:399). Despite this, Petty managed to return to England possessing ten pounds more than when he left.

Possibly through the good offices of Hobbes or Pell, on returning to England Petty received an introduction to Samuel Hartlib, a patron of science and letters and friend of John Milton (*vide* Webster 1970:1–72). Along with Hartlib, Robert Boyle and others, Petty became a member of the London Philosophical Society, which had been established by Theodore Haak in 1645 to promote natural philosophy as understood by the Bacon-inspired new scientific movement. This was the seed from which the Royal Society developed. From 1646 to 1650 Petty divided his time and energies between studying medicine at Brasenose College, Oxford, and earning his living in London. From 1648 he appears to have been resident in Oxford. Some members of the Philosophical Society and others were meeting in his rooms in this period, calling themselves the Invisible College'. In March 1650 he was awarded the degree of Doctor of Physic of Oxford and later became a candidate of the London College of Physicians. In quick succession Petty then became a Fellow of Brasenose, deputy to the University Professor of Anatomy (Thomas Clayton), Vice-Principal of Brasenose, and finally Professor of Anatomy in 1651, at the age of twenty-seven.

Petty's rapid academic elevation was partly due to the Cromwellian

reorganization of the University of Oxford with its replacement of loyalist dons. Indeed the transfer of the Invisible College from London to Oxford was due to so many of the progressive scientists being appointed to university positions: for example, Jonathan Goddard, John Wilkins, John Wallis and Petty himself. Through the assistance of John Graunt, Petty was also appointed professor of ‘music’ at Gresham College—a position allowing the holder to teach what would now be described as mathematical physics. Graunt, through his influence with Cromwell, may also have played a part in Petty’s Oxford appointments and his first Irish appointment. Within a few weeks of his inaugural lecture as professor of anatomy Petty obtained two years’ leave of absence and towards the end of 1651 was appointed physician-general to the army in Ireland. On 10 September 1652 he landed at Waterford, on the southern coast of Ireland. More than two decades of his remaining thirty-five years were spent in Ireland.

2.2 IRELAND AND THE DOWN SURVEY

Petty’s decision to go to Ireland was not surprising. He had a lifelong antagonism towards the universities, based upon his temperament combined with philosophical convictions which almost inevitably gave rise to a contempt for orthodox learning.² The antagonism was at bottom an expression of his commitment to the Bacon-inspired new science. Furthermore, though he had achieved considerable success in life by 1651, relative to his origins, Petty was more ambitious. His Irish ‘adventure’ opened the way for his acquisition of substantial personal wealth.

Petty’s fortunes at this point became bound up with the English policy of colonization and subjugation of Ireland by transplantation of English settlers, a policy which had led to rebellion. The army which had gone to Ireland to enforce a bloody suppression was financed in large part by private individuals on the surety, given as early as 1642, of 2,500,000 acres of Irish land which were to be confiscated upon the success of the venture. By 1652 both the debts owed to the subscribers, or so-called Irish Adventurers, and other wage payments to the army had not been settled. The government proposed to meet the demands of all claimants by payment in land, a proposal necessitating a survey of the entire country. After some conflict with Benjamin Worsely, the Irish Surveyor-General, Petty secured the contract for this project on 24 December 1654. This massive undertaking became known as the Down Survey of Ireland (Larcom 1851). Petty undertook to complete the task within thirteen months, an obligation which was to keep him extremely busy. He achieved his goal with the assistance of 1,000 workers and finished the survey during April 1656.

Cromwell’s political strategy in Ireland had been to attract the support of the Presbyterians with a view to breaking the power of the Anabaptist and vehemently republican army officers. Petty allied himself with Cromwell in

this struggle and when Henry Cromwell (Oliver's son) became commander of the forces in Ireland in 1655 Petty quickly became his secretary and finally clerk of the governing Council of Ireland. He also played the key role in the actual allotment of land among the Adventurers and the army, this task being completed by February 1657. As a result of his work in Ireland as surveyor and land commissioner, Petty acquired vast tracts of land, eventually some 30,000 acres, and netted £9,000. His official positions and the obvious advantage he gained from them placed him under sustained attack from the army clique on charges of illicit dealing in debentures, receipt of bribes and other frauds. No such charges were ever proven. Petty was also elected as Member for West Looe (Cornwall) in the short-lived parliament summoned by Richard Cromwell of March-April 1659. Further charges were brought against him in the parliament but nothing came of them. The least damaging conclusion that can be reached about Petty's role in the survey and allotment of Irish lands is that it was the source of enormous personal advantage to him. If this were by legal means, it was not by altogether morally scrupulous ones. The attacks upon him on this account increased after Oliver Cromwell's death in September 1658. With the fall of the Cromwellian party in May 1659 Petty lost all his public offices (including the Brasenose Fellowship) and in June returned to England. His dismissal as physician to the Irish Army marked virtually the last time he practised medicine, apart from services to friends.

The intellectually most significant episode of this, Petty's first extended Irish residence, was the actual undertaking of the Down Survey itself. Petty had evinced an interest in economic subjects quite early. His *Advice to Hartlib* (1648), partly inspired by his observations of Holland, prefigures many of the concerns of his mature economic writings: for example, division of labour, technical progress, and labour productivity. But during the years he was in England, from 1645 to 1652, Petty's interests were primarily in medicine, anatomy and experimental natural philosophy in general. The undertaking of the Down Survey provided him with the opportunity to examine in microscopic detail the social and economic condition of an entire people.³ The economy which Petty confronted in Ireland was primitive; but as he himself later suggested in defending the application of his novel empirical method (political arithmetic) to Ireland, it could be hoped that the application to a relatively simple social economy would make the pioneering task easier and more readily lay bare fundamental relations (Petty 1691a:129). The experience of undertaking the Down Survey gave Petty a wealth of empirical knowledge to which he could apply his theoretical ideas and empirical method. It may also be understood as a watershed which marked the end of his primary interest in natural science and the beginning of a sustained interest in political, social and economic subjects. The latter interest was to occupy by far the greatest part of his intellectual energies for the rest of his life.

2.3 ACTIVITIES, 1659–87

Disputes concerning the legality of Petty's land acquisitions during his first Irish sojourn plagued him with lawsuits for the rest of his life. Some of these were still outstanding at the time of his death. More importantly, the protracted lawsuits and Petty's vigorous efforts to preserve his property took up a disproportionately large part of his admittedly remarkable energies. These disputes also probably contributed to his failure ever to gain significant public office, a failure which was the source of considerable personal frustration and bitterness on Petty's part. His persistent and disastrous forays into naval architecture and boat construction from 1662 until his death also compromised his public reputation, not least with Charles II. Petty's land dealings even caused some ill-feeling among his former friends, in particular Hartlib; but he retained an honoured place among the progressive scientists. During the decline of the republican government Petty lived mostly in London, acquiring property and generally looking to his private affairs. Most of his Oxford allies were back in London by 1659 and together they were meeting at Gresham College. When their club was incorporated as the Royal Society on 15 July 1662, Petty was one of the foundation members of its Council. Subsequent to that he was continually communicating with the Society from Ireland, and in 1673, during a three-year residence in London, he served as its vice-president. In 1684 he established with William Molyneux an Irish equivalent of the Royal Society, the Dublin Society, of which he was elected president. Upon his return to England in 1659 Petty had also become a regular participant in the debates of James Harrington's Rota Club.

After the Restoration Petty had found some favour with Charles II, apparently through cultivating favour with the Duke of Ormond. Petty was knighted on incorporation of the Royal Society. Already in 1660 he was writing to Ormond with proposals for a massive reform of the Irish economy. In 1662 he published (anonymously) his first major economic work, *A Treatise of Taxes and Contributions*. Any hope he had of gaining political influence was destroyed by his vigorous defence of the English landed interest in Ireland—which of course coincided with his own interest—in direct opposition to the attitude of the government. However, Petty did play some part in the Irish Council of Trade set up by Ormond and modelled on the English Council of Trade and Plantations. Apart from that, he obtained only the minor posts of Registrar to the Irish Court of Admiralty in 1676 and appointment as a Commissioner of the Navy in 1682, his efforts at higher office being continually rebuffed. With the exception of the years 1672 to 1675 and a long stay in London in 1682–3, most of Petty's life from 1666–7 to 1685 was spent in Ireland, resident in Dublin but frequently visiting his major properties in Kerry. He established a colony of English Protestants at Kenmare, and developed ironworks, lead mines, marble

quarries and a pilchard fishery there. On 2 June 1667 he married Lady Elizabeth Fenton, the widowed daughter of one of Petty's key supporters in his efforts to gain the rights to the Irish Survey, Sir Hardress Waller, now remembered as one of Charles I's judges.

Petty's visit to England in 1682–3 was part of a plan to gain management of the Irish revenue-raising system, but the result, yet again, was failure. During the remainder of Charles II's reign, Petty made no further attempts to obtain preferment. His time was divided between Dublin, Kerry and the continuing lawsuits in London. His hopes of preferment were restored by the death of Charles on 6 February 1685 and the accession of James II, of whom Petty held out great expectations. In May 1685 Petty gave up the personal administration of his Irish estates, returned to England, settled in his house in Piccadilly and lived there until his death. Petty had served James (then Duke of York) faithfully in the Irish Admiralty Court. His ill-founded hopes of influencing James were based merely upon the perceived strength of his own arguments and James's liking for him, strong enough for Petty to gain frequent personal interviews with the King. The policy Petty proposed for Ireland was a summary of the reforms and proposals he had been elaborating in his writings since the Restoration, and the role he saw for himself was as a kind of accountant-general of the project. By his last months it was clear to Petty that political events were moving in a less-fortunate direction. On 16 December 1687, just a year before James II fled England, Petty died of a gangrene infection at his house in Piccadilly. He was buried near his parents in Romsey Abbey.

2.4 TEMPERAMENT, ACTIVITIES AND INTELLECTUAL WORK

Petty's fortunes throughout his life were bittersweet, at least as perceived by him. From humble origins he rose to become one among the notable intellects of his age and an intimate and acquaintance of the intellectual giants of his era: Boyle, Descartes, Hobbes and Isaac Newton. He had established himself as a doctor and anatomist of high repute by the age of thirty. By the age of thirty-five he had acquired considerable wealth and income, and had become a respected member of the progressive scientific coterie of English life. The bitterness had two sources. The lesser reason was the continual insecurity that attached to his property because of the manner in which it had been acquired—an insecurity probably felt the more strongly for his having risen from humble origins. More important was his lifelong frustration in never achieving political power commensurate with his abilities, both as perceived by him and in fact. As a consequence of this, he was unable to implement, to any degree, the policies and social reforms to which he was deeply and consistently committed for the greater part of his life. This 'failure' is an important element in what was, by any standard, a

brilliant, energetic life. It may be called a failure primarily because Petty perceived it as such, as evidenced by the persistence with which he sought such office.

Some reasons for this failure have already been suggested. Petty's personality almost certainly played a part also. Even as a child he is said to have demonstrated intellectual precociousness and a well-developed satirical wit. This is certainly consistent with the character and personality of the mature Petty. His temperament also probably did not suit him for academic life, though his brashness would probably have caused him problems in any vocation—as it did. His sharp, sometimes dangerously satirical and utterly irrepressible humour did not endear him either to the conventionally minded or to those in authority. John Evelyn reports what is perhaps the best example of Petty's imprudent brashness:

[H]e would take a text and preach, now like a grave Orthodox divine, then falling into the Presbyterian way, then to the fanatical, the Quaker, the Monk, and Friar. The Popish priest, with such admirable action, and alteration of voice and tone, as it was not possible to abstain from wonder, and one would swear to hear several persons... but it was very rarely he would be prevailed on to oblige the company with this faculty, and that only amongst most intimate friends. My Lord Duke of Ormond once obtained it of him. But by-and-bye, he [Petty] fell upon a serious reprimand of the faults and miscarriages of some Princes and Governors, which, though he named none, did so sensibly touch the Duke, who was then Lieutenant of Ireland, that he began to be very uneasy, and...would not have him preach any more.

(Bray 1907: vol. 2, 1000–1)

The indifference to all religious sects which Petty's mimicry indicates in a transparent manner also did not assist his relations with the radical-protestant army officers in Ireland. A further example of his tactlessness is his response on first being offered a peerage (at a price): 'I had rather be a copper farthing of intrinsic value than a brass half-crown, how gaudily soever it be stamped and gilded' (Fitzmaurice 1895:155). Five months before Petty's death, Robert Southwell wrote to him inquiring rather innocently, 'are you satisfied, in Mr. Newton's New Booke, with the Reasons he gives for the ebbing and flowing of the Sea?' This was on the publication of Newton's *Principia Mathematica*. Petty's cryptic response (again finding expression in economic language) reveals that he had lost none of his characteristic humour nor, for that matter, his intellectual perspicacity: 'As for Mr. Newton's book, I would give 500£ to have been the author of it, and 200£ that Charles [his son] understood it. My bad eyes disable mee to make the most of it, for diagrams cannot bee read by others.' Petty later commented, 'poor Isaac Newton will certainly meet with the

same fate in the world [as Petty's own efforts], for I have not met with one Man that puts an extraordinary value upon his Book' (Lansdowne (ed.) 1928:278, 279, 283). In a long footnote devoted to Petty in the *Contribution to the Critique of Political Economy*, Marx (1970:53n.) notes the 'highly original sense of humour [which] pervades all his writings'. But his irrepressible nature is nowhere more clearly revealed than in the correspondence with Southwell, a cousin of Petty's wife. Petty's character is thrown into sharp relief by the contrast with his more conventional cousin by marriage, who was ever cognizant of public appearance and the potential political dangers from words spoken even in private correspondence (*vide* Lansdowne 1928).

Petty's failure to gain the public preferment he sought was the source of considerable personal frustration, but it also provided the opportunity for what may now be regarded as his greatest success. Rather than expend his energies in the duties of high public office, Petty devoted himself to reflection on economics and politics—and putting his ideas into systematic form on paper. Out of these endeavours came the beginnings of classical economics. It is at least doubtful whether he would have achieved all that he did, intellectually, in the absence of this externally imposed exile from political power. It may be noted in particular that the *Treatise of Taxes*—Petty's most important work, from a theoretical standpoint—was a product of his loss of public offices in 1659 (Petty 1662). During the years that he was intimately involved in public affairs (1652–9) he wrote nothing other than the voluminous records of the Down Survey itself (cf. Strauss 1954:180).

2.5 WHY ECONOMICS?

A quite comprehensive interpretation of Petty's economics is provided in Chapter 3 below; but a brief account of the basic elements may be outlined here. Petty's first major economic work, *A Treatise of Taxes and Contributions* (1662), contains the basic theoretical elements which inform his subsequent economic writings. At the heart of his approach to economic analysis lies the concept of surplus labour—that proportion of labour time (in particular, society's available workforce) which is not required for the provision of necessary consumption (in particular, necessary social consumption). In the *Treatise of Taxes* the concept of surplus is applied to the division between necessary and surplus labour so understood, and the determination of natural rents and natural value. The analysis of employment provides the basis for his grand schemes of socio-economic reform in the *Treatise* and later writings—which schemes, in this respect, amount to an answer to the questions of how to maximize total employment and surplus labour, and how best to utilize surplus labour. The analysis of employment also informs Petty's treatment of foreign trade and material progress. In the 1670s Petty wrote his *Political Anatomy of Ireland* (1691a) and *Political Arithmetick* (1690), wherein he sought to apply

his theoretical ideas in quantitatively precise empirical analyses of national economies. It was for this purpose that he invented his famous (or infamous) ‘political arithmetic’. In the 1680s Petty wrote a number of generally short works, largely devoted to population issues, which in general do not match the quality of his earlier writings. However, the *Quantulumcunque concerning Money* (1695) is an elegant and valuable statement of monetary thought and Petty also outlines the analysis of the relation between technical division of labour and labour productivity growth which appears to have much impressed Adam Smith (Petty 1683a: 473–4; cf. Bonar 1932:120, with Keynes 1971:17, 25; Smith 1776: bk I, chs i–iii). With regard to monetary theory Petty is best remembered for his invention of the concept of the velocity of circulation.

Having devoted his intellectual efforts to economic analysis Petty thus made pathbreaking contributions. Before directly addressing the historical problem posed in the introduction to this chapter—why Petty, uniquely among the seventeenth-century English scientists, actually *did* devote himself overwhelmingly to economic studies—attention must be drawn to the crucial role Thomas Hobbes played in shaping Petty’s intellectual temper. A full account of this is provided in Chapter 4; but the basic significance of Hobbes’s influence, in attracting Petty to economic subjects, may be indicated. As a result of meeting Hobbes in France Petty developed a close relationship with the distinguished philosopher, who exercised a decisive influence upon Petty’s intellect. Petty imbibed deeply of the Hobbesian conviction that mathematics is the appropriate model for all rational inquiry. This shaped Petty’s methodological convictions. He also imbibed deeply of the fundamental conviction of Hobbes’s political theory that the purpose of theory is to determine the rational requirements for civil peace and material plenty. The vision of political life and the purpose of political thought which Petty inherited from Hobbes—political here being construed in the broadest human terms—naturally pointed Petty towards economics, given his commitment to political thought broadly conceived. The characteristic designation employed to denote the twin political goals was ‘peace and plenty’ (for example, Hobbes 1651b:258, 260, 344; Lansdowne 1927: vol. I, 154). Hobbes had devoted himself to determining the theoretical conditions for peace in human society; Petty turned to the conditions required for prosperity. Of course this interpretation does not explain why Petty acquired a primary interest in political philosophy as such, as opposed to natural and speculative philosophy. In this respect it may be added that he was deterred from speculative philosophy (in particular, metaphysics) by a scepticism also derived partly from Hobbes: the only ‘sensible’ knowledge is literally knowledge acquired via the senses. With regard to the choice of political philosophy (political or human science) over empirical natural philosophy (natural science), no explanation on the grounds of purely intellectual conviction can be given. An element of temperament or taste and historical accident enters.

We come then to the question, why economics? In examining the backgrounds of the seventeenth-century English writers on economics one may—borrowing loosely from Schumpeter (1954:159, 161, 209)—distinguish between merchants and philosopher-scientists, as well as consultant-administrators, though of course the categories are not mutually exclusive. (Petty *aspired* to being a consultant-administrator.) In terms of sheer numbers the literature is dominated by the merchant writers—the very designation of that literature as ‘mercantilist’ is a reflection of that fact. Even among the few philosopher-scientists who contributed to the literature Petty is unique in his *overwhelming* interest in economic subjects.⁴ The explanation for Petty’s singular commitment to that intellectual domain lies in a constellation of circumstances. Fuelled by personal ambition, his first journey to Ireland and his subsequent supervision of the Down Survey during the 1650s provided him with the opportunity to examine in detail the socio-economic life of an entire people. This experience formed a watershed between his earlier primary interest in natural science and his mature interest in economics. His persistent failure to gain high public office provided him from the beginning of the 1660s with the time to write extensively upon economic subjects and develop his ideas. The intellectual influence of Hobbes, along with shaping Petty’s methodological views, led him to approach political life with a strong emphasis upon its economic dimension. Even allowing all this, it still remained open for Petty to direct his intellectual efforts elsewhere than economics. An element of taste entered—for example, in Petty’s aversion to metaphysics—and also personal ambition: Petty no doubt conceived his writings partly as a potential vehicle for gaining public office, though his hopes in this regard were disappointed.⁵

In section 2.4 above, mention was made of Petty’s reaction at the publication of Newton’s *Principia Mathematica*. Petty’s bitterness concerning the reception of his own ideas colours his spectacularly incorrect assessment of the likely reception Newton’s book would gain: ‘Newton will certainly meet with the same fate in the world [as Petty], for I have not met with one Man that puts an extraordinary value upon his Book’ (Lansdowne 1928:283). In the end Petty was wrong also about the reception of his own ideas. In the early eighteenth century ‘one man’ in particular recognized the value of Petty’s work and was able to put it to good use: Richard Cantillon. As Schumpeter (1954:218) rightly argues, ‘Cantillon was to Quesnay, and Petty was to Cantillon, what Ricardo was to Marx.’ Though others also were to be influenced by Petty’s ideas, Cantillon’s *Essai* (1755) took up and developed the analysis of economic surplus and thereby provided an essential part of the basis for French Physiocracy. Petty pioneered a scientific approach to economic problems which reached full fruition in mature classical economics. He deserves to be honoured for that achievement as well as his substantive contributions to economic analysis. Across the span of more than three centuries those who, in spirit, have followed in his footsteps

and sought to advance the scientific understanding of economic life against vulgar orthodoxies may gain some comfort from Petty's own prudent but committed stance:

Cousin our going to the University is Necessary. Those who are there, and who have been there, are a Great Body of Men, and are or will be in great offices and authority; and Consequently will bee able to Crush and Run Downe any single Man that stands at Defiance with them,...against their Insignificant Gibrish.

(Lansdowne 1928:300)

ECONOMIC SURPLUS AND THE SOCIAL DIVISION OF LABOUR

The Economics of Petty

Whatever may have been the contemporaneous estimate of Petty, he has subsequently been remembered primarily for his contributions to economics, Schumpeter (1954:210n.) has commented that ‘economists whom no other topic could unite...have...joined forces in extolling him’. This judgement is not difficult to corroborate. Marx’s high estimation of Petty was noted in Chapter 1. For Jevons, Cantillon overshadows Petty: his ‘*Political Arithmetic* and... *Treatise of Taxes and Contributions* are wonderful books in their way, and at their time, but, compared with Cantillon’s *Essai*, they are mere collections of casual hints’. Petty’s Very remarkable *Treatise of Taxes*’ and his ‘ingenious ideas’ are to be remembered for their contribution to Cantillon’s system (Jevons 1881:342, 346). Cossa notes that Petty, along with some other seventeenth-century writers, ‘had a strong influence on the Physiocrats and on Adam Smith himself. Notwithstanding their ‘erroneous’ (alleged) labour theory of value, Petty’s writings ‘form part of a noteworthy progress in the scientific analysis of production’ (Cossa 1880:129–30). Johnson (1937:93) describes Petty as ‘the person ordained to apply [the Baconian experimental method] to economic inquiry’; ‘to the study of economic questions Petty brought a scientific insight and an inductive approach that were essentially new’. Petty’s writings embody a system, his later essays elaborating and developing the basic doctrines proposed in the *Treatise of Taxes*, ‘Petty’s most important work’ (Johnson 1937:97–8, 113). Beer (1938:167–8) argues that Petty is ‘the pioneer of the English economics of production. He stands in the middle, between the past great mercantilist writers...and the coming great industrial economists... [H]e must be regarded as the initiator of English classical economics.’ Schumpeter (1954:209–10, 213) himself actually takes the view that the ‘superior quality of [Petty’s] mind shows in all his comments and suggestions, but there is nothing very striking or very original or very distinctive about them’. Schumpeter is very much more taken with what he understands to be Petty’s pioneering of econometrics: ‘he hammered out concepts from, and in connection with, statistical investigations, and in doing so he got further at some points than did any of his contemporaries’. In Schumpeter’s opinion,

the concept of the velocity of circulation is the most famous example of this, and rightly so. Letwin (1963:114, 140) repudiates the view that Petty was the father of statistics: he ‘deserves a higher, though different reputation, as an economic theorist of the first order, the best or equal to the best that existed before 1750’, the *Treatise of Taxes* being Petty’s ‘finest piece of economic writing’. Deane (1968), evidently following Schumpeter, suggests that ‘Petty’s claim to fame as an economist lies not so much in his originality or his theoretical ability as in his analytical skill’; in particular, Petty is ‘the first econometrician’. Deane also notes his analysis of the division of labour, but is sceptical of his having a labour theory of value. Hutchison (1988:40, 30; also 3–4, 5, 7, 23, 29) judges Petty to be ‘the outstanding economist of the seventeenth century’, his ‘vital new departure’ being ‘the introduction of a general theoretical and scientific foundation for sounder policy-making, together with the endeavour to estimate quantitatively the elements involved’.

There are a number of strands of interpretation which emerge from these commentaries, of which two may be noted here. There is a widespread impression of Petty as a kind of erratic, or at least unsystematic, genius—a view well summed up by Johnson (1937:11–12, emphasis added): ‘Petty was all spermatozoa, restless and impulsive; so impatient, in fact, that *before he could finish* the exposition of one idea he was wrestling with another.’ From this kind of standpoint Petty’s *corpus* of economic writings contains disparate, fragmentary, unsystematic and more or less primitive (albeit ingenious or brilliant) ideas—at least some of which subsequently became constituent elements of genuine systems of economic theory—but Petty’s writings themselves do not embody a systematic scheme of thought. So follows, for example, Jevons’s references to Petty’s ‘casual [if “ingenious”] hints’.¹ To be sure, Johnson correctly asserts that Petty’s thought constitutes a system within which the later writings are elaborations of doctrines of the *Treatise*, but Johnson neither states what this system is, nor provides convincing testimony for his view. Letwin makes much of the theoretical merit of the *Treatise* but actually devotes little attention to it, suggesting just three theoretical principles in that work: tax policy should avoid output-reducing measures; a theory of rents (‘the most important principle in the whole of Petty’s economic work and his greatest contribution to economic thought’); and a labour theory of value (Letwin 1963:140–6). The first of these is merely a policy norm and, *in toto*, Letwin’s account of the *Treatise* distorts and greatly underestimates it.² More recently, interpretations of Petty which impute to him a more substantial and seminal role in the history of classical economic theory have appeared (Roncaglia 1985; Walsh and Gram 1980:3, 10, 14–17; Asproumorgos 1986b)—though, as alluded to in Chapter 1 above, even Sraffa-influenced interpreters of classical economics have generally been inclined to conceive Quesnay as the origin of the classical approach to distribution.

The purpose of this chapter is to provide a systematic interpretation of Petty's economic writings in order to demonstrate that he constructed a theory of agricultural surplus and applied it, principally, to the analysis of 'the social division of labour'; by which is meant the division or ratio between necessary employment and total employment (or population) within political society. In contrast to the characteristic views of Petty noted above, the interpretation here reveals that Petty systematically employed a surplus analysis and at the heart of this approach was a theory of the division between necessary and total labour time, that is, a theory of the determinants of surplus social labour. The theory of natural rents and labour theory of value will come to light as specific forms of this more basic notion. This interpretation confirms the view that the classical surplus approach begins with Petty rather than Quesnay.³ Furthermore, in its fundamental theoretical innovation and its totality, Petty's intellectual achievement marks him off from his seventeenth-century English confrères who wrote on economic subjects. The argument is divided into six parts. The theoretical uses to which Petty applies the distinction between necessary and total labour time in the *Treatise of Taxes* are examined and their underlying unity drawn out (section 3.1). It is then shown how this fundamental perspective serves as a framework for his analysis of the three major issues which concerned him: economic and social reform (including taxation), foreign trade and material progress. Underlying all these analyses are the problems of how society's surplus labour may be maximized and how surplus labour actually is—and how it ought to be—utilized (sections 3.2–3.4). With regard to its substantive content, Petty's political arithmetic fits easily into this interpretation: it is an attempt to determine the empirical orders of magnitude of the factors which Petty's theory told him were the determinants of national wealth and welfare, with a view to statecraft and policy (section 3.5). The penultimate section 3.6 examines some aspects of value and distribution in Petty's writings. A brief conclusion follows.

3.1 FUNDAMENTAL IDEAS: THREE MODELS OF PRODUCTION

A Treatise of Taxes and Contributions (1662) was Petty's first major contribution to economic literature, though his early *Advice...to...Hartlib* (1648) had treated some important economic subjects in the context of educational reform. Published about the time of his thirty-ninth birthday, the *Treatise* is also the most important work Petty produced, though perhaps not his most famous. It contains an elaborate and systematic analysis of sources and methods of public revenue-raising and the composition and consequences of government expenditures, as well as detailed proposals for reform of the fiscal system. But Petty's quite orderly exposition of public finance is interrupted by occasional digressions into broader or deeper

considerations—in particular, related theoretical questions pertaining to production, value and problems of measurement—digressions which greatly augment the book's contribution to the development of economic theory. From the modern standpoint the most remarkable aspect of the *Treatise* is that it provides what is apparently the first statement in the history of economics of a surplus approach to production and distribution.

The opening chapters of the *Treatise* provide an overview of the major components of public expenditure: defence, public administration, maintenance of the clergy, schools and universities, care of the poor, provision of public employment, and transport infrastructure. In Petty's view the first four of these components warrant reduction and the remaining expenditures should be increased (Petty 1662:18–20, 29). He distinguishes between the poor who are incapable of labour—the old, the chronically ill, orphans ('all helpless and impotent Persons')—and the able-bodied poor (Petty 1662:20, 29). This was not a novel distinction, and its importance in Petty's case is due to the objective of full utilization of the available labour force—also not novel in seventeenth-century England—an objective which finds expression throughout his writings. Here at the beginning of the *Treatise* Petty advocates the public provision of employment for those unemployed who are able to work and then asks an apparently simple question: 'who shall pay these men?' (Petty 1662:29–30). In answering this question Petty goes beyond the forms of public revenue-raising and expenditure to analyse the conditions of social production and distribution.

Petty posits a 'Territory' of 1,000 men and that '100 of these can raise necessary food and raiment for the whole 1000'. A further 200 produce exports tradeable for imports or money; 400 more are 'employed in the ornaments, pleasure and magnificence of the whole'; 200 are 'Governours, Divines, Lawyers, Physicians, Merchants, and Retailers'. This leaves 100 unemployed for whom, by assumption, sufficient means of subsistence are produced. Petty concludes that this additional 100 men should indeed be provided with 'the superfluity which would otherwise be lost and wasted, or wantonly spent'—rather than being forced to beggary, theft or starvation. Even if apparently no such 'overplus' exists, 'tis fit to retrench a little from the delicacy of others feeding in quantity or quality; few men spending less than double of what might suffice them as to the bare necessities of nature' (Petty 1662:30–1).

The key to this analysis is the assumption that on average each producer of necessary consumption goods provides sufficient subsistence for nine others as well as himself.⁴ If the existence of such surplus is not evident, Petty concludes this to be only apparently so: the consumption requirements of additional employment generally can be financed by reducing the average per capita consumption of those already employed, since consumption is rarely at subsistence in the strict sense.⁵ On the basis of a postulated excess of output of necessary consumption per worker over necessary consumption

per capita, the analysis demonstrates how public provision for the unemployed and poor is possible, whether they are put to work or not. It demonstrates this at the fundamental level of the production and distribution of means of subsistence. But the analysis also makes clear that necessary consumption by producers of exports and luxury goods is provided for in exactly the same way. The character of the exchange process required to bring about any actual or desired distribution of surplus necessary consumption goods is not explained; but Petty's quite clear view is that this distribution in part is effected by the fiscal system: the precise point of the exercise is to show that taxation and public expenditure are devices for distributing surplus consumption goods, for various public purposes. However, in the case of export producers, other luxury good producers and others, it is evident that market exchange is the only plausible means for bringing about the required distribution. The necessary consumption of the 'Governours', clergy, lawyers, and so on, is likewise provided by an appropriate distribution of surplus; and the first two of these classes are as much provided for by taxation as are the unemployed and the poor, as Petty (1662:18–20) points out.

From this standpoint taxation is possible because the system of production within political society produces a surplus—in particular, a positive necessary consumption goods output net of the necessary (labour) consumption requirements for its production. The fundamental conception which underlies Petty's discussions of public levies is that taxation and public expenditure constitute extraction and redistribution of surplus product, in the service of political purposes. These purposes may be desirable or otherwise. Furthermore, the division of activities between the 1,000 men of Petty's hypothetical community is a microcosm of the salient features of the division of labour within political society, as he perceives them. Petty's analytical approach opens the way for a complementary critical analysis of the kinds of activities surplus product *ought* to be used to finance. In other words, the analysis of the division of labour raises the question of the desirability of the prevailing division of labour. Petty addresses this question in detail throughout his writings.

A second model proposed by Petty in the *Treatise* is designed to explain the 'mysterious nature' of rents, in the context of a discussion of taxes on rents. Petty posits a single individual who produces corn from a given quantity of land and has prior possession of the necessary seed corn. Petty then proposes,

when this man hath subducted his seed out of the proceed of his Harvest, and also, what himself hath both eaten *and given to others in exchange for Clothes, and other Natural necessaries*; that the remainder of Corn is the natural and true Rent of the Land for that year (Emphasis added).

Then, if these annual physical surpluses or ‘natural rents’ are averaged across the agricultural cycle—‘so many years as makes up the Cycle, within which Dearth and Plenties make their revolution’—‘the ordinary Rent of the Land in Corn’ is determined (Petty 1662:42–3). Petty is not entirely explicit here that it is output net of *necessary* labour consumption plus replacement seed corn which determines natural rent; but his reference to ‘natural necessities’ implies this. It should be apparent that, since this corn surplus depends upon exchange of corn for clothing and other things, its magnitude is dependent (strictly speaking) upon commodity exchange ratios or relative prices. Petty does not engage the difficulty that as a result the natural corn rent cannot be determined exclusively by reference to conditions in corn production. Recall that also in Petty’s first model above, subsistence was heterogeneous (‘necessary food and raiment’).

However, Petty does explicitly introduce intersectoral relations to explain the money value of corn rents. He utilizes what is in effect a model of individual production and exchange in which two individuals labour for equal lengths of time. One produces his subsistence plus a quantity of corn; the other produces his subsistence plus a quantity of silver. The exchange value of corn in terms of silver and, thereby, the money value of natural rent is determined by equating the value of these two surpluses. Petty states this theorem on exchange value very baldly, merely affirming that ‘the Silver of the one, must be esteemed of equal value with the Corn of the other’ (Petty 1662:43). If one were to assume that the labour time required to satisfy subsistence is the same for each individual, as well as their total labour time—Petty is here explicit about neither—then his formulation entails that the silver value of corn equals the ratio of quantities of labour time embodied per unit of these commodities. That this is what Petty intended in the second model is confirmed by a more explicit statement of a labour cost theory of price in the following chapter of the *Treatise*:

If a man can bring to London an ounce of Silver out of the Earth in Peru, in the same time that he can produce a bushel of Corn, then one is the natural price of the other; now if by reason of new and more easie Mines a man can get two ounces of Silver as easily as formerly he did one, then Corn will be as cheap at ten shillings the bushel, as it was before at five shillings *caeteris paribus*.⁶

Finally, in a third model in the *Treatise* Petty formulates a concept of real value, as opposed to nominal value—‘a real and not an imaginary way of computing the prices of Commodities’. This is presented in the context of an analysis of currency debasement. Alluding back to the first model above, Petty posits a community of 1,000 people and that one-tenth the population (and one-tenth the land) ‘can produce Corn enough for the whole’. In contrast to the first and second models, corn is now assumed to

be the only necessary consumption good. The labour time required to produce a bushel of corn or an ounce of silver is assumed equal—the postulate implicit in the second model and made more explicit in the passage quoted at the end of the last paragraph. In contrast to the first model, Petty now supposes that 200 workers, rather than the necessary 100, are actually employed in production of the necessary consumption good, thereby allowing ‘that where a Bushel of Corn would suffice, yet men out of delicacy will use two, making use of the Flower onely of both’ (Petty 1662:89). Consumption per capita becomes a variable above subsistence (cf. Petty 1690:306).

Petty, (1662:89–90) draws a number of conclusions, or ‘Inferences’ as he calls them, of which the following are particularly significant. The exchange value of corn in terms of silver is ‘onely an artificial value, not a natural; because the comparison is between a thing naturally useful, and a thing in it self unnecessary’. Second, ‘natural dearness and cheapness depends upon the few or more hands *requisite* to necessaries of Nature: As Corn is cheaper where one man produces corn for ten, then where he can do the like but for six’ (emphasis added). Third, as opposed to natural cost or price, ‘Political Cheapness’ depends upon the number of ‘Supernumerary Interlopers into any Trade *over and above all that are necessary*’ (emphasis added). The primary motivation for Petty’s first inference is the measurement problem he recognizes as arising out of changes in money values; that is, movements in the value of the customary numeraire. It is for the same reason he is concerned to specify natural rents—the physical product of land net of necessary labour consumption—rather than merely the money (silver) value of rents, which ‘will be more or less, according to the plenty of money, which hath changed strangely since the discovery of the West Indies’ (Petty 1662:50 with 43). The former represents ‘intrinsic values’, the latter ‘extrinsic or accidental!’ value; for ‘the change of the store of money would change the rates of commodities according to our reckoning in names and words, (pounds, shillings, and pence being nothing else)’ (Petty 1662:50). As is shown in section 3.5 below, Petty’s political arithmetic in part is devoted to measuring economic phenomena without recourse to a monetary numeraire (for example, Petty 1691a:174). With regard to the second inference, it is noteworthy that Petty articulates it in terms of the proportion between necessary labour and total population or total employment. In the third inference Petty states that political price will exceed ‘natural price’ to the extent that actual labour employed in production exceeds necessary labour time. Petty also calls the former price ‘the true Political Price computed upon naturall grounds’—presumably because like natural price it is a measure of labour embodied. When political price is equated with ‘the common artificial! Standard Silver’, one arrives at ‘the true Price Currant’ (Petty 1662:90). Since political price is defined in terms of an excess of actual labour time

embodied over necessary labour time in *any* trade, it follows that the produced money (silver) also has both a natural and political price.⁷

The fundamental element common to all three of Petty's arithmetical models is the use in the analysis of production of a basic distinction between output and necessary input, giving rise to a concept of surplus. The notion of production is a very simple one: in the first and third model there is production by means of labour and land alone; in the second model, production of corn by means of labour, land and corn (though other instruments of production are implied). Hence explicitly, the primary form of produced necessary input is necessary labour consumption. The first model treats surplus on a macroeconomic level, as the net product of necessary food/clothing production. There is a schematism of society in which this surplus is distributed to various classes, providing the necessary means for their respective activities to be pursued. Petty does not explain at all fully how this distribution comes about. Taxation provides a partial explanation and the second model indicates how surplus agricultural product is realized as rents. These arguments do not explain what kind of realization or exchange process brings about the distribution of necessary consumption output to merchants, retailers and others included in the first model; and, as pointed out above, the first and second models also entail unarticulated intersectoral exchanges with regard to the heterogeneity of necessary consumption. The theory of rents and in some respects the theory of taxation can be understood as first, faltering steps towards solving the problem of how production and distribution conditions are realized in exchange. Petty does not even adequately pose this problem. That is hardly surprising at this seminal stage, since the search for an adequate value theory consistent with the surplus approach is a continuing problematic of the classical tradition and was never satisfactorily resolved within it (*vide* Chapter 10 below).

The third model, like the first, focuses on the proportion of the population engaged in production of necessary consumption goods, now explicitly assumed homogeneous. Petty evidently nominates 'corn' because of its role as the staple food for labour consumption; though he is obviously aware of the abstractness of his postulate. The source of surplus in the third (and first) models is the difference between output and necessary consumption per worker, in corn (and food/clothing) production—and this is similarly true for the individual producers in the second model. The third model makes explicit that if labour consumption exceeds subsistence this will be reflected in the increase in the proportion of the workforce or population devoted to production of such consumption and the reduction in the quantity of labour time available for other purposes. This means of course that part of the surplus labour, strictly defined, is devoted to production of extra consumption for workers. In addition, the distinction between political and natural price highlights an efficiency problem: actual labour employed in

production may exceed technically necessary labour time. This is an important signal that Petty was writing about a kind of economy for which it could not be taken for granted that competition would ensure an equation of the two.

It is the themes of the first and third models which find pervasive expression in Petty's writings. By conceptualizing determinants of the ratio between a society's necessary labour and total employment or total population, Petty brings to light systematic characteristics of the social division of labour so understood, thereby enabling it to become an object of systematic intellectual inquiry. Petty's applied economics can be understood in this light. His writings are illuminated by understanding them as applications of this fundamental theory to the issues of economic and social reform, taxation, foreign trade, money, material progress and quantitative, empirical analysis. This underlying purpose may be clarified by use of a simple model.⁸ Let

P = total population of a society;

n = proportion of P which is employable ($0 < n \leq 1$);

L = society's total potential workforce (nP);

L_c = total workforce employed in production of necessary consumption goods;

A = average productivity of labour employed in production of necessary consumption goods;

c = necessary consumption per head of population.

Production of necessary consumption is by means of labour and land alone (with the latter assumed to be always in sufficient supply), so that seed input is ignored here. Assume also that all the above variables are homogeneous quantities—so that in particular, c embodies Petty's corn assumption—and that P , n , A , c are exogenously given. If output of necessary consumption equals total necessary social consumption, then

$$AL_c = cP \tag{3.1}$$

$$= c(L/n) \tag{3.2}$$

The social division of labour is given by

$$L_c/L = (c/A)(1/n) \tag{3.3}$$

The proportion of a society's total (potential) labour which is available for non-necessary employments varies inversely with c and directly with A . Petty devotes some attention in his writings to variations in necessary consumption—indeed, in the third model he explicitly refers to the influence of climate upon necessary consumption (Petty 1662:90; also Chapter 7, n. 6 below). However, Petty attaches greater importance to labour productivity, as a means of increasing surplus labour time. Productivity can be increased by increasing the intensity of labour or extending working hours (Petty

1691b:110, 113–18; Lansdowne 1927: vol. I, 271, vol. II, 236); but Petty's major focus is upon the role of technical progress or 'invention'. He is also concerned that labour time per unit of output be minimized under *given* production conditions—for example, that the value of *A*. above be maximized—by ensuring that only labour genuinely necessary for production is employed: the value of *A* which maximizes $(L-Lc)$ given *P*, *n* and *c*, is the inverse of the natural price of corn—as opposed to the political price associated with 'Supernumerary Interlopers into [the corn or] any Trade' (Petty 1662:90). The proportion of population available for labour (*n*) is largely treated as a datum in Petty's writings,⁹ but population growth is extensively considered. Given the maximization of surplus labour, much of Petty's applied and critical analyses of employment, production and related matters constitutes examination of the actual and desirable composition of activities to which surplus labour is devoted. *Above* necessary consumption, for example (as distinct from increases in necessary consumption), is a use of surplus labour.¹⁰

Finally, it is worth noting that Petty is completely conscious that he is constructing arithmetical models in order to demonstrate fundamental principles; completely aware of the abstract character of these constructions and their conclusions. The second model, Petty tells the reader, provides only 'the foundation of equallizing and ballancing of values;...in the superstructures and practices hereupon, I confess there is much variety, and intricacy'. At the same time Petty has no doubt that the analysis is consistent with heterogeneous labour: 'possibly there may be more Art and Hazzard in working about the Silver, then about the Corn, yet all comes to the same pass' (Petty 1662:43–4; cf. Petty's reduction of 'Art' to 'Simple Labour' in 1691a:182). The use of a '*caetens paribus*' clause in the related statement on value discussed above is therefore not incidental (Petty 1662:50–1). Likewise, after presenting the theory of prices in the third model, Petty adds a qualification: since virtually all commodities have substitutes and 'novelty, surprize, example of Superiours, and opinion of unexaminable effects do adde or take away from the price of things', there will be a variety of 'contingent Causes' operating on prices, as well as the 'permanent Causes' with which Petty is concerned. His further comment that an apprehension of the contingent causes is properly a task belonging to 'the judicious foresight and computation whereof lies the excellency of a Merchant', makes it evident that Petty is excluding from his analysis the issue of fluctuations in market prices (Petty 1662:90; also 1691a:181). The distinction between permanent and contingent causes has a kinship with the distinction between intrinsic and extrinsic value noted above; and Petty indeed speaks of the distinction between intrinsic and extrinsic or contingent determinants of price elsewhere (Hull (ed.) 1899: vol. I, 625–6). In the third model Petty's self-consciousness concerning the abstract assumption of a single necessary consumption good is evidenced by the quaint manner in which he defends it:

‘Corn,...we will suppose to contain all necessaries for life, as in the Lords Prayer we suppose the word Bread doth.’¹¹

3.2 ECONOMIC AND SOCIAL REFORM

Petty’s first *Treatise* model conceives taxation as an aspect of the distribution of surplus product. His concrete treatment of taxation in the *Treatise* involves detailed consideration of the operation and merits of various taxes, problems of evasion, consideration of equity, and currency debasement as covert taxation—with his fundamental notion of tax reform animated precisely by the recognition that taxation and public expenditures reallocate expenditures and redistribute income. Petty (1662:32–7) obliges himself to show that the redistributive character of an economically desirable tax system is consistent with a defensible equity criterion. Taxes ‘do little harm to the whole Body of the people’, in so far as they ‘onely...work a change in the Riches and Fortunes of particular men’ (and are not expended on imports). But taxation certainly effects a ‘new distribution’ of ‘Riches’ and may do so systematically; for example, ‘by transferring the same from the Landed and Lazy, to the Crafty and Industrious’.¹² The explicit principle of tax equity which Petty finally settles upon is that ‘men should contribute to the Publick Charge but according to the share and interest they have in the Publick Peace; that is, according to their Estates or Riches’—immediately adding that an individual is ‘actually and truly rich [only] according to what he eateth, drinketh, weareth, or any other way really and actually enjoyeth’, rather than in proportion to wealth or income. The ideal tax is therefore an excise on final consumption (Petty 1662:91 with 56). Petty is well aware that this principle, however equitable between consumers, favours savers or accumulators, ‘the frugal Patriots, by whom the Publique Weal subsists’ (Petty 1662:66). A fiscal regime built upon this principle ‘is very light to those, who please to be content with natural Necessaries’; it ‘engages to thrift, the onely way to enrich a Nation’ (Petty 1662:94; also 1690:306).

The intention behind the consumption tax is made even more explicit in the *Political Arithmetick*. Since tax revenues ‘be only transferred from one hand to another’, the decisive question for policy is ‘whether the said Money or Commodities, are taken from an improving hand, and given to an ill Husband, or vice versa’:

suppose that Money by way of Tax, be taken from one who spendeth the same in superfluous eating and drinking; and delivered to another who employeth the same, in improving of Land, in Fishing, in working of Mines, in Manufacture, etc. It is manifest, that such Tax is an advantage to the State whereof the said different Persons are Members.

On the other hand if taxes are imposed on ‘the Stocks of laborious and

ingenious Men’, the transfer being to ‘such as do nothing at all, but eat and drink, sing, play and dance;...such as study the Metaphysicks, or other needless Speculation; or else employ themselves in any other way, which produce no material thing, or things of real use and value in the Commonwealth’, then ‘the Wealth of the Publick will be diminished’. These considerations are exemplified by the Dutch, who do not impose taxes ‘according to what Men gain,...but...according to what Men spend: And most of all, according to what they spend needlessly, and without prospect of return’. The Dutch experience also indicates to Petty that high taxation need not prejudice national prosperity and may promote it (Petty 1690:269–71). It may be noted that Petty does not, in these arguments, repudiate luxury consumption and commend thrift on the usual mercantilist ground; that is, not on the ground that luxury consumption is consumption of luxury *imports*, though for Petty consumption of imports can be a *further* problem (see section 3.3 below). His arguments here concern how the fiscal regime redistributes expenditures and thereby influences the composition of output and employment. Petty takes the view that this mechanism should be used to discriminate against luxury consumption and in favour of those who are thrifty and accumulate.

The applied analysis of the composition of society’s employment in the *Treatise* is couched in terms of the categories of public expenditure enumerated in the first chapter: defence, public administration, the clergy, education, care of the poor, public employment and transport infrastructure. These categories closely parallel the classes of employment incorporated in the first model. Indeed Petty’s critical analysis of the composition of employment proceeds from the first and third *Treatise* models: the largest part of various classes live off the product of others, without themselves making an adequate social contribution; so their numbers should be reduced to the minimum necessary, thereby removing all ‘Supernumerary Interlopers’ (Petty 1662:90), and certain commendable expenditures and useful employments increased. Petty advocates reduced expenditures on defence, public offices, clergy, lawyers and physicians; and increased expenditures for public employment and the poor. These seven categories find a place in both the first model and Petty’s wider applied analysis of government expenditures. There is criticism of the economic role of merchants and retailers (another category in the first model)—though here in particular, as well as with regard to lawyers and physicians, it is not entirely clear how their numbers are to be reduced by policy. There is also criticism of the universities, this being connected to the attack on clergymen, lawyers and physicians (Petty 1662:21–31). Behind Petty’s views on public provision for religion and education lies a deep loathing for the clergy and a certain contempt for orthodox, formal education.¹³

On public offices in general, Petty recommends abolition of ‘superfluous,

supernumerary, and antiquated' positions; and a reduction in the income of others 'to what the labour, art, and trust...do require'. A 'universal Reformation' will allow these 'Surplusages' to be restored to the people or put to better public use (Petty 1662:25–6, cf. 76–7; and Lansdowne 1927: vol. II, 115). The causes of excessive military expenditures are also examined, Petty pointedly noting that the remedy for offensive wars is to keep 'the chief Governours Revenue...small, and not sufficient to carry on such Wars' (Petty 1662:21–3). Recommendations for reductions in public expenditures on religion are a regular theme in Petty's writings (Petty 1691a:148, 158, 218, 223; 1690:263, 292; Lansdowne 1927: vol. I, 36, 66; *Papers* i.15:3). In the *Treatise* he pursues the theme in a rather facetious manner. Petty proposes halving the number of clergy via rationalization of parishes and organizational reform; and notes that salvation could be secured with altogether less religion—a view which he implies the Bible corroborates: 'for the yoke of Christ is easie, and his burthen light'. (This is an allusion to the Gospel of Matthew 11:30.) Warming to his subject, Petty adds that, if he 'had not an abhorrence from propounding the lessening of the Church Means', he could recommend that the remaining half of the clergy be financed partly by voluntary contributions, as 'a way to promote the Gospel, and to give less offence to such as think that their whole maintenance should be made in that manner'. Furthermore, if celibacy were restored, the parson could 'live as well' with half his current income (Petty 1662:23–5; also 73, 79–80; Lansdowne 1927: vol. I, 194). Petty omits to mention how many clergy he expects to endorse these proposals. More seriously, Petty is concerned about both the waste of public expenditures on religion and the loss of social labour time. With regard to the latter, in the *Treatise* Petty measures the tythe in terms of the number of workers it could feed (Petty 1662:78). Elsewhere he stresses also the greater number of working days lost due to religious holidays under Catholicism as opposed to Protestantism (Matsukawa 1977:49–50).

Petty also offers some comments advocating reductions in other employments, though it is unclear what kind of policy is supposed to achieve this. Expenditure on the universities can be reduced by reducing the number of students in the professions (divinity, law, medicine); which in turn can be effected 'by lessening the use of those Professions'. On the basis of his own calculations, Petty believes that the number of lawyers and physicians greatly exceeds the socially necessary number (Petty 1662:26–7). The same judgement is applied to merchants and retailers, collectively responsible for the distribution of commodities in foreign trade and domestic exchange respectively. A calculation of the necessary number of these middlemen would recommend a substantial reduction in their number: 'a large proportion of these...properly and originally earn nothing from the Publick, being onely a kinde of Gamesters, that play with one another for the labours of the poor' (Petty 1662:28). Effectively, what Petty is advocating in all these

cases is a change in the composition of activities to which surplus labour is devoted.

The activities and employments Petty favours for surplus labour are more systematically examined in section 3.4 below. The activities he recommends in the *Treatise* for the unemployed constitute some examples of how surplus labour, in this case the unemployed, ought to be allocated. It may be noted, incidentally, that Petty sees little need to justify public provision for the poor or work for the unemployed: ‘it is unjust to let any starve, when we think it just to limit the wages of the poor, so as they can lay up nothing against the time of their impotency and want of work’ (Petty 1662:20, 29). Furthermore, Petty believes any employment is better than no employment at all, at least so long as it does not require use of imports:

’tis no matter if [the unemployed] be employed to build a useless Pyramid upon Salisbury Plain, bring the Stones at Stonehenge to Tower-Hill, or the like; for at worst this would keep their mindes to discipline and obedience, and their bodies to a patience of more profitable labours when need shall require it.¹⁴

Nevertheless, Petty finds sufficient useful employments ‘wanting in this Nation’: improving highways, ‘whereby the charge and tedium of travelling ...may be greatly lessened’; making rivers navigable; ‘planting of usefull Trees for timber, delight, and fruit in convenient places’; bridge-building; work in mines, quarries and collieries; and ‘Manufactures of Iron, etc.’. These activities also recommend themselves for being ‘works of much labour, and little art’ (Petty 1662:29–30, with 20). The difficulty and cost of transportation and the need to improve it is a problem to which Petty often returns and he is particularly sensitive to the role of transport costs as a component of prices (Petty 1662:42; 1691a:147, 217; 1690:256–7, 293–4; 1683a:474; Lansdowne 1927: vol. I, 174, 190–2, vol. II, 149–51; Lansdowne 1928:40–42). The general case for a full utilization of available labour is also reiterated in later and other writings (for example, Petty 1691a:217–18; 1683a:474–5; Lansdowne 1927: vol. I, 34, vol. II, 185–6, 210). Petty even found room in his Will to again advocate public provision for the poor and unemployed (Fitzmaurice 1895:323). The same position finds vigorous expression in the early *Advice to Hartlib* (1648:13), combined with a repudiation of the employments so extensively analysed in the *Treatise*. Petty is eulogizing Holland:

all beggars,...even thieves and robbers (made for want of better employment)...set on work;...not...so many fustian and un-worthy preachers in divinity, so many pettifoggers in the law, so many quack-salvers in physick,...and so many lazy serving-men in gentlemen’s houses...

The employments Petty recommends in the *Treatise* relate primarily to

economic infrastructure and mining. The former is suggestive of the primitive economic conditions Petty confronted; the latter are probably intended partly for the production of the means of production. Nevertheless, it is evident that when Petty looked out upon the economic landscape of his time, he did not see the possibility of systematically allocating social labour to the accumulation of produced means of production (*vide* section 3.4 below).

3.3 FOREIGN TRADE AND MONEY

Petty's treatment of monetary subjects is largely independent of his theories of surplus and the social division of labour; but there are two points at which the latter bear a certain relation to the former. The first of these concerns velocity. It is well known that Petty's most notable contribution to monetary theory was his invention of the concept of velocity of circulation,¹⁵ which he uses to estimate the quantity of money required to facilitate national trade. Being so seminal, his discussions may be quoted at some length (though not in full):

there is a certain measure, and proportion of money requisite to drive the trade of a Nation, more or less then which would prejudice the same.... [This] proportion...is to be...taken from the frequency of commutations, and from the bigness of the payments.

(Petty 1662:35–6)

It may be asked...whether the...6 Millions [pounds of money approximately estimated to be the existing stock (see Petty 1691b: 106)]...would suffice for such revolutions and circulations thereof as Trade requires? I answer yes; for the Expense [that is, (loosely) annual national expenditure] being 40 Millions, if the revolutions were in such short Circles, viz. weekly, as happens among poorer artizans and labourers, who receive and pay every Saturday, then 40/52 parts of 1 Million of Money would answer those ends: But if the Circles be quarterly, according to our Custom of paying rent, and gathering Taxes, then 10 Millions were requisite. Wherefore supposing payments in general to be of a mixed Circle between One week and 13, then add 10 Millions to 40/52,...half of...which will be, $5\frac{1}{2}$, so...if we have $5\frac{1}{2}$ Millions we have enough.

(Petty 1691b:112–13)

Is there any way to know how much Money is sufficient for any Nation? Answ. I think it may pretty well be guessed at; viz. I think that so much Money as will pay half a Years Rent for all the Lands of England, and a Quarters Rent of the Houseing, and a Weeks Expense of all the People, and about a Quarter of the Value of all the exported

Commodities, is sufficient for that purpose. Now when the States will cause these things to be computed, and the Quantity of their Coins to be known,...then it may also be known whether we have too much or too little Money.

(Petty 1695:446).¹⁶

The interesting aspect of this treatment of velocity is the functional relation to income distribution, due to different payment frequencies (as well as payment magnitudes) for various income categories. However, not much should be made of this since Petty does little more than state the relation, as quoted above. The connection between distribution, monetary circulation and velocity is more richly characterized by Cantillon (sections 5.3 and 7.2 below). Much more could be said about Petty's treatment of velocity and money than is appropriate here; but it is worth noting that he also proposes that velocity can be increased (if there is a money shortage) by certain forms of credit innovation (Petty 1662:36; 1691b:113; 1690:311–13; 1695:446).

The second and more significant connection between money and surplus concerns Petty's recommendations in *Verbum Sapienti* (written some four years after the *Treatise*) for using surplus labour to accumulate national money reserves. In a chapter devoted to further consideration of the desirable composition of employment ('How to employ the People, and the End thereof) Petty states a first priority, consistent with the first and third models of the *Treatise*: 'producing Food and Necessaries for the whole People of the Land, by few hands'. This objective can be furthered 'by labouring harder' or by technical innovation. Petty here explicitly recognizes that the very fact that only a proportion of the population produces necessary consumption goods for the whole population entails intersectoral relations; for it 'will necessitate others to buy them [that is, necessities] with much labour of other kinds'. His focus here is on the use of surplus labour for production of exports: 'we should employ our selves by raising such Commodities, as would yield and fetch in money from abroad: For that would supply any wants of ours from the same, or any other place at all times' (Petty 1691b:118–19; cf. Lansdowne 1927: vol. I, 209–10). Petty's strategy for the accumulation of money by foreign trade is to minimize the price of necessities (or wage goods) by minimizing the labour required to produce them; and to minimize the price of exports by minimizing the labour required to produce them. As he puts it, to 'make no more [exports] than we can vend, but so much with the fewest hands, and cheapest food, which will be when Food also is raised, by fewer hands than elsewhere' (Petty 1691b:119).

The reason here for Petty's advocacy of allocating surplus labour to the accumulation of money is simply that money constitutes a liquid and internationally acceptable store of purchasing power. From this standpoint

he commends it as ‘Universal Wealth’, as compared to ‘Local [in the sense of specific] Wealth’, Money provides a means to acquire any of the particular forms of wealth, and at any time or place (Petty 1691a:147; 1690:259–60, 295). It serves as a kind of precautionary reserve. Considered in isolation, this advocacy might appear to give Petty’s economic thought a strong ‘mercantilist’ element; but this argument could not be taken very far. Petty does not believe that the quantity of circulating currency—or changes in that quantity due to the foreign trade balance—are of decisive significance for the volume of domestic economic activity (Petty 1662:35–6; 1691b: 112–13; 1691a:192–3, 219; 1690:265–6, 310–13; 1695:446; 1899:558; Lansdowne 1927: vol. II, 114). This is so much the case that he can speak of money as ‘but the Fat of the Body-politick, whereof too much doth as often hinder its Agility, as too little makes it sick’ (Petty 1691b:113). Neither does Petty favour regulation of foreign trade and payments, though his views on this question are more ambivalent and pragmatic (Petty 1662:47–8, 54–61, 87, 92–3; 1691a:185, 192–3, 221–2; 1690:304; 1695:441, 445–8; Lansdowne 1927: vol. I, 246–8). Furthermore, to the extent that he conceives money accumulation as acquisition of a precautionary national reserve, this desirable accumulation also has a well-defined limit: ‘When we have certainly more Money than any of our Neighbour States’ (Petty 1691b: 119). There is nothing illogical in Petty’s application of his model of surplus labour to net export production and national money accumulation; though it may appear strange from the standpoint of later classical economics. Indeed, the important point is that, even to the extent he favours a foreign trade surplus, Petty’s understanding of its significance extends to its implications for social production and the division of labour: a foreign trade surplus—or for that matter, export production for importation of non-necessary commodities—implies the existence and employment of surplus labour domestically.

3.4 MATERIAL PROGRESS

Petty’s economic writings do not contain anything which can reasonably be described as a theory of economic development. Nevertheless, there are scattered throughout them various fragments which together provide some elements for an analysis of the material progress of nations, and these are related to the theory of the social division of labour. Petty’s analysis of material progress is fundamentally an analysis of how an increasing quantity of surplus labour can be generated by technical progress and how that labour may best be utilized. Much of this has the character of acute insights which receive very little elaboration.

The young Petty’s *Advice to Hartlib* focuses upon technical progress understood as the key to material progress. Petty (1648:3, 5, 10–12) recommends establishing ‘a college of tradesmen’ to promote ‘mechanical

arts and manufactures’, and developing an encyclopaedic compendium of ‘all...real or experimental learning’, as the departure points for further technical advances. Petty eulogizes the increase in productive powers that will result from this, the case of Holland being exemplary (Petty 1648:13):

barren grounds made fruitful, wet dry, and dry wet;...even hogs and more indocile beasts shall be taught to labour;...all vile materials shall be turned to noble uses;...one man, or horse, shall do as much as three, and everything be improved to strange advantages.

The role of ‘invention’ in increasing labour productivity, and thereby surplus labour, is stated clearly in *Verbum Sapienti*. ‘producing Food and Necessaries for the whole People of the Land, by few hands’ can be brought about ‘by labouring harder, or...introducing the Compendium, and Facilitations of Art’, whereby ‘he that can do the Work of five men by one, effects the same as the begetting four adult Workmen’ (Petty 1691b:118; also 1691a:182). The connection between the theory of surplus (*c.*1661) and technical innovation (1665) is explicit and direct: invention influences the social division of labour via its influence upon labour productivity in the production of necessary consumption goods (in terms of the model used in section 3.1 above, increasing *A*). More generally, technical innovation is the key to increasing output per worker in non-necessary production as well; though as indicated in section 3.1 above, Petty also makes some other minor suggestions for increasing the intensity of labour or working hours. In the *Advice* Petty also draws attention to the division of operations within production processes. The proposed encyclopaedia of technology should describe ‘the whole process of manual operations and applications of one natural thing...to another, with the necessary instruments and machines, whereby every piece of work is elaborated’. Since there are ‘divers ways and methods of working most manufactures’, the virtues of each should be noted. Every particular manufacture should be reduced to ‘a certain number and classes of operations, tools, and materials’ (Petty 1648:10–11). This suggestion also takes on clearer economic substance in later writings. The significance for labour productivity and unit costs of the technical division of labour—that is, the division of operations or activities within production processes—is elaborated in the *Political Arithmetick*: ‘Cloth must be cheaper made, when one Cards, another Spins, another Weaves, another Draws, another Dresses, another Presses and Packs; than when all the Operations abovementioned, were clumsily performed by the same hand’. It is such specialization applied to the production and outfitting of ships which explains how Dutch shipping operates at lower cost than others, this specialization in turn being made possible by their ‘command of the Sea Trade’ (Petty 1690:260–1). The size of the Dutch sea trade or market enables specialization and division of labour.

Interestingly, Petty himself made extensive use of technical division of

labour in the survey of Ireland in the 1650s, both in preparing the requisite instruments and in executing the survey itself (Larcom 1851:xiii-xvii; cf. Fitzmaurice 1895:50–1; and section 2.2 above):

consideringe the vastenesse of the worke, [Petty] thought of dividinge both the art of makeinge instruments, as alsoe that of usinge them into many partes, vizt., one man made onely measuringe chaines, vizt., a wire maker; another magnetical needles, with their pins, vizt., a watchmaker; another turned the boxes out of wood, and the heads of the stands on which the instrument playes, vizt., a turnor; another, the stands or legges, a pipe maker; another all the brass worke, vizt., a founder; another workman, of a more versatile head and hand, touches the needles, adjusts the sights and cards, and adaptates every peece to each other.

With regard to the survey itself:

the principall division of this whole worke was to enable certayne persons, such as were able to endure travaile...were taught, while the other things aforementioned were in doinge, how to make use of their instruments, in order to take the bearinge of any line, and alsoe how to handle the chaines, especially in the case of risinge or fallinge grounds;... Another sort of men...were instructed in the art of protractinge, that is, in drawinge a modell or plott of the lands admeasured,...accordinge to the length and bearinge of every side transmitted vnto the said protractors in the ffeild bookes of the measurers last above described;... Over and above all these, a few of the most nasute and sagacious persons...did in the first place view the measurers ffeild bookes, and...did endeavour to discover any falsification that might be prejudiciall to the service. The same men alsoe reprotracted the protractions above mentioned, [and] compared the common lines of severall men's worke...¹⁷

If labour productivity is the key to material progress, this implies that neither the nation's quantity of land nor its mere number of (potential) workers is decisive. Petty embraces both these conclusions: 'a small Country and few People, may be equivalent in Wealth and Strength to a far greater People and Territory'. The explanation is indeed labour productivity, though location and natural fertility may also play a part: 'one Man by Art may do as much work as many without it', the exemplar again being Holland (Petty 1690:249–50; also 284–5, 290–7). But though population as such may not be decisive for national wealth, Petty vigorously advocates increasing the population and population density of England. This is further confirmation of the significance for material progress of human labour, relative to land or

natural resources in general. The following comments are indicative of Petty's attitude: 'Fewness of people is real poverty'; 'Labour is the Father and active principle of Wealth, as Lands are the Mother'; it is in England's interest 'Not to seek a foot more of territory'; 'a desire of multiplying of people ought to precede all designs of multiplying Land' (Petty 1662:34, 68; Lansdowne 1927: vol. I, 262, vol. II, 129–30; see also Petty 1662:21–2, 40–1; 1690:255, 285–90, 298, 301–2; 1683a:469–76; 1687b: 507–8; 1899:573; Lansdowne 1927: vol. I, 40–2; Lansdowne 1928:154). In the context of considering the benefits of increasing London population density, the technical division of labour arises again; and as with Dutch shipping above, there is at least an intimation of the role of extent of the market (Petty 1683a:473):

The Gain which is made by Manufactures, will be greater, as the Manufacture it self is greater. For in so vast a City Manufactures will beget one another, and each Manufacture will be divided into as many parts as possible, whereby the Work of each Artisan will be simple and easie; As for Example. In the making of a Watch, If one Man shall make the Wheels, another the Spring, another shall Engrave the Dial-plate, and another shall make the Cases, then the Watch will be better and cheaper, than if the whole Work be put upon any one Man.

Petty (1683a:474) here also links population density to reduction in difficulty and cost of transport, discussed in section 3.2 above. The link between technical division of labour and extent of the market is of course reminiscent of Smith (1776: Bk I, chs i–iii). It seems more than coincidental that *Another Essay* (1683a) is the one Petty writing which Smith certainly possessed (Bonar 1932:120; with Keynes 1971:17, 25).¹⁸

Finally, an examination of Petty's notions of wealth and accumulation further assists in clarifying his concept of material progress and its relation to surplus labour—the notion of wealth both clarifies the content of material progress and points to the allocation of surplus labour for a form of accumulation. The distinction between universal and local wealth, noted in section 3.3 above, reflects a hierarchical ordering of the elements of wealth. Expenditures and employments are ranked in terms of the durability of the associated product, going from food, through clothing, furniture, housing, mining, improvement of land, and finally, accumulation of gold and silver (Petty 1690:269; cf. 259–60, 295):

Because those things [that is, gold and silver] are not only not perishable, but are esteemed for Wealth at all times, and every where: Whereas other Commodities which are perishable, or whose value depends upon the Fashion; or which are contingently scarce and plentiful, are wealth, *but pro hic et nunc...*

In accordance with this hierarchical notion of wealth, Petty speaks of the

growth of national wealth in terms of the rate of accumulation of such things, or ‘superlucration’ as he calls it (Petty 1690:254):

if a Prince have never so many Subjects, and his Country be never so good, yet if either through sloth, or extravagant expences, or Oppression and Injustice, whatever is gained shall be spent as fast as gotten, that State must be accounted poor; wherefore let it be considered, how much or how many times rather, Holland and Zealand are now above what they were 100 years ago, which we must also do of France: Now if France hath scarce doubled its Wealth and Power, and that the other have decupled theirs; I shall give the preference to the latter...

Similar catalogues of the components of national wealth appear elsewhere in Petty’s writings. In the *Treatise* (1662:34), ‘all the wealth of this Nation’ is defined as ‘Lands, Housing, Shipping, Commodities, Furniture, Plate, and Money’. An empirical calculation based upon a similar, though more detailed categorization is provided in *Verbum Sapienti* (1691b:105–8)—Petty referring in passing to ‘the Wealth, Stock, or Provision of the Nation’ as ‘the effect of...past labour’ (Petty 1691b:11; also 108 with 114)—and again, towards the end of *Political Arithmetick* (1690:302–5). The concept of superlucration as accumulation of wealth is therefore about the accumulation of durables, including durable consumption goods, not the accumulation of produced means of production as such; though the catalogues include some items which are, or may be interpreted as, produced means of production—shipping, the ‘Shops, Warehouses, Cellars, Barns, and Graineries’ included within housing (Petty 1691b:106–7), metals and livestock. Petty’s connection of superlucration and material progress is summed up in his comment, ‘[W]here a People thrive, there the income is greater than the expence’, ‘expence’ being understood to refer to consumption of non-durables.¹⁹ This incipient notion of accumulation provides the point of departure for Gregory King’s more rigorous and sophisticated analysis some few years later (*vide* section 9.4).

The most striking peculiarity of Petty’s views on wealth accumulation to a modern reader is not so much the inclusion of the accumulation of precious metals; rather, it is that instead of a distinction between consumption (or non-necessary consumption) and produced means of production, one is confronted with a distinction between non-durable consumption and durables. The leading role played by the distinction between capital accumulation and (luxury) consumption in mature classical economics is in Petty submerged within an alternative distinction which combines produced means of production and some consumption within the one notion of wealth. It is important in this context to distinguish between ‘capital’ in two senses: as produced means of production; and as property right over such

inputs (instruments of production and/or wage goods), this right being the source of a claim to a share of the product in the form of profits (cf. Tucker 1960:79–87, esp. 80 n. 2). Petty is not unaware of the existence of non-labour instruments of production, including machinery—as his wealth catalogues, noted above, to some extent indicate (see also Petty 1648:10–11; 1690:249–50; 1691a:147; Lansdowne 1927: vol. I, 181). Though expansion of production capacity plays a role in his views on surplus labour, this does not crystallize into a clear conception of capital accumulation so understood. (But recall also the role of infrastructure, especially transport, discussed in section 3.2 above.) As to capital in the second sense, Petty’s writings entirely lack any conception of capitalist social relations (*vide* section 3.6 below). Neither of these limitations should obscure the fact of Petty’s fundamental insight that it is the existence of surplus which is the condition for material progress—whatever the form of wealth in which surplus labour is realized—by providing the required degree of freedom for accumulation to occur. This notion of a release from necessity is clearly implied in a Petty dialogue first published by Matsukawa (1977:45–6):

- A. ...pray if you can, show how to Measure ye Naturall and Intrinsic strength of any Country.
- B. I will try. First Measure ye Country geometrically as to its quantity figure and scituation.
 - 2. Number ye People.
 - 3. Reckon what quantity of such food will suffice those people as that land will beare.
 - 4. Compute of how much of such food the Land will produce.
 - 5. Compute with how many hands ye same may be produced.
- A. What then.
- B. Then, say that if ye last mencioned Number of hands bee equall to ye whole That the Country is very Weake as being able to spare none from Necessary labour, And ye greater ye difference, The Stronger ye Country.²⁰

3.5 POLITICAL ARITHMETIC

The fundamental elements of Petty’s economics were developed by 1662, in the *Treatise of Taxes and Contributions*. As has been shown above, this work contains the theory of surplus and the social division of labour, as well as a detailed exposition of Petty’s critical analysis of the division of labour within political society. Furthermore, some of these characteristic ideas and attitudes had taken shape in his mind by the 1640s, in significant part as a result of his early experience and observations of Holland. The *Advice to Hartlib* (1648) prefigures the later ideas concerning technical progress. It also expresses Petty’s basic attitudes towards labour utilization and the

division of labour and suggests the role of Dutch practice in the formation of those views (Petty 1648:13; cf. Lansdowne 1927: vol. II, 185–6). Hence, though the empirical analysis of the division of labour in the *Treatise* and later writings may be described as ‘applications’ of the theory in the *Treatise*, it is also correct to describe that theory as a development and analytical clarification of convictions long held by Petty. In the light of this, the most distinct development of Petty’s thought after the *Treatise* is political arithmetic: the determination of quantitative measures of politically and economically relevant phenomena, with a view to placing the policy of government on secure, objective foundations.

The idea of political arithmetic evidently took shape in Petty’s mind during the decade from 1662. It is virtually certain, as Davenant (1698: vol. I, 128) asserts, that Petty coined the term, notwithstanding the opinion of his first biographer (Fitzmaurice 1895:183). Petty apparently first used the term in a list of his own writings dated 6 October 1671 and in a letter of 17 December 1672 (Lansdowne 1927: vol. II, 260–2; Fitzmaurice 1895:157–8; also Petty 1674: Ep. Dedi.). Taken together, these sources indicate that the first essay in political arithmetic (Petty 1690) was at least begun in 1671 and *The Political Anatomy of Ireland* in 1672. In a dedication to Charles II written for the former work (but in the event never used), Petty comments that ‘few doe think much practice of [arithmetic] very necessary in matters of State, *otherwise then in what concerns the Revenue* (Petty 1690:239n; emphasis added). The ‘revenue’ (taxation) is precisely what had occupied Petty himself in the *Treatise* and *Verbum Sapienti*. Nevertheless, with the benefit of the hindsight provided by the later writings, there can be discerned in these two works elements which point forward to the concerns of political arithmetic. In the *Treatise* Petty rejects the reliability of nominal values for economic measurement and stresses the need to ascertain the various products of land in physical terms, ‘not as yet comparing it to money, in which the value ...will be more or less, according to the plenty of money, which hath changed strangely since the discovery of the West Indies’ (Petty 1662:49–50; also 43–5). The three models of production in the *Treatise* are themselves attempts at formulating more reliable and substantial analytical categories; for example, a more robust notion of value or price, immune from arbitrary changes in nominal value. The search for a ‘natural Par’ of value—examined in Chapter 6 below—is also first mooted in the *Treatise* (1662:44–5) and the somewhat related notion of the capitalized value of labour (examined in section 6.1) is first raised in *Verbum Sapienti* (1691b:108–10). *Verbum Sapienti* in effect is an extension of the *Treatise*.²¹ One final aspect of the *Treatise* worth noting in the context of the later political arithmetic—though it appears quite peripheral in the context of the *Treatise* itself—is that Petty often emphasizes the need for more precise empirical measures of economic variables. The following are merely examples (Petty 1662:34, 52–3; also 21, 26–8, 49–52, 94–5):

Ignorance of the Number, Trade, and Wealth of the people, is often the reason why the said people are needlessly troubled, *viz* with the double charge and vexation of two, or many Levies, when one might have served.

[It] will be objected, that these computations are very hard if not impossible to make; to which I answer onely this, that they are so, especially if none will trouble their hands or heads to make them, or give authority for so doing: But withall, I say, that until this be done, Trade will be too conjectural a work for any man to employ his thoughts about; for it will be the same wisdom in order to win with fair Dice,...as to consider how to advance the Trade of this Nation.

In the subsequent decade Petty decided to attempt this task, and reduce these uncertainties, himself. Indeed, to some extent that task was begun in *Verbum Sapienti*. The purpose of this brief work was to show that an equitable distribution of the tax burden can ensure that the revenue requirements of government, including extraordinary war finance, can easily be met. For the first time, Petty presents quite extensive quantitative estimates—of England’s wealth and national expenditure—in order to justify his argument. The culmination of this project of empirical quantification was the *Political Arithmetick* (1690) and *The Political Anatomy of Ireland* (1691a), Petty’s first large-scale and detailed empirical inquiries undertaken with a view to publication and, together, his most comprehensive applied studies. In the early 1670s Petty may have been undecided between ‘arithmetic’ and ‘anatomy’ as models for the kind of empirical economic project he had conceived. Anatomy is also evocative of Petty’s intellectual training and early career (*vide* section 2.1 above); but it is not surprising that finally he should have settled upon arithmetic. For Petty mathematics was a much more important model for rational inquiry than was anatomy.²² It may be added that the *Political Anatomy* is a much more diffuse and rambling work than the *Political Arithmetick*, lacking the well-defined purpose of the latter. In any case, it is not pertinent here to embark upon a general examination of the content of the empirical inquiries (or to attempt an assessment of their accuracy). What is of relevance is the extent to which Petty’s fundamental notions of surplus and the social division of labour played a role in these inquiries. The short answer is that the scope of political arithmetic embraces a very broad political, social and economic compass. Large parts of it are largely non-economic; for example, Petty’s treatment of the structure and distribution of political power in Ireland (Petty 1691a:162–70). What follows, though not exhaustive, indicates the ways in which those fundamental notions about production and employment enter into Petty’s empirical inquiries, before turning, at the end of this section, to a consideration of the over-arching intention behind political arithmetic.

From the standpoint of Petty’s fundamental analysis, a cogent theoretical

treatment of labour allocation and the composition of employment requires a determination of the quantity of (potential) surplus social labour and its allocation, as he understands it. However, empirically, Petty commonly pursues a quantitative empirical analysis which involves a much lesser goal: estimation of the quantity of unutilized or under-utilized labour—perhaps partly because of the intractability of empirically determining total surplus labour available; perhaps partly as a tacit acknowledgement that reallocation of currently employed surplus labour is impracticable for social and political reasons. In the *Political Anatomy* Petty calculates a figure for unutilized labour by deducting from the total population those incapable of labour, soldiers, those who don't need to labour because of their social status, and, it may be especially noted, their servants, along with clergy and students. This leaves the number 'fit for Trade'. Petty then deducts the workers required for the various agricultural and manufacturing trades (including 'Trades of Fancy and Ornament') to arrive at the relevant figure.²³ This is a measure of unemployed or under-employed labour, not surplus labour. Petty is entirely aware of the distinction. In the *Papers* (iv.33:4–5; also Lansdowne 1927: vol. I, 194) he argues, consistent with the above, that by determining 'the number of working hands between 10 and 70, and the number of those already employed, it may be knowne how many *spare* hands there are, and consequently what new Trades may bee introduced, without destroying what are allready' (emphasis added). Half a page later he makes the quite separate point with regard to national defence: 'From ye number of Males of between 16 and 60, and ye number of *necessary* workmen may be found the practicable number of ye Trayn-bands or grand Militia' (emphasis added). A similar analysis to that undertaken in the *Political Anatomy* is applied to England in the *Political Arithmetick* in order to show that, with full employment of labour, an additional £2 million of wealth could be accumulated annually (Petty 1690:307–9).

Analysis like this is to be understood in the light of Petty's intention to account for the physical composition and character of national economic activity—production, consumption, employment—not merely the public finances, nor simply nominal magnitudes; though it is nevertheless not surprising, given the overall content of Petty's economics, that estimates of variables such as the quantity of money and balance of foreign trade are included in political arithmetic. Just as in the second model of production Petty wants to define and clarify the natural rent of land—the net physical product—so in the *Political Anatomy* he seeks to estimate 'the natural and genuine Rent of Lands in Ireland, not that [in] Money' by determining the quantities of land, seed, and so on, required to produce various compositions of agricultural product (Petty 1691a:172–6; also 180–1). The emphasis on production conditions, combined with the overwhelming actual predominance of agriculture (particularly in Ireland), directs him to analyse the role of both labour and land—a preoccupation encompassed in the

phrase lands and hands' (*Papers*, i.15:2; i.22:1; iv.33:11; Lansdowne 1927 vol. I, 193–6). Hence, symmetric with the determination of the quantity of labour time per capita required for subsistence is an estimation of the quantity of land required per capita: 'The moderate Labour of 12 million, not over...12 houres p[er] diem upon necessary Business will soe cultivate 72 million of acres as to be sufficient Meaintenance for 19 millions of people'; and '3 acres, 2 thirds [of land] well Cultivated, will Maintaine...at a Medium of Man, woman and children' (*Papers* i.22:4; cf. iv.33:11). The requirements for subsistence are twelve workers per every nineteen members of the population and three and two-thirds acres per average family. Given these figures, calculated on the basis of a projected doubling of the population, it is clear why Petty deprecated the importance of land: though there is a necessary quantity of land per capita required for subsistence, on the basis of these figures the actual quantity of land available does not threaten to become a binding constraint. There are detailed inquiries in the private *Papers* (B.69; B.108; E.63), intended to demonstrate that, in the face of population growth, extent of land will not impose a binding constraint on subsistence, for England or Ireland. However, the strict possibility that land could become a constraint on population growth is recognized.²⁴

Petty provides another empirical estimate of the ratio between necessary labour and total population in Matsukawa (1977). In a quotation from that manuscript, given at the end of section 3.4 above, Petty defines the 'strength' of the nation in terms of the magnitude of available surplus labour. He proceeds to apply this approach to Ireland, giving a detailed account of the agricultural products the land is capable of producing and the quantities of labour required. In effect, Petty 'solves' for the social division of labour—the 'data' of the problem being the methods of agricultural production, necessary consumption per capita and total population—and concludes: '18,000,000 of akers 3,500,000 Boves, 1,000,000 of Sheep and 300,000 people may feed 1,200,000 [that is, the entire population] and Consequently That there being 1,200,000 in all, That 900,000 are Spare hands and may bee employed to luxury Ornament War Sciences, Superstitions etc.'²⁵ At the very end of the dialogue Petty rather facetiously has the interlocuter ask him to apply his 'arithmetically arguments' to the service of 'Popery'. In response Petty makes explicit that the alternative (limiting) case to having a quarter of the population produce necessaries, while the remainder are engaged in other employments, is to have the entire population working a quarter of the time: 'ye moder ate labour of $\frac{3}{4}$ of ye people can give a livelyhood to ye other $\frac{3}{4}$ Or...all ye people working None need worke full 2 days in ye week. Why Then should not all the Rest bee days of Worship to God and his Saints' (Matsukawa 1977:50). In another unpublished paper Petty formulates with similar clarity the conceptual problem of measuring surplus labour (Lansdowne 1927: vol. I, 89–90):

if wee know now how many people there are and the faculties of each, wee can tell how much Corne will make them bread and beare; how much wooll and skins, Clothes; what Cattell will afford them flesh, butter and cheese; how many men's labour in nets and Boates will find them fish and fowle. by all which and by knowing how much of all these the Intrinsick vertue of the Country will produce, and with what labour, wee know as followeth, vizt:

1. Whether wee can live.
2. What wee can spare and export.
3. How many of our whole number need actually to Labour.

The acquisition of detailed information concerning the conditions of production and the character of consumption patterns, in order to answer such questions, is part of the purpose of political arithmetic. However, when the inquiries actually undertaken under the name of political arithmetic are examined, the social division of labour is not found to play a very significant role, notwithstanding its crucial role in Petty's wider economic analysis and policy advocacy (sections 3.2–3.4 above). It is noteworthy that the clearest examples of measuring surplus labour time, as indicated above, are to be found in the unpublished papers. Petty's economic principles do play a pervasive role in his empirical inquiries in other ways, including aspects of his economic thought not directly related to production and employment. But political arithmetic is even broader than this. Its entire compass as understood by Petty is well summarized in a manuscript (among similar others) which lists fifty-four subjects for quantitative analysis (Lansdowne 1927: vol. I, 193–8, and 167–200). It covers a myriad of phenomena in a grand and comprehensive political, social and economic quantitative project.

What then is the unifying intention of political arithmetic? In the Preface to the *Political Arithmetick* Petty says he will employ a method 'not yet very usual': instead of using 'comparative and superlative words', he will express himself 'in Terms of Number, Weight, or Measure;...use only Arguments of Sense, and...consider only such Causes as have visible Foundations in Nature'.²⁶ The work is offered 'as a Specimen of the Political Arithmetick I have long aimed at'. The meaning of comparative language is suggested by the following: 'In a session of the Royal Society when someone chanced to use the words "considerably bigger", "Sir William Petty cautioned, that no word might be used but what marks either number, weight, or measure"' (Hull (ed.) 1899: vol. I, lxiv, citing Birch 1756–7: vol. IV, 193). Superlative words refer to exaggerated language or hyperbole. Petty is quite self-conscious about this novel venture in socio-economic analysis. In the dedication to Charles II, Petty apologizes 'for having presumed to practice a Vulgar Art upon Matters of so high a nature'; but since 'whatever is firm and high must have low and euen foundations', he hopes he has 'done no

incongruous thing' (Petty 1690:239n.). Petty also affirms in the Preface that he will ignore those causes that proceed from 'the mutable Minds, Opinions, Appetites and Passions of particular Men'; as he puts the same point elsewhere, to 'use no arguments grounded upon ye humours and fancies of men but only upon... Things considered in Number Weight and Measure' (Matsukawa 1977:40).

These sentiments can be understood in the light of both the method and content of political arithmetic. As to method, Petty chooses to express his arguments in quantitative form: his model for rational inquiry is mathematics. Additionally, he seeks to employ concepts and arguments with well-defined empirical or objective meaning, not those which arise out of subjective opinion or prejudice. In the Preface to the *Political Arithmetick* Petty also argues, with regard to explanation based upon particular 'Opinions, Appetites and Passions', that he is 'as unable to speak satisfactorily upon those Grounds (if they may be call'd Grounds), as to foretel the cast of a Dye'. It will be recalled that earlier in this section some quotations were given from the *Treatise of Taxes* to show how the project of political arithmetic was prefigured a decade prior to its birth. In one of these Petty argues that without exact computations of rents, national wealth, and so on, 'it will be the same wisdom in order to win with fair Dice,...as to consider how to advance the Trade of this Nation' (Petty 1662:53). It is noteworthy that this dice metaphor should ingrain itself in Petty's mind for at least ten years. By being posited on objective empirical foundations and mathematical method, political arithmetic can serve to remove the ignorance, inaccuracy and uncertainty that Petty perceives as endemic to statecraft. By providing an accurate account of the social economy, political arithmetic can serve as the precondition for effective policy. It will be recalled that this objectivist temper also animates Petty's approach to value theory—in particular, the relegation of subjective factors to merely contingent or 'extrinsic' influence—discussed at the end of section 3.1 above.

With regard to the content of political arithmetic, Petty conceives his 'arguments', and the 'causes' he perceives, as comprehending the genuine determinants of political, social and economic welfare, from a national standpoint. In broad terms, Petty's applied economics may be conceived as an empirical account of economic progress and prosperity on the one hand, economic stagnation and poverty on the other. This analysis is bipolar also in another sense: Holland is exemplary; Ireland exemplifies the opposite extreme. The poverty of the latter is evident enough from Petty's observations that more than 85 per cent of the population engage in virtually no commodity exchange at all and that the average Irish house is built with three or four days' labour (Petty 1691a:188–91). Petty vigorously argues that neither material progress in the one case nor poverty in the other is due to any mysterious qualities of these people but have intelligible, literally 'sensible' (that is, empirical), explanations (geography, manners, religion,

policy, and so on). Hence in analysing the reasons for Dutch trade superiority Petty comments disparagingly: ‘Many...do...magnifie the Hollanders as if they were more, and all other Nations less than Men...making them Angels, and others Fools, Brutes, and Sots’ (Petty 1690:255). Likewise in the *Political Anatomy* the economic condition of the Irish is explained by their weather, diet, political regime, the influence of their rulers, and ‘Ancient Customs’; from all of which, Petty sees ‘nothing in them inferior to any other people’. Their laziness arises ‘rather from want of Employment and Encouragement to work, than from the natural abundance of Flegm in their Bowels and Blood’ (Petty 1691a: 201). The very fact that such bizarre, non-empirical propositions required repudiation is a testimony to the state of opinion Petty confronted.

In short, political arithmetic was intended as a calculus for application to socio-economic concepts which themselves possess well-defined empirical meaning. It should be evident that this project requires as a precondition the construction of explanatory, theoretical concepts to serve as criteria of relevance. Certainly that was a precondition in Petty’s case: his empirical inquiries were directed towards determining the empirical magnitudes of the factors which his earlier developed theoretical ideas told him were the determinants of national wealth and welfare. The chronology alone, together with a careful reading of the *Treatise* (1662) should indicate this. There is no warrant for the suggestion that Petty applied the (allegedly) Baconian experimental method to economics (Johnson 1937:93); nor for the view that political arithmetic evidences ‘the daydream...that solutions lie hidden in the facts’ (Letwin 1963:138). Nor is it sensible, on the evidence of political arithmetic, to describe Petty as the founder of econometrics, as Deane (1968) does, tacitly following Schumpeter (1954:209–10). Political arithmetic did not involve the specification and ‘testing’ of empirical hypotheses. Nor did it employ any significant statistical constructs (cf. Hull 1899: vol. I, lxxv). Hicks (1983:17) is closer to a *part* of the truth in construing political arithmetic as ‘social accounting’. But the intention behind Petty’s empirical inquiries is more extensive than this. Political arithmetic, in its economic content, seeks the orders of magnitude associated with empirical equivalents of the theoretical concepts, with a view to statecraft.²⁷ This intention was itself animated by a vigorous view that government was manipulating the social economy and imposing policy upon it, without really even perceiving its structure and contours. Consequently, the success or otherwise of policy was in large part the result of chance. Petty’s intention can be summarized in his own words (Lansdowne 1927: vol. I, 111):

God send mee the use of things, and notions, whose foundations are sense and the superstructures mathematicall reasoning; for want of which props so many Governments doe reel and stagger, and crush the honest subjects that live under them.

The *idea* of political arithmetic was creative and progressive. Furthermore, the project of bringing to statecraft a reliable and extensive knowledge of its terrain, the social economy, was a pioneering enterprise, particularly useful because informed by Petty's theoretical ideas. He was well aware of its pioneering character (Petty 1691a:172; 1686b:497–8; Lansdowne 1927: vol. II, 226–7). Petty's 'anatomical' investigations required precise 'instruments', even when performed on so simple a political 'animal' as Ireland; but he could bring to the task only 'a common Knife and a Clout, instead of the many more helps which such a Work requires' (Petty 1691a: 129–30). Whatever allowance is made for Petty as a pioneer, it remains true that the *execution* (as distinct from the concept) of political arithmetic sometimes left much to be desired (*vide* Hull 1899: vol. I, lxvi–lxviii). The Preface to the *Political Arithmetick* (1691a:244–5) reveals both the pioneering character of the project and a somewhat cavalier attitude to quantification:

Now the observations or Positions expressed by Number, Weight, and Measure, upon which I bottom the ensuing Discourses, are either true, or not apparently false,...and if they are false, not so false as to destroy the Argument they are brought for; but at worst are sufficient as Suppositions to shew the way to that Knowledge I aim at.

The tendency for political arithmetic sometimes to degenerate into political sophistry no doubt contributed to its falling into disrepute (*vide* section 9.4 below).

3.6 VALUE AND DISTRIBUTION

In section 3.1 it was shown how Petty formulates a labour theory of value. He seems to construe this as a kind of centre of gravity for relative prices: 'the foundation of equalizing and ballancing of values;...in the superstructures and practices hereupon, I confess there is much variety, and intricacy' (Petty 1662:44). But this theoretical construction finds almost no operational role in Petty's economic writings. Indeed, in the very same model of production in which the labour theory of value is formulated, exchange value is (apparently unwittingly) *presupposed* in the argument: Petty specifies natural (corn) rent, on the assumption of given exchange ratios between corn and other necessary consumption goods (clothing, and so on), without offering any explanation of how these exchange ratios are determined. It may be that Petty tacitly supposes the price of corn in terms of clothing, and so on, to be determined by labour embodied also; but this would be a very generous interpretation. The 'slip' involved in Petty's argument is of the utmost importance. In relaxing the assumption used explicitly in the third production model—that necessary consumption is homogeneous with out-put—and allowing, albeit in passing, that the magnitude of natural corn rent depends upon exchange ratios with other commodities, Petty unknowingly stumbles into a fundamental

theoretical problem of the classical tradition: the measurement of heterogeneous surplus (cf. Roncaglia 1985:82–8).

Given the primitive character of the seventeenth-century economy, it is perhaps not altogether surprising that Petty sees little need to inquire more extensively into the problem of price determination. His own observation of Ireland (admittedly something of an extreme example), that 85 per cent of the population engaged in virtually no exchange at all (Petty 1691b:192), is telling. From this standpoint, Petty's labour theory of value might even be construed as a 'primitivist' or 'original condition' explanation of value, rather than an argument that labour embodied determines natural prices in a developed social economy. In each of the three instances of the labour theory noted in section 3.1 above, it is employed to explain the silver value of corn, though it is implied clearly that this exemplifies a general principle. In two of these instances the principle is also applied to the silver value of gold (Petty 1662:43–4; Matsukawa 1977:47). If understood as a theory of primitive value, Petty's argument would be consistent with asserting, in the manner of Adam Smith (1776: bk I, ch. vi, 65–6), that beyond the 'early and rude state of society' this relation no longer holds. Hence Roncaglia (1985:76–84, esp. 81–2) interprets Petty as in general attempting to explain prices by costs of production, with the labour theory of value merely intended by him to be a special and highly abstract case. The problem in interpretation here is to determine what operational significance Petty attached to the labour theory of natural (and political) prices, detailed in section 3.1 above. Specifically, does he intend it to apply to prices in a social economy with non-labour means of production in general use? It is impossible to answer this with certainty, precisely because value plays so small a role in Petty's corpus of writings and his value theory is quite cryptically stated. In our judgement, the textual evidence is not definitive enough to exclude either Roncaglia's conclusion or the alternative view that the labour theory is intended to be of wider application; though we would tend to the latter.²⁸ Certainly Petty's reduction of 'Art' embodied in Tools' to 'Simple Labour' is suggestive of a wider application, particularly if it is kept in mind that profits play no systematic role in his economics (Petty 1691a:182). On a further issue, Roncaglia (1985:76–9) is certainly correct in arguing that natural price as conceived by Petty is not a centre of gravity for actual (market) prices. Here attention may be drawn to two formal properties of natural prices in the later classical tradition: natural price is associated with technically necessary costs of production; natural prices are centres of gravity. As is most clear from the third production model, Petty's natural prices have the former property but 'political' prices are the centres of gravity. This is because Petty has no conception of competition establishing a tendency for inefficient production methods to be eliminated; so that political price associated with inefficient production methods (in particular, under-employment or excessive labour input) is the centre of gravity for actual prices, in general,

and Petty must have recourse to his proposed policy interventions (section 3.2 above) to move political price in the direction of natural price. This is a further manifestation of the essentially pre-capitalist character of the economy Petty is theorizing.

Petty's surplus theories of the social division of labour, natural rents, taxation and natural value provide neither a theory of the relation between distributive variables, nor a treatment of the relation between distribution and relative prices.²⁹ Petty does have a 'common-sense' understanding that prices are made up of their constituent cost elements: cost of material inputs, wages, taxes, interest and transport costs are the most salient elements (Lansdowne 1927: vol. I, 189–92; Petty 1691a:187). There is no suggestion that this is a *theory* of price. In the private papers there is also the suggestion of a supply-and-demand explanation of price fluctuations. Petty comments that the prices of Irish exports fell in 1686, in part 'Because a quarter...of the *ordinary* quantity of Irish Goods usually sent beyond seas, hath been added to the same...so as the foraine Markets have been glutted and overstockt thereby' (*Papers B.64*; emphasis added). Furthermore, the distributive categories which find any significant place in Petty's economics are wages, rents and taxes only. These are the income categories Petty regards as appropriate subjects for systematic theoretical analysis of any kind, tacitly denying a systematic role for profits. This does not mean that profits do not exist for Petty; rather, they are so peripheral to the operation of the economy, as he perceives it, as to warrant no place in analysis. He is aware of profit and depreciation, but they are of peripheral significance (Lansdowne 1927: vol. I, 235–6, 240; vol. II, 145–6). It is evident that Petty's writings constitute an analysis of a pre-capitalist social economy. Since he has no theory of profits—and therefore, obviously no theory of capital (in the second sense noted at the end of section 3.4 above)—he could hardly possess a theory of competition. Nevertheless, there are limited domains in which a definite notion of arbitrage eliminating differential returns is clearly implied—in particular, foreign exchange rates (Petty 1662:48; 1691a:183–7) and the systematic relation between interest and returns on land alluded to in note 29 (*vide* section 6.1 below). It is also worth noting that Petty generally favours unregulated trade, though this should not be identified with capitalist competition. However, as mentioned in section 3.3, his position is not unequivocal. On the one hand his advocacy is pragmatic, in effect based on case-by-case appraisal; for example, on customs excises and monopolies (Petty 1662:54–61, 74–7, 92–3; 1691a:192). On the other hand, he appeals to general principles; for example, that nature favours unregulated trade (Petty 1662:59–60, 87; 1695:445). Evidently Petty sees no contradiction between favouring unregulated trade and also advocating regulation of real wages (Petty 1662:52, 87; 1691b:118–19; 1690:274–5; also 1691a:220 with 1690:299).

3.7 THE FOUNDING OF THE CLASSICAL SURPLUS APPROACH

Petty's development of models of economic surplus in the *Treatise of Taxes* (1662) by itself warrants the judgement that he is the seminal figure in the history of the classical surplus approach—at least, on the supposition that no one prior to Petty formulated such notions. However, if Petty himself made no significant use of these theoretical insights then one might conclude, in the manner of some commentators, that he contributed only fragmentary if ingenious hints, as discussed in the introduction to this chapter. In the foregoing the entire range of Petty's economic thought has been examined in the light of the principles enunciated in the *Treatise*, showing how those principles inform his economic writings. The most striking result of this examination is the extent to which Petty's economics is an investigation into the maximization and allocation of surplus labour. The distinction between necessary and total labour time—or equivalently, the notion of surplus-producing (in particular, agricultural) labour—gives rise to the theory of the social division of labour at the level of the social economy as a whole. This almost inevitably raises the question of how surplus labour ought be employed. Petty's arguments against the clergy, the professions, public offices, the universities, military expenditure, merchants and retailers—and his proposals for public expenditure devoted to transport, mining, infrastructure, and so on—constitute a critical analysis of the composition of activities to which surplus labour is devoted and proposals for its alteration. His tax proposals constitute a fiscal regime which consciously discriminates against non-necessary consumption and in favour of those who accumulate and use their stock in improving land, mining and so on; though the notion of the accumulation of durables clearly includes forms of luxury consumption. Surplus labour is also to be used for net export production, with a view to the nation's accumulating a precautionary reserve of international money. In this context Petty stresses maximizing surplus labour and minimizing wage-goods prices, by minimizing labour required in wage-goods production. This is one instance of a wider imperative to ensure that only technically necessary labour is employed in all production activities. In a dynamic context, rising labour productivity, both in necessary production and other activities, results from technical innovation and extending the technical division of labour. In all these arguments Petty is extending, applying and drawing policy implications from his fundamental theory. This body of analysis manifests itself in many aspects of the quantitative empirical analysis constituted by political arithmetic; but this project covers a considerable terrain, more extensive even than economic inquiry as a whole. More narrowly, the surplus notions play some role in political arithmetic, though by no means a major one. Value plays little role in Petty's economics altogether, save for the measurement issues examined in Chapter 6.

In the series of writings which constitute the bulk of his intellectual lifework Petty achieved a number of things. Most fundamentally, he developed and applied elements of a surplus approach to economic analysis. The foregoing examination of the relation between Petty's production models and his wider economic ideas concentrated on the social division of labour—rather than, for example, value theory—because that is easily the major form in which Petty's theoretical ideas on production receive further elaboration in his writings. It is this which gives a certain substantive unity to his economics. There is also a unity of *purpose*, methodological and political, in Petty's economics, which is examined in the following chapter. Taken together with all his 'lesser' insights (for example, technical division of labour, velocity of circulation) these achievements amount to a very great deal. Nevertheless, though his formulation of a surplus approach may be (almost) necessary for demonstrating a crucial role for Petty's economics in the formation of classical economics, it is not sufficient. It also needs to be shown that his economics did indeed influence the development of surplus theories. Petty's influence on the formation of classical economics follows one clear route and many other weaker, more diffuse and more complex ones. Most decisive is Petty's influence upon Richard Cantillon; and via that route, upon Physiocracy. This is only the most important contribution Petty made to the formation; other influences operating both via Cantillon and Quesnay, and directly from Petty's writings, can be documented. All these matters are taken up in Chapters 5 to 9.

METHODOLOGICAL AND POLITICAL BASES OF PETTY'S ECONOMICS

As we indicated in Chapter 2, Petty was in many respects typical of the intellectual coterie associated with the early history of the Royal Society. What marked him out from those contemporaries and made him unique was his overwhelming and sustained concentration on economic studies, as opposed to the prevailing preoccupation with natural science and technology—even allowing that in certain respects technology constitutes a point of intersection between natural science and Petty's economics. This chapter traces the methodological and political intentions behind Petty's economics and the intellectual influences which shaped them. The central conclusion is that the methodological and political views which shaped Petty's project were derived primarily from Hobbes.

4.1 INTELLECTUAL BACKGROUND

If from Petty's own words and writings one seeks a profile of his intellectual temper and horizons, the picture which emerges is of a man possessed of a broad appreciation of a great diversity of literature. Hobbes tends to dominate the picture, by virtue of the sheer number of citations (Lansdowne 1927: vol. I, 219; vol. II, 5, 35–9; Lansdowne 1928:158, 260, 305, 322, cf. 310–11). Bacon is mentioned just once in the *Correspondence*, though the young Petty conceived his *Advice to Hartlib* as a 'footnote' to Bacon, so to speak, and the preface to the *Political Anatomy* defers to him (Lansdowne 1928:158; Petty 1648:2; Petty 1691a:129). In the *Correspondence* Petty also provides a remarkably heterogeneous list of those he conceives to be great modern thinkers: Molière, Francisco Suarez, Galileo, Thomas More, Bacon, John Donne, Hobbes and Descartes. An analogous list of great 'ancient' thinkers consists of Archimedes, Aristotle, Hippocrates, Homer, Julius Caesar, Varro and Tacitus (Lansdowne 1928:158; also Lansdowne 1927: vol. II, 5, with Fitzmaurice 1895:302–4; Lansdowne 1928:321–2 with Lansdowne 1927: vol. II, 8). Descartes is mentioned, rather whimsically, in the *Political Arithmetick* and acknowledged in the *Discourse... Concerning...Duplicate Proportion* (Petty 1690:286; Petty 1674: Ep.

Dedi.). Newton is discussed in the *Correspondence*, as a result of the appearance of his *Principia Mathematica* in 1687 (Lansdowne 1928:277, 279, 283, 295). There is also an extensive critical discussion of Pascal (Lansdowne 1928:148–9, 155, 158–9, 172, 192, 208; Lansdowne 1927: vol. II, 198–9). In a list of directions to his sons with regard to their education Petty includes, for Charles, reading of ‘Josephus, Molière, Virgil, Caesar, Sallust and Tacitus without bounds... Aristotles *Rhetorick*, Hobbes *de Cive*, Justinians Institutions’; and for Henry, ‘Bacon’s Collections... Aristotles *Rhetorick* and *Logick*... Hobbes *de Cive*’, as well as ‘His father’s writings’ (Fitzmaurice 1895:302–4).

There are also in Petty’s writings references to five individuals who may very broadly be described as economic writers. In the *Political Arithmetick* Edward Chamberlayne’s *Present State of England* (1669) is commended and two of its empirical estimates used (Petty 1690:284, 308). Like Petty, Chamberlayne was a founding Fellow of the Royal Society and spent the duration of the Civil War on the Continent. The *Present State of England* became a kind of ‘yearbook’, going through thirty-eight editions between 1669 and 1755. Samuel Fortrey’s calculations of the value of English imports from France are also discussed in the *Political Arithmetick* (1690:297, 309). (There is a two-page manuscript endorsed by Petty, ‘Mr. Fortrey’s account of the French trade’, in the unpublished *Papers*, A.39.) There are incidental references to Nehemiah Grew and Sir William Temple in the *Correspondence*, neither pertaining to economics (Lansdowne 1928:81, 87). Grew was also from 1671 a Fellow of the Royal Society, a medical graduate of Leyden the same year, and wrote extensively on agricultural subjects. Temple, among many other things, wrote a tract on Holland which went through many editions and is regularly cited in seventeenth-century literature.¹ Sir Matthew Hale is discussed in the *Correspondence* and in *Another Essay*, with reference to his *Primitive Origination of Mankind* (1677), an essay on population growth (Lansdowne 1928:9, 32, 44; Petty 1683a:463). Though circumstantial, this evidence corroborates the judgement that Petty had no significant debts to the economic literature. As Petty’s editor comments, ‘it is doubtful whether Petty had any acquaintance worth mentioning with such economic writings as existed in his day’.²

The mere proclamation by Petty of certain sources of intellectual inspiration does not prove that any of the above writers had a significant influence on his thought. But if the intellectual horizons evoked by this casual empiricism, taken in conjunction with other evidence, do point to significant intellectual debts, then they point to Hobbes and Bacon. The circumstances of Petty’s early association with Hobbes in Paris was briefly discussed above (section 2.1). Aubrey reports that

At Paris [Petty] studied Anatomie, and read Vesalius with Mr. Thomas Hobbes, who loved his company. Mr. H. then wrot his

Optiques; Sir W.P. then had a fine hand in drawing and limning, and drew Mr. Hobbes Optical schemes for him, which he was pleased to like.

(Dick 1972:399; cf. Clark 1898: vol. I, 336–7, 367–8)

The closeness of their relationship in subsequent years is uncertain. There would have been plenty of opportunity, since Hobbes was living mainly in London from his return to England (c.1651) until his death in 1679. Aubrey provides some suggestive evidence. Speaking of Hobbes's acquaintances and friends: 'Lord Falkland was his great friend and admirer, and so was Sir William Petty; both...friends I have heard him speake of (Dick 1972:318); and with regard to Hobbes's dislike of book-reading (an attitude Petty acquired):

He had very few Bookes. I never sawe (nor Sir William Petty) above halfe a dozen about him in his chamber... He was wont to say that if he had read as much as other men, he should have knowne no more then other men.

(Dick 1972:314)

There exists a letter from Hobbes to Aubrey in Petty's private *Papers* (vi. 17, second series; dated 24 February 1674) praising his *Discourse* (1674), though there is no Hobbes-Petty correspondence. Whatever contact they may have had in the 1660s and 1670s, the *Correspondence* certainly provides firm evidence of Petty's continuing high esteem for Hobbes, right up until the former's death.

There is a curiously close parallel between the relationship of the young Petty and Hobbes and the earlier relationship between the young Hobbes and Bacon. Aubrey's account is no doubt based upon a somewhat tongue-in-cheek report from Hobbes:

The Lord Chancellour Bacon loved to converse with [Hobbes]. He assisted his Lordship in translating severall of his *Essayes* into Latin... His Lordship...was wont to contemplate in his delicious walkes at Gorambery, and dictate to... Gentlemen, that attended him with inke and paper ready to sett downe presently his Thoughts. His Lordship would often say that he better liked Mr. Hobbes's taking his thoughts, then any of the other, because he understood what he wrote, which the others not understanding, my Lord would many times have a hard taske to make sense of what they writt.³

These events apparently occurred during Bacon's last years (1621–6), following his fall from public office (Stephen and Lee (eds) 1949–50: vol. IX, 933). Bacon was twenty-seven years older than Hobbes; Hobbes, thirty-five years older than Petty. Petty was not quite three years old when Bacon died.

The little that has previously been written about the intellectual roots of

Petty's economics has tended to point to Bacon as the decisive, formative influence. The *prima facie* evidence for this interpretation is, on the one hand, Petty's own appeals to Baconian philosophy as an exemplar for both his *Advice to Hartlib* (1648) and the *Political Anatomy* (1691a); and on the other hand, an interpretation of political arithmetic as a Baconian 'inductive' enterprise (Lansdowne 1927: vol. I, xxviii; Johnson 1937:93; section 3.5 above). It is the argument of this chapter that Petty's association with Hobbes was the most influential intellectual association of Petty's life, leaving a significant, and at certain points decisive, stamp on both the questions he posed and the methods he brought to bear upon them. The debts associated with Petty's intellectual 'pedigree' are methodological and political—the actual substance of his economics is largely original. The basic methodological and political beliefs which inform Petty's pioneering economics were a result of exposure to Hobbes, and only to much lesser extent, to Bacon. Hence, Bacon's influence on Petty has been overrated and that of Hobbes underestimated. Bacon's thought does play a basic, if subterranean, role in Petty's economics; but this does not involve any alleged 'inductivism' pertaining to political arithmetic. Indeed, that *could* not be the manifestation of its role, as the interpretation of political arithmetic in section 3.5 above demonstrates. In short, Petty was an empiricist, not an inductivist. (The imputation of 'inductivism' to Bacon's philosophy is itself, at best, too crude an interpretation.) It was probably via Hobbes that Petty was directed to Bacon's philosophy though Petty is likely to have been introduced to aspects of Bacon's thought during his medical studies in Holland.

4.2 PETTY'S METHODOLOGICAL INTENTIONS: MATHEMATICAL METHOD AND 'SENSIBLE' CONCEPTS

One fundamental, methodological intention of Petty's economics was summed up by a contemporary (quoted in Hull 1899: vol. II, 513n.); to show 'that Mathematical Reasoning is not only applicable to Lines and Numbers, but affords the best means of judging in all the concerns of humane Life'. But Petty was sophisticated enough to recognize that even the most precise methods of inquiry would be as vacuous in execution as the concepts to which they were applied. Both his unshakeable esteem for mathematical method and his grasp of this latter principle date back to his early intellectual encounters in France.⁴ There is a need both for 'some mathematics' and 'variety of matter, data and phenomena, whereupon to exercise the same; since lines and numbers, without those, are but like lustrings without a lute or a hand' (Petty 1674: Ep. Dedi.). As early as 1648 Petty writes that mathematics (that is, 'arithmetick and geometry') are 'the best grounded parts of speculative knowledge, and of...vast use in all practical arts'; as well

as being ‘sure guides and helps to reason, and especial remedies for a volatile and unsteady mind’ (Petty 1648:4–5). The model and most reliable method of rational inquiry is mathematics. Second, the encyclopedia of ‘all...real or experimental learning’, proposed in the *Advice*, will provide the ‘matter, whereon to exercise those most excellent sciences’. Without such empirical objects the (mis-)use of mathematics will only be to ‘unprofitably apply about resolving needless questions, and making of new difficulties’ (Petty 1648:13–14). (Note the similarity to the language used in Petty 1674, quoted immediately above.) The second requirement for rational inquiry is also emphasized in the dialogue published by Matsukawa (1977:48):

- A. I see nothing of Arithmetic in your Way, which Every[body] doth not know and can do.
- B. True; Every body can Add Subtract Multiply divide, but every body have not materials to worke upon, Nor are there many who can state and reduce political questions into termes of Number weight and Measure But are like ye fellow who when hee learned to Write, knew not at all what to write.

The demand for empirical ‘data’ or ‘phenomena’ is to be understood as a corollary of Petty’s repudiation of comparative and superlative words (*vide* section 3.5 above). What is being sought is an analytical language which constitutes well-defined concepts with definite empirical content—in Petty’s terms, ‘words of sence [and]...of a Single Signification’; words of ‘certain, sensible signification’ (Lansdowne 1928:158, 300). The desire for concepts both precise and empirical often finds expression in Petty’s writings; from his defence of the Royal Society in the *Discourse...Concerning... Duplicate Proportion* to his attacks on Pascal and his contempt for the ‘Insignificant Gibrish’ taught in the universities (Lansdowne 1928:300). In the former he argues that this is just the purpose of the Royal Society: ‘to make mysterious things plain; to explode and diffuse all insignificant and puzzling words; to improve and apply little small threds of mathematics to vast uses’. For this project, ‘precise exactness is indispenible’ (Petty 1674: Ep. Dedi.). Hence when Petty says that concepts must be ‘sensible’ and ‘significant’, these terms themselves carry a strict meaning: analytical concepts must signify, in a precise manner, objects of sense perception. From this vantage point, the methodological commitment embodied in political arithmetic—to argue only in terms of number, weight and measure—may be regarded as *the ultimate expression* of this prior methodological conviction, at least once combined with the commitment to mathematical method (*vide* section 3.5). Argument confined to terms of number, weight and measure is not synonymous with argument confined to sensible, significant concepts; but once the latter, more general methodological conviction is transformed into the former, Petty strays on to very dubious ground. For the presumption then

becomes, not merely that analytical concepts must have definite, empirical meaning, but that they be capable of strict quantitative expression. This leads to problems, both in economic analysis and further afield; for example, the reduction of skilled labour to simple labour and the notion that national 'vice' can be measured.⁵

With regard to the method to be applied in treating legitimately constructed concepts, Petty favours 'the Algorithm of Algebra'. This is 'a kind of Logick' which allows manipulation of 'not onely numbers but the several species of things'. Such applications of algebra are made possible 'by noting the severall species of things by letters or other characters, ...all which characters or marks are called Symbolles' (Lansdowne 1928:318). This is the particular mathematical method which in Petty's opinion is paradigmatic for politico-economic analysis: a calculus of symbolic forms which finds concrete expression in arithmetic. This is indeed the method which tacitly underlies the theoretical models of production in the *Treatise*, though they are actually expressed in arithmetical form. It also serves tacitly or explicitly as the model for other constructions; most notably, political arithmetic. In the same letter, written six weeks before his death, Petty provides a simple example of how the algebraic method may be applied to practical problems;⁶ adding that

where the algorithme is more operose, and where the stock [of data] is all the truth in nature that can be expressed in number, weight, and measure, it is not to be imagined what a number and variety of light truths may be deduced by Algebra.

(Lansdowne 1928:322)⁷

Petty is well aware that there is nothing novel, or even remarkable, about the mathematical content of his thought. (Letwin's criticism concerning the unremarkable mathematical content of Petty's thought, therefore, is as misplaced as his contention that Petty conceived political arithmetic as a contribution to algebra is wrong; Letwin 1963:137.) Petty in no way considers himself to be contributing to mathematics as such. Hence in the quotation from the Petty dialogue (p. 58), when 'A' asserts that there is nothing novel in the arithmetic employed, 'B' answers unqualifiedly in the affirmative, drawing attention rather to the novelty of the application. Indeed, Petty almost glories in the simplicity of the mathematical structures, *despite* their great analytical power. In the letter concerning algebra quoted immediately above Petty concludes (Lansdowne 1928:322):

[Algebra] came out of Arabia by the Moores into Spaine and from thence hither, and WP hath applyed it to other then purely mathematical matters, viz: to policy by the name of *Politick Arithmetick*, by reducing many termes of matter to termes of number, weight, and measure, in order to be handled Mathematically.

In the *Advice to Hartlib*, Petty (1648:13–14) had argued that the extension of reliable knowledge of the empirical world, combined with mathematics, would lead to the development of new empirical sciences ('mixt mathematical arts'):

For we see, that opticks are made up of pure mathematics, the anatomy of the eye, and some physical principles, concerning the nature of light and vision, with some experiments of convex and concave glasses; astronomy is constituted again of them, and some celestial phaenomena. Enginery again of them, and some propositions *de cochleâ et vecte*. And so certainly, as the number of axioms concerning several subjects doth increase by this work, so the number of (their applications to pure mathematicks, *id est*,) new mathematical arts will increase also.

It can safely be supposed that Petty regarded his political arithmetic in particular, as well as his economics in general, as steps towards just such a new mixed science.

4.3 POLITICAL INTENTION: THE PURPOSE OF POLITICO-ECONOMIC ANALYSIS

Conceptually precise empirical science built on mathematical foundations constitutes the *form* of analysis to which Petty aspired. However, this provides no explanation for the content of his intellectual lifework being overwhelmingly economic. As discussed in Chapter 2 above (esp. section 2.5), a completely determinate answer to this question is not possible. It may be in part that Petty just happened to have a taste for this subject matter. It may be in part that he was inclined, perhaps unself-consciously, towards questions at least superficially tractable to algebraic and quantitative methods; though Petty nevertheless stumbled into measurement problems and measurement absurdities. (See also Chapter 6.) Certainly part of the answer is that the economic organization of political society recommended itself to him as a subject matter, on grounds of intellectual conviction. A combination of these possibilities explains Petty's preoccupation with economics; along with other more subterranean motives, for example, personal ambition (cf. Lansdowne 1927: vol. I, 98 with 76). The point emphasized here is that certain definite intellectual bases for the substantive interest can be isolated.

In the first instance a negative point can be made. It is quite clear why Petty does not pursue at any length questions of speculative philosophy in general or metaphysics in particular. Given his predilection to identify human knowledge with knowledge of empirical phenomena—that is, knowledge of sensually perceived objects—it is natural that he should be

sceptical of theology, revelatory or otherwise (Lansdowne 1928:186–7, 190; Lansdowne 1927: vol. I, 162–6). There is an undertone of sarcasm when, in the dialogue on political arithmetic, ‘B’ answers a question as to whether arithmetic can be applied to everything, by commenting: ‘Unlesse They bee Mystical Spirituall eternall etc.’ (Matsukawa 1977:48). Lansdowne (1928:xvii) suggests that Petty probably died an agnostic. Certainly there is plentiful evidence in Petty’s unpublished papers of his scepticism towards Christian doctrines and, to some extent, his repugnance for them; though the following is perhaps inspired more by sorrow than anger: The Notion of Eternall paines and pleasures, and of Election and reprobation, and the paucity of them that shall bee saved, hath much distressed the World’ (Lansdowne 1927: vol. I, 118; also vol. I, 116–17, 133, 136, 154, vol. II, 40–1, 117). Petty’s indifference to Christian belief is epitomized in his Will (Fitzmaurice 1895:324; cf. Lansdowne 1928:208–9):

As for religion, I dye in the profession of that faith, and in the practice of such worship, as I find establht [established] by the Law of my country, not being able to believe what I myself please, nor to worship God better than by doing as I would be done unto, and observing the Laws of my country...

Along with these intellectual (and partly ethical) convictions concerning religion, Petty’s private papers reveal a deep loathing for the clergy—a sentiment which played a (muted) role in his applied analysis of the social division of labour (*vide* section 3.2). Petty includes among the ecclesiastical ‘arts’: ‘to advance the ecclesiastical above the Temporall power... To confine...spectative [that is, speculative] spirits... To have an oare in every man’s boate, and a spy in every family... To keep laymen in ignorance’ (Lansdowne 1927: vol. II, 190–1; cf. vol. I, 117–18, vol. II, 227–8, 251–2).

What of Petty’s attitude towards metaphysics and speculative philosophy in general? There is an aside in the *Advice to Hartlib* (1648:5) which is suggestive of the conclusion that a scepticism with regard to speculative philosophy is almost a corollary of Petty’s esteem for mathematics: ‘We have...recommended the study of the elements of arithmetick and geometry to all men...;...they being *the best grounded parts of speculative knowledge*’ (emphasis added). Notwithstanding Petty’s love of ‘ratiocination’ for its own sake (Petty 1691b:119–20; Lansdowne 1928:283), this attitude suggests an explanation of why his intellectual efforts were drawn to practice as to a magnet. On the other hand, the notion that empirical knowledge is the only source of genuine or reliable knowledge is problematic—as evidenced in Petty’s case by his positing the validity of mathematical method. The problem is how mathematical method itself is to be legitimated, since its axioms cannot be defended by recourse to experience.

It is at this point that Hobbes enters the picture. Petty is aware that fundamental theoretical problems of this kind require solution. It can be

suggested that his deference to Hobbes in particular (as well as others) is symptomatic of Petty's discomfort with such fundamental theoretical discourse (Lansdowne 1927: vol. I, 219; Lansdowne 1928:305). An example of this discomfort and hesitancy occurs in relation to a fundamental question of political philosophy, in a philosophical dialogue in the private papers, characteristically devoted to analysis of certain fundamental concepts (Lansdowne 1927: vol. I, 152–62). Petty attempts to distinguish humanity as a species by isolating four uniquely human characteristics: speech, a concern for immortality, a care for remote consequences of events, and the making of rules concerning sexual conduct. The dialogue continues (Lansdowne 1927: vol. I, 156; cf. vol. II, 19–43):

- A. From all you have said of Man, I do not find him more excellent than all other animalls.
- B. Not perhaps from what I have hitherto said, for his speech, religion, sollicitude for the future, and dogmas about generation may be very uneasy to him. But there be other considerations which make him superior to any other animall...
- A. Pray in what?
- B. Leave it alone till another time.

These considerations concerning Petty's intellectual convictions and tastes do not point in a compelling manner towards a preoccupation with economic inquiry; they merely point *away* from metaphysics and speculative philosophy and towards empirical inquiry in general. It would be consistent with this for Petty to have engaged in intellectual inquiry into experimental natural philosophy—as did a number of his contemporaries and friends (for example, Robert Boyle), and as did Petty himself as a young man. (Petty did maintain something of an interest in this area, via his involvement in the Royal Society and the Dublin Society.) Given the absence of a conclusive intellectual explanation for the political, social and economic direction taken by Petty's intellectual labours, that direction appears to have been in large part a matter of taste; though, as has been argued, the survey of Ireland in the 1650s is likely to have sharpened this taste for 'economics' (*vide* Chapter 2).

However, it is possible to say somewhat more than this. Once Petty's commitment to analysis of social life (in the broadest sense) is taken as given, it is possible to provide some explanation for why, within these parameters, Petty gave to his efforts a primarily economic content. The spirit which animates Petty's intellectual project is summarized in his own words, in a quotation given earlier (section 3.5) and repeated here (Lansdowne 1927: vol. I, 111):

God send mee the use of things, and notions, whose foundations are sense and the superstructures mathematicall reasoning; for want of

which props so many governments doe reel and stagger, and crush the honest subjects that live under them.

Rational inquiry is to be devoted to statecraft or the enlightenment of the state. The faith in the efficacy of such inquiry is summed up in Petty's opinion that 'the Impediments of England's greatness, are but contingent and removable' (Petty 1690:298 with 301). Petty himself defines the legitimate purpose of the state as 'onely to procure peace and plenty to body and soule before death' (Lansdowne 1927: vol. I, 154; also 225, 229). If the purpose of social inquiry is to enlighten or serve statecraft properly construed, then it follows that the legitimate purpose of the state will define the appropriate scope of social inquiry. Hence Petty devoted himself to 'the solid study of...peace and plenty' (Lansdowne 1928:61; also Lansdowne 1927: vol. I, 98, 103). His clear and explicit methodological commitment to confining social inquiry to a well-defined (and objective) terrain in which economics is central, is conveyed by the following exchange in the dialogue on political arithmetic:

- A. Politiques can never bee plaine, You see Geometry, which considers ye most simple quantities...is extremely difficult. The Science of Motions more, The Fabrick of [Animation?] yet more, The Minds of Men yet more, But ye Genius of Multitudes [that is, the distinctive character of peoples or nations], which I take to bee Politiques, most of all, What do you Meane by Politiques.
- B. Troth, I meane by Politiques not a quarter of all this, but ye way how to keep a people in Peace and Plenty, that is able to resist ye petulancy of ambitious Conquerors and ye chagrin of discontented persons at home and to hinder ye land from bearing any Unusefull herb to make ye best use of all it produces.⁸

One may add to this interpretation a final, somewhat more speculative point: if Petty further believed that the politico-theoretical problematic concerning determination of the conditions which guarantee social peace had fundamentally been solved by Hobbes (see section 4.4 below), then for Petty the preoccupation with 'plenty' finds an even firmer intellectual basis.

Much more could be said about the content of Petty's political views, apart from the tangential comments made in Chapter 3. It suffices to note here some aspects of his views on religion and education which throw light upon his applied economics and economic policy. The anti-clericalism which has been noted above (section 3.2 and this section) has an economic expression in relation to the social division of labour; and also a political expression, in terms of an imperative that religion be subordinated to the requirements of orderly political society. However, the latter may in turn have an economic significance: 'persecution, being incompatible with peace

and order, was a...hindrance to prosperity' (Laski 1936:131 with 118). (This suggests a certain relation between the goals of peace and plenty, a subject discussed further in section 4.4 below.) Petty's commitment to religious toleration—at least for those beliefs consistent with civil peace (Petty 1662:71; Lansdowne 1927: vol. I, 140, 273)—is the concrete embodiment of this desire to pre-empt religious strife and resulting political disorders. This is reinforced by the pragmatic perception that persecution encourages, rather than stifles, heterodoxy (Petty 1690:262–3); and of course, Petty has a personal interest in toleration, given his own heterodoxy. At most, the political status of religion is limited to its providing an extra-rational basis for public morality (Petty 1662:71–2; Lansdowne 1927: vol. I, 34, 130–1, 137; Lansdowne 1928:174, cf. Lansdowne 1927: vol. I, 118). This itself is evidence of Petty's subordination of religion to the requirements of political life. His attitude is suggested by the intent expressed in the title of one of the (many) unpublished papers on religion: 'Of ye Church of England and its consistence with the Civill power' (*Papers* I. 73).

The stance towards religion is linked with Petty's stance towards formal education. This is due to Petty's perception of the antagonism of religion towards genuine learning (Lansdowne 1927: vol. I, 118; vol. II, 191) and the extent of clerical dominance in the universities. Petty's attitude towards the place of the universities and professions within the social division of labour can be understood, in part, as an expression of his contempt for formal education: 'the Universities...seek Truth as the Courts do Justice' (Lansdowne 1928:229; also 250, 252–3). The facetiousness is evident enough, especially in the light of Petty's unhappy experience with lawsuits (*vide* section 2.3). Petty sums up his deeply antagonistic, if pragmatic, view of the universities, via the pen of his son in a letter to Southwell's son (Lansdowne 1928:300 with 306; also Lansdowne 1927: vol. II, 114):

But Cousin our going to the University is Necessary. Those who are there, and who have been there, are a Great Body of Men, and are or will be in great offices and authority; and Consequently will bee able to Crush and Run Downe any single Man that Stands at Defiance with them, and will make a Lowder laugh against words of a single signification than any Single Man can make against their Insignificant Gibrish.

4.4 THE DEBT TO HOBBS

Given Petty's disposition in favour of social inquiry in general, the economic character of his intellectual priorities had a basis in his view of political life. And once the substantive object of analysis ('plenty') was posited, the methodological principles informed Petty's thought in a positive way: as regulative principles, so to speak, with regard to the methods of addressing the substantive economic questions Petty proposed for analysis. It is to be

emphasized that it was Petty who formulated and conceptualized the substantive issues for addressing the problem of 'plenty'—itself hardly a substantial specification of an economic problem. Most fundamentally, these questions were: how does political society actually subsist and prosper? How does society actually, and how ought it to, distribute and allocate surplus labour? There is no evidence to suggest that Petty owes a significant debt to anybody for the formulation of these conceptual economic problems; nor, at least with respect to the first,⁹ for the answers he developed. On the other hand, for both his views on scientific method and his fundamental conception of politics, Petty was indebted to Hobbes.

Petty's methodological principles are an expression of Hobbes's understanding of science, both with regard to the paradigmatic role of mathematics and the notion of sound concept construction. (It almost goes without saying that for our purposes here the plausibility of Hobbes's view of human understanding is of no consequence.) The fundamental principle of Hobbes's theory of knowledge is that all thought consists of representations of external objects, originating in sense perception: 'there is no conception in a man's mind which hath not at first, totally, or by parts, been begotten upon the organs of sense'; 'whatsoever...we conceive, has been perceived first by sense...; a man can have no thought, representing any thing, not subject to sense' (Hobbes 1651a:7, 17). Likewise the connection of thoughts in the understanding arises from sense perception; and such understanding can be governed by a design which directs thought to a goal (Hobbes 1651a:13–15):

From desire, ariseth the thought of some means we have seen produce the like of that which we aim at; and from the thought of that, the thought of means to that mean; and so continually, till we come to some beginning within our own power.

The animating desire which spurs the understanding makes it more than merely a passive, random receptor of sensation: 'when imagining any thing whatsoever, we seek all the possible effects, that can by it be produced; that is to say, we imagine what we can do with it, when we have it' (Hobbes 1651a:15). The peculiar cognitive faculties which distinguish human understanding from that of other animals 'proceed all from the invention of words, and speech'. Though the natural materials of understanding are essentially identical for all species, 'by the help of speech, and method, the same faculties may be improved to such a height, as to distinguish men from all other living creatures' (Hobbes 1651a:17). (On speech and seeking effects, cf. Lansdowne 1927: vol. I, 155–6, on speech and concern for consequences, partly quoted in section 4.3 above.) Speech consists of '*names, or appellations, and their connexion*'. Such '*imposing of names, and the connexion of them*' translates sequences of thoughts into sequences of words. The development of language is entirely an act of human

construction, since there is ‘nothing in the world universal but names; for the things named are every one of them individual and singular’ (Hobbes 1651a:18–19). Hence, on the highest level, the philosopher or scientist must create order out of chaos: as Hobbes put it elsewhere, ‘those things that lie in confusion must be set asunder, distinguished, and every one stamped with its own name set in order; that is to say, your method must resemble that of the creation’ (Mintz 1962:18, citing Molesworth 1839–45: vol. I, xiii).

Rational speech is ‘reckoning’ of the relations between concepts in the understanding; ‘words are wise men’s counters, they do but reckon by them; but they are the money of fools, that value them by the authority of an Aristotle...or a Thomas’ (Hobbes 1651a:21–2). Truth is just the logical connection of sound concepts in the form of an affirmation or antecedent-consequent—‘*man is a living creature*’ or ‘*if he be a man, he is a living creature*’ (Hobbes 1651a:21). So much is this so that Hobbes (1651a:57) can speak of ‘science, *namely* the mathematics’ (emphasis added). Arithmetic, geometry, logic, as well as political science and jurisprudence, are all properly constituted by mathematical method:

in what matter soever there is place for *addition* and *subtraction*, there also is place for reason; and where these have no place, there reasoning has nothing at all to do... REASON, in this sense, is nothing but *reckoning*...of the consequences of general names agreed upon for the *marking* and *signifying* of our thoughts...¹⁰

Truth is arrived at by sound definitions and a ‘right ordering’ of concepts; and geometry, ‘the only science that it hath pleased God hitherto to bestow on mankind’, is paradigmatic for science: ‘men begin at settling the significations of their words; which settling of significations they call *definitions*, and place them in the beginning of their reckoning’. The beginning of science is sound construction of concepts: ‘in the right definition of names lies the first use of speech; which is the acquisition of science: and in wrong, or no definitions, lies the first abuse; from which proceed all false and senseless tenets’ (Hobbes 1651a:21–2). Sound concepts must be both of sensible objects and internally consistent. Concepts which do not conform to this twofold requirement are merely ‘insignificant sounds’ (recall Petty’s ‘Insignificant Gibrish’ at the end of section 4.3 above)—contradictory concepts arising when ‘men make a name of two names, whose significations are contradictory and inconsistent’. Hobbes’s favourite example is the Thomistic concept, ‘incorporeal substance’—in effect, positing an immaterial matter (Hobbes 1651a:23). It is like, for example, the notion of ‘*round quadrangle*’: a concept which cannot constitute any object which could be known; ‘a mere sound’, literally ‘nonsense’ (Hobbes 1651a:24, 27). Genuine understanding or science begins with the formulation of well-defined empirical concepts and proceeds by necessary consequences to certain conclusions (Hobbes 1651a:26, 29–30): ‘to understanding perfectly...all manner of sciences...is to be learnt from

reasoning; that is to say, by making necessary consequences, having first taken the beginning from experience' (Hobbes 1651b:344; cf. 1651a:53–5). Science is a human construction or 'invention': 'truth...is made by ourselves' (Hobbes 1651b:373; 1651a:15).

Petty nowhere provides an account of scientific method as comprehensive or as fundamental as that of Hobbes; but it is apparent that Petty's methodological views reflect an acceptance of Hobbes's theory. Petty's economics embodies a decisive lesson learnt from Hobbes: genuine scientific inquiry requires transparently precise, empirically definite concepts and rigorous, deductive methods. Hobbes, and Petty following him, had a conception of mathematics and the mathematically based sciences as the only parts of philosophy (or science) which had made any systematic progress. To use Petty's own words, he seeks, like Hobbes, 'things, and notions, whose foundations are sense and the superstructures mathematicall reasoning' (Lansdowne 1927: vol. I, 111). Petty's abstract models in the *Treatise of Taxes* (1662) are pioneering attempts to apply precisely these methods to empirical economic phenomena. These deductive systems indeed give rise to the kind of antecedent-consequent or hypothetico-deductive theorems which Hobbes treats as paradigmatic for science. For example, with regard to the first model in the *Treatise*, if necessary consumption per worker is one-tenth of output per agricultural worker, then the maximum (potential) workforce is ten times the agricultural workforce (*vide* section 3.1). Two differences between the two writers may be noted. Petty's methodological views end up at a narrower position than those of Hobbes: there is nothing in the latter's thought which requires that scientific concepts be susceptible to strict quantitative expression. Petty somewhat vulgarizes the methodology. Second, Hobbes prefers geometry to algebra, as a model for science. Petty favours algebra, at least as a model for his own work. This may be merely a result of their different substantive interests.¹¹

Turning to politics, it is well known that the fundamental problematic of Hobbes's political theory is the determination of the conditions necessary for 'peace', consistent with human nature or what human nature can make of itself (for example, Hobbes 1651b:109–10). His crucial behavioural postulate is the diversity and insatiability of individual human desires (Hobbes 1651a:64):

I put for a general inclination of all mankind, a perpetual and restless desire of power after power, that ceaseth only in death. And the cause of this, is...because he cannot assure the power and means to live well, which he hath [at] present, without the acquisition of more.

This endless quest for security and power, combined with the natural equality associated with humanity's 'pre-political' condition (a hypothetical construct), leads to the famous Hobbesian formulation of humanity's natural state as an anarchic condition, a war of all against all (Hobbes 1651a:82):

There is no place for industry, because the fruit thereof is uncertain; ...no knowledge of the face of the earth,...no arts;...no society; and...worst of all, continual fear, and danger of violent death; and the life of man, solitary, poor, nasty, brutish and short.

A natural condition of ‘absolute liberty’ results in a complete lack of security and liberty: ‘in such a condition, every man has a right to every thing; even to one another’s body. And therefore, as long as this natural right of every man to every thing endureth, there can be no security to any man’ (Hobbes 1651a:85). The desire for peace and security, and all that derives from them, can only be realized by the institution of a sovereign political power (Hobbes 1651a:232). Since peace is the precondition for the realization of all other desires, however diverse their content, peace is both a universally recognized good and rational (Hobbes 1651a:104–5; 1651b: 150–1). The task of reason is to frame ‘convenient articles of peace upon which men may be drawn to agreement’; that is, binding moral principles requisite for the establishment and maintenance of peace, which Hobbes identifies with natural law (Hobbes 1651a:84). As he elsewhere puts it, more pertinently and directly, ‘[T]hese dictates of reason...are but conclusions, or theorems concerning what conduceth to the conservation and defence of [men]’ (Hobbes 1651a:104). The task of the state is to effectively enforce these principles (Hobbes 1651a:94):

There must be some coercive power, to compel men equally to the performance of their covenants, by the terror of some punishment, greater than the benefit they expect by the breach of their covenant; ...and such power there is none before the erection of a commonwealth.

It is difficult to ascertain how much of Hobbes’s political theory Petty accepts because, to a greater extent than with methodology, no comprehensive statement of political theory can be found in Petty’s writings. However, it seems evident that Petty accepts, in a fundamental respect, the Hobbesian stance towards politics. Petty accepts that peace is at least one of the two central problems of politics, if not *the* problem. There is also evidence that Petty accepts basic Hobbesian definitions and political concepts; for example, Hobbes’s definition of political power (Lansdowne 1927: vol. I, 219, 225, 229). On the other hand, Petty expresses strong doubts about Hobbes’s preference for monarchy, which is really a secondary issue in Hobbes’s political theory; and most significantly, Petty raises substantial economic issues in his analysis of monarchy versus democracy, as Hobbes had not:

Whether the citizens are usually both universally and individually wealthier [in a monarchy or a democracy]? Whether they perish more rarely through hunger and need...?

Whether the mechanical arts flourish more so in one state or the other?
Or whether useful inventions are more frequent in one state or the
other?¹²

The opening sentence of Petty's critique of Hobbes on democracy expresses both Petty's basic deference to Hobbes and his (secondary) dis-agreements: 'The most notable Hobbes who usually examines with great depth subjects which deal with the nature of all things, seems to me at times to proceed with over-confidence' (Amati and Asprougourgos 1985:128).

It might seem from these considerations that Petty simply *adds* the problem of plenty to the Hobbesian political agenda which is grounded in the goal of 'peace'. But that is not correct. Interrelations between peace and plenty are considered by Hobbes. The security or 'peace' provided by the state is clearly a precondition of 'plenty' (for example, 'industry', '[a]griculture', 'commodious building', 'arts'), in the minimal sense of enforcing well-defined property rights, and so on (Hobbes 1651a:82). Furthermore, Hobbes (1651b:258, 260) tells us that all the duties of the state are embraced by the proposition that '*the safety of the people is the supreme law*', safety being understood to comprise four elements: defence against external threat; civil peace; enjoyment of appropriate freedoms; and '[T]hat they be enriched, as much as may consist with public security'. So understood, plenty is a part of the goal of security or peace; and the state is to pursue certain policies with a view to this. The purpose of the state is not merely that individuals live, but that they 'live well' (Hobbes 1651b:344). Hence there is in fact a commonality of views between Hobbes and Petty concerning the purpose of politics and the state. In relation to Petty's peace-and-plenty formula, plenty is contained within Hobbes's notion of 'peace'. But in relation to Hobbes's thought, Petty systematically engages that which Hobbes treats only very casually: the problem of plenty itself.¹³

Hobbes's substantive treatment of economics is not extensive. There are a number of specific issues on which he is in agreement with Petty and it is possible that this is the source of Petty's views on these particulars. Hobbes is concerned that heavy or, more pertinently, inequitable taxation may threaten the political regime with dissolution, as is Petty (Hobbes 1651b: 223, 263–4; Petty 1662:23, 37). This is so general a notion that too much should not be made of this common view. More significant is that on the basis of the same equity argument as Petty was to put forward, Hobbes favours taxes levied in proportion to consumption expenditure (Hobbes 1651a:152, 226–7; 1651b:251–2, 264–5). Hobbes also argues that those incapable of labour should be provided for by the state (rather than being left to 'the hazard of...uncertain charity') and the able-bodied poor should be put to work—both views firmly held by Petty, and others (Hobbes 1651a:227). On certain economic issues Hobbes's views directly contradict those of Petty and it may be wondered, in these cases, to what extent Petty was responding to

Hobbes's opinions in developing his own. Hobbes raises the possibility that civil peace (and human life) might be threatened if population growth outstripped natural endowments (Hobbes 1651b:91; cf. 1651a:227). As indicated in Chapter 3, Petty is dismissive of this potential problem, primarily because of his convictions about the prospects for labour productivity growth. Related to the doubts about population growth, Hobbes (1651a:165, 227) favours sending excess labour to under-populated territories, something Petty vigorously opposed.

A final and more fundamental role for Hobbes's economics may be tentatively suggested. In the *Philosophical Rudiments* (1651b:266–7) Hobbes argues that there are four sources of prosperity: labour, thrift, natural endowments and military power. He dismisses the last (equivalent to conquest) and deprecates the role of land: 'The two first only are necessary.' The deprecation of nature's contribution is similar to Petty's view, though Petty radicalizes it and provides a more substantial defence (*vide* section 3.4 above). (There is at least a tension between Hobbes's deprecation of land and his view on population growth.) In *Leviathan* (1651a:160–1) plenty is said to arise from nature (commodities, which... God...giveth') and labour. Hobbes is here much more coy about deprecating nature, simply asserting that 'Plenty dependeth, next to God's favour, merely on the labour and industry of men.'¹⁴ If the emphasis on labour and production in these accounts of prosperity was a disposition transmitted to Petty, this helps to explain the central role that these categories played in his economics—a disposition not characteristic of seventeenth-century economics in general.¹⁵ Hobbes himself hardly developed any substantive analysis on the basis of this insight into the central role of labour and production.

4.5 THE UTILITY OF SCIENCE

If Petty's methodological convictions and his view of political economy and the state were shaped so decisively by Hobbes's thought, then little role remains for any direct influence of Bacon—apart from Petty's broad commitment to the general Baconian temper of the Royal Society's endeavours. The role of Hobbes explains the essentials of Petty's methodology and politics. It follows that too much should not be read into Petty's deference to Bacon in the *Advice to Hartlib* (1648:2) and the *Political Anatomy* (1691a: 129). If taken too seriously, these acknowledgements lead one away from the real source of Petty's intellectual inspiration. Yet there is a Baconian element in Petty's projection of a new mixed science devoted to the economic organization of political society. What makes this nevertheless of little interest to the interpretation of Petty's thought is that this element is so deep as to be embedded, in any case, in Hobbes's thought as well; no doubt an inheritance from Bacon. The basic Baconian doctrine that human

knowledge must be geared to serve the (earthly) welfare of humanity ('the relief of man's estate') informs the thought of both Hobbes and Petty (Bacon 1605:42). The utility of philosophy or science is its ability to improve humanity's condition—not least its material condition (Bacon 1605:41–3). For Bacon, the avenue to this goal is first and foremost the human mastery of nature (for example, Bacon 1620:42, 47); and the most obvious manifestation of this vision is an emphasis upon the role that 'invention' and progress in the sciences and arts play, or might play, in human life (Bacon 1605:82–6). Technical progress so understood plays an important analytical role in Petty's economics, particularly in relation to labour productivity growth and technical division of labour. In a sense, one could even conceive of the production of surplus labour in Petty's theory as an expression of humanity's emancipation from bondage to nature and necessity, though in the context of a specific social economy. Perhaps most fundamentally, Petty's vision of a new kind of political science was understood by him as the inspiration for providing a rational basis for statecraft and, thereby, for furthering the material and general welfare of those subject to it. At the risk of repetition, such a science would ensure that governments do not 'reel and stagger, and crush the honest subjects that live under them' (Lansdowne 1927: vol. I, 111). In relation to these matters Webster (1975:71–7, 95–9, 363, 365–6, 377, 382–3, 420–6, 430, 434–44, 446–9, 453–6, 496, 499–501, 511, 515–16) presents some plausible evidence for the role of Petty's involvement with the circle of Samuel Hartlib in Petty's commitment to certain aspects of the circle's Bacon-inspired project—in particular, the importance of technical progress; the utility and material benefits of technical and scientific knowledge and education; and the role of the state in economic organization. Nevertheless, in our judgement Webster's view of Petty exaggerates the influence of both Bacon and the circle relative to Hobbes.

As to other possible significant influences upon Petty's economics, Roncaglia (1985:50–3) draws an interesting parallel between Machiavelli's embryonic political science and Petty's similarly nascent economic science, stimulated in part by a suggestion of Sraffa to Antonio Gramsci (Roncaglia 1985:50–3, 106 n.4). Roncaglia also suggests an *influence* of Machiavelli upon Petty—a stronger claim for which there is no explicit textual evidence. It is not surprising that in his published works Petty nowhere refers to Machiavelli; but neither is he anywhere mentioned in Petty's unpublished papers, to the best of our knowledge, though this circumstantial evidence does not suffice to decide the issue. To the extent that there is a Machiavellian element in Petty's thought it is most plausibly explained as due to that element also being embedded in Hobbes's politics (cf. Roncaglia 1985:106 n.3). Indeed, Roncaglia (1985:19–28, esp. 19–22; also 1988:164, 168) gives a more important role to Hobbes, as well as Bacon, in the formation of Petty's method and political arithmetic. In relation to the issue

of Petty's intellectual pedigree as a (partial) explanation of the direction and character of his thought, the implicit principle applied in our interpretation above is that the most economical explanation is the best explanation. In the absence of any evidence for an independent influence of Machiavelli, this points to Hobbes as the more direct and plausible explanation.

THE THEORY OF PRODUCTION AND DISTRIBUTION IN CANTILLON'S *ESSAI*

Richard Cantillon (c. 1680–1734) is one of the most enigmatic figures in the history of economic theory. He was a very successful merchant and banker of Irish extraction who carried out his business primarily from Paris. Recently, Murphy (1986) has done much to unravel the mysteries surrounding the man and his work (cf. Higgs 1931b:363–81)—including the remarkable possibility that he was not murdered in 1734, as has long been supposed, but disappeared to South America (Murphy 1986: ch. 14). Cantillon's (known) contribution to economic literature consists of a single work, the *Essai sur la Nature du Commerce en Général*. His contributions to economic theory were many, and in total their most significant role was to provide the theoretical bridge between seventeenth-century English economics and French Physiocracy, though he also influenced many others. The history of Cantillon's *Essai* is as obscure as his life. It appears to have been written in the late 1720s or early 1730s. The manuscript found its way into the hands of the Marquis de Mirabeau, whose momentous meeting with François Quesnay in July 1757 was the seed from which the Physiocratic movement began. Mirabeau had intended to write an elaborate commentary on the *Essai*; but the original owner of the manuscript demanded it back and it was then published in its own right in 1755 (*vide* Meek 1962:15–18; Higgs 1931b:381–3; Murphy 1986: ch. 15).

Though the *Essai* was certainly influential, later, when it had become merely part of the history of theory, both its intrinsic theoretical merit and its influence upon economic theory were not recognized, or forgotten, at least in the English-speaking world. A hundred and twenty-five years after the publication of the *Essai* Jevons (1881) published an effusive essay in praise of Cantillon, though Jevons's commentary was more a celebration of Cantillon's genius and insight than a systematic interpretation of the *Essai*.¹ The purpose of this chapter is to provide such an interpretation, at least for the most fundamental part of Cantillon's economics. Broadly speaking, his theoretical contributions may be located in two categories: (a) production, distribution and value; (b) money, interest, and foreign trade and payments. Our attention is directed almost exclusively to the former. Section 5.1

examines Cantillon's theory of the production and allocation of economic surplus. Section 5.2 clarifies the treatment of distribution and prices and explains the relation between this part of Cantillon's theory and the former part. The penultimate section 5.3 examines some aspects of Cantillon's treatment of money and interest which are particularly relevant to the theory of production and distribution.² A brief conclusion ends the chapter. The underlying purpose of what follows is to demonstrate two propositions: on a formal level, that the *Essai* is a remarkable and underrated theoretical contribution to classical economics; and more importantly, on a substantive level, that the theoretical argument of the *Essai* is most clearly revealed by grasping the role which economic surplus plays within it.

5.1 PRODUCTION AND ALLOCATION OF SURPLUS

It is evident as early as the opening two chapters of the *Essai* that Cantillon's economics focuses upon land, labour and rural production. Cantillon establishes the basic theoretical and social setting for his economic analysis: on the one hand, the economic themes of land, labour and wealth understood as 'nothing but the Maintenance, Conveniencies, and Superfluities of Life'; on the other, the social primacy of a landowning class. Land is the 'Source or Matter' of 'all Wealth'; labour is 'the form which produces it'. Cantillon argues that in any society the ownership of land will necessarily devolve upon a few of its members. The landowners will manage the land themselves or let it out to farmers. It is here that the concept of surplus is first touched upon: 'it is essential that the Farmers and Labourers should have a living whether they cultivate the Land for the Owner or for the Farmer. The overplus [*le surplus du produit*] of the Land is at the disposition of the Owner.' Hence the economic analysis (at this stage) deploys a notion of three distinct social classes. It is also intimated that the notion of a surplus agricultural product, net of the consumption of the workforce, is linked with the allocation of land in society: 'the first necessity is to employ part of [the land] for the Maintenance and Food of those who work upon it and make it productive: the rest depends principally upon the Humour and Fashion of Living of the Prince, the Lords [via taxation], and the Owner:...moreover part of the Land must be employed to support those needed for these labours'.³

Cantillon makes clear that the allocation of at least subsistence (agricultural) consumption to the entire population on the one hand, and the distribution of the agricultural product on the other, must bear a definite relationship to each other, which is expressed in exchange. The visible expression of this in the Cantillonian economy is the exchange between city and country.⁴ In a self-consciously rough-and-ready characterization of the process, Cantillon supposes that the distribution of the agricultural product between farmers and landowners is 2:1. The farmers' two-thirds provides

subsistence ‘directly or indirectly’ for the country population and for the artisans and ‘undertakers’ (*entrepreneurs*) who supply merchandise produced in cities for use in the country. The landowners’ one-third provides subsistence for all the artisans and so on, who are employed for the landowners’ purposes in cities, as well as the carriers who transport produce between city and country. Given the distribution of population between cities and country, half the agricultural produce must be supplied to cities, half must remain in the country. Since Cantillon assumes that all of the landowners’ one-third share of the agricultural product goes to cities, it follows that one-quarter of the farmers’ gross share (one-sixth of the total product) finds its way to cities, via exchange between cities and country (Cantillon 1755:43–5; cf. 149–51).

Cantillon’s analysis of the social allocation of labour finds its most transparent expression in Chapter XVI of Part I. The basis of the analysis is that ‘the Labour of 25 grown persons suffices to provide 100 others, also grown up, with all the necessaries of life according to the European standard’.⁵ Cantillon adds to this a calculation that half the population is not available for labour, due to age, health or social class (landowners and some undertakers). It follows that ‘there remains 25 persons out of the hundred who are capable of working but would have nothing to do’ (Cantillon 1755:87). The explicit data of this analysis are the proportion of the population required to produce the normal consumption of the total population and the proportion of the population available for labour. Behind the former proportion stands the notion of necessary consumption per capita as a datum with causal priority in the analysis of the allocation of labour (and causal priority also in the allocation of land and commodities, as will be shown below).

The analytical structure of the argument can be clarified as follows. Available labour (L), assumed homogeneous, is a given proportion (n) of total population (P):

$$L/P = n \quad 0 < n \leq 1 \quad (5.1)$$

The labour required to produce the necessary consumption of the total population (L_c) is a given proportion (x) of population:

$$L_c/P = x \quad (5.2)$$

With regard to the latter formulation Cantillon’s argument lacks explicitness. Behind equation (5.2) lies the recognition that a part of the workforce (L_c) produces an output equal to the necessary consumption of the population ($c.P$ —where c is per capita necessary consumption of an agricultural commodity, assumed homogeneous). To complete the equation, a given output per worker in the production of necessary consumption (A)

must be introduced, assuming for simplicity production by means of labour alone (and homogeneous land—see below). Then,

$$\begin{aligned} AL_c &= cP \\ L_c/P &= c/A \\ &= x \end{aligned} \tag{5.3}$$

The quantity of surplus labour—total labour net of necessary labour—per unit of population and per unit of available labour is then determined with c , A and n treated as data:

$$(L - L_c)/P = n - (c/A) \tag{5.4}$$

$$\begin{aligned} (L - L_c)/L &= 1 - (L_c/nP) \\ &= 1 - (c/A)(1/n) \end{aligned} \tag{5.5}$$

where

$$0 < (c/A) \leq n \leq 1 \tag{5.6}$$

Equation (5.5) expresses a fundamental binding condition on the allocation of social labour, associated with the division between necessary and surplus labour.⁶ But subject to this, the allocation of (surplus) labour is free as to its composition. The actual content of economic activities undertaken by surplus labour is what Cantillon, from this starting point, proceeds to examine (Cantillon 1755:87–95). Soldiers, domestic servants and labour devoted to production of above-necessary consumption (especially in terms of quality) are notable examples. Cantillon himself particularly favours employing surplus labour to produce durable ('permanent') commodities: mining of metals for production of 'Tools and Instruments'; durable consumption goods; and especially gold and silver, either by direct extraction or by production for net exportation (cf. Cantillon 1755:225–43). Finally, '[I]f enough employment cannot [thus] be found to occupy the 25 persons in a hundred', Cantillon does not object 'to encouraging employment which serves only for ornament or amusement'.⁷

As might be expected, symmetric with the surplus analysis of labour allocation Cantillon presents an analysis of land allocation, which is couched in terms of the economic determinants of population. In Cantillon's view, the ultimate constraint upon population is the quantity (and quality) of land. The underlying principle is succinctly stated in a discussion of the Chinese economy: 'the People...are necessarily proportioned to their Means of Living and do not exceed the number the Country can support *according to their standard of life*' (emphasis added). (Note again that normal or necessary consumption is taken as a datum for the purposes of causal analysis.) Given the quantity of land available

to any society, population will depend upon consumption per capita and the quantity of land required to produce per capita consumption (cf. Appendix B, item 5). If the landowners devoted their land entirely to subsistence of the population, population would tend towards a maximum determined by these three factors taken together. There is, however, another factor which must be taken into account in order to determine population: 'if instead of that the Prince, or the Proprietors of Land, cause the Land to be used for other purposes than the upkeep of the People...the People will necessarily diminish in number' (Cantillon 1755:65–73).

Cantillon's analysis can be clarified as follows. Given the available quantity of land (E), assumed homogeneous, the output of the homogeneous consumption good per unit of land (T), and, as above, necessary consumption per capita (c), the maximum output of necessary consumption goods (Q^*) and the maximum population (P^*) are determined:

$$Q_c^* = TE \quad (5.7)$$

$$P^* = (TE)/c \quad (5.8)$$

A proportion of land ($1 - k$ where $0 < k \leq 1$) will be allocated to non-necessary production, ultimately, by the landowners and the Prince, the latter directly—as landowner—and indirectly, via taxation. Supposing, as Cantillon does, that population adjusts to the remaining quantity of land; then output of necessary consumption goods and population will be given by

$$Q_c = T(kE) \quad (5.9)$$

$$P = T(kE)/c \quad (5.10)$$

Given T and E , P is a positive function of k and an inverse function of c (Cantillon 1755:73–85). Having so analysed the fundamental determinants of the relation between population and surplus land, Cantillon proceeds to examine the economic activities in which surplus land is employed and the mechanisms by which population is constrained, via the determination of, and interactions between, k and c . The horses employed in transporting the food consumed by landowners to the cities (and presumably transporting manufactures back)—as well as the food consumed by the domestic servants, artisans, and so on, who serve the landowners in the cities—must themselves be fed (Cantillon 1755:73–5). Exportation of agricultural output to finance importation of luxury manufactures is another notable surplus use of land, of which Cantillon disapproves (cf. Cantillon 1755:91, 233). Most generally, the use of surplus land will depend upon the general mode of consumption favoured by the nobility (Cantillon 1755:75–85). Just as domestic agricultural

output may be exchanged for foreign manufactures, so domestic manufactures may supply subsistence via exchange with foreign agricultural output. (Holland and England are the examples Cantillon notes.) Also, the quantity of land can be increased by conquest or colonization (Cantillon 1755:83–5). Thus by a kind of sequential method Cantillon first analyses the determination of P , then allows for and analyses variations in its determinants (k, c, E).⁸

A parenthetical comment—which, it must be emphasized, goes beyond Cantillon’s own formulation—may be added here to clarify one aspect of the above formulation of Cantillon’s system. Even though the viability condition with regard to labour (inequality 5.6 above) is independent of E and P , there is a somewhat deeper requirement for the viability of the economic system which constrains k to a set of definite values partly determined by n, c and A . If some land $[(1-k)E]$ is allocated to non-necessary production, then in general some labour must also be so allocated. Assuming some given average labour-land ratio (q) in non-necessary production on land and that all surplus land is employed, then the quantity of labour employed on surplus land is

$$L_{se} = q(1 - k)E \quad (5.11)$$

The quantity of surplus labour available is given by

$$\begin{aligned} L_s &= L - L_c \\ &= [n - (c/A)]P \\ &= [n - (c/A)][T(k \cdot E)/c] \end{aligned} \quad (5.12)$$

where $n > (c/A)$, to ensure that some surplus labour exists. Viable allocations of labour and land must conform to the requirement that

$$\begin{aligned} L_s &\geq L_{se} \\ [n - (c/A)][(kT)/c] &\geq q(1 - k) \end{aligned} \quad (5.13)$$

This may be interpreted as constraining the values which can be taken by k , with all other coefficients treated as independent data. For k to conform to (5.13),

$$q / \{q + [n - (c/A)](T/c)\} \leq k \leq 1 \quad (5.14)$$

where the term on the LHS of the first inequality is necessarily positive and less than unity. Hence the allocation of land remains free to vary in two respects— k may vary as well as the content of economic activities to which $(1-k)E$ is allocated—whereas the allocation of labour can only vary (analogously) in the latter respect. The larger $[n - (c/A)]$ —that is, the larger the quantity of surplus labour per unit of population (equation 5.4 above)—the more the scope for k to vary. If k exceeds the value of the term on the LHS of the first inequality in (5.14), there exists surplus labour over and above that employed on surplus land; that is, idle labour or labour employed

upon non-necessary production not requiring land (for example, manufactures). It might appear somewhat excessive to push the explanation of Cantillon's theory to a point like this, apparently beyond the limits of his own analysis. But the explanation does clarify the logical requirements of Cantillon's analysis; and furthermore, while he does not engage the problem at this level, he does grasp the principle behind condition (5.14). That is to say, he asserts that k must conform to the priority that labour and land be first and foremost devoted to necessary social consumption. (See the quotation at the end of the first paragraph of this section.)

The analytical structure of Cantillon's theory of production and allocation, and the fundamental causal role which agricultural (or more accurately, 'rural') surplus plays within it, may now be clarified. In the formal presentation above, surplus necessary consumption output (or surplus 'agricultural necessities') per worker employed in its production ($A-c$) is a datum which, when taken in conjunction with the quantity of available labour per unit of population (n), determines the available quantity of surplus labour per head of population or per worker (equations 5.4, 5.5); that is to say, determines the fundamental division in the allocation of labour between production of agricultural necessities and all other activities. Agricultural surplus in this sense is output of the necessary consumption good net of necessary commodity input, the latter identified in the simplified model above with necessary consumption by the workers employed in production of that output. On the other hand, surplus labour in the above sense is defined for the economy as a whole: the quantity of available labour net of necessary labour input, the latter identified with the labour required to produce necessary consumption for the total workforce plus non-working population. The scale and composition of the economic surplus in its commodity form (including both manufactures and non-necessary agricultural output) will thus be constrained by the magnitude of the surplus of agricultural necessities and the parameters which determine it. The quantity of land required to produce necessary consumption per capita (c/T), taken in conjunction with the quantity of available land for such production (kE), determines total population (equation 5.10). The quantity of surplus land for the economy as a whole—total land (in economic use) net of land employed in production of agricultural necessities—will be constrained by the parameters determining the surplus of agricultural necessities and the associated division between necessary and total labour, though it will not be determined entirely by them (inequality 5.14). Subject to these fundamental relations, the allocation of labour, land and commodities, and the scale and composition of output, are left open, Cantillon having recourse to the composition of normal consumption, the mode of living of the landowners and the nobility in particular, and the economic demands of the state, in order to determine the allocations within the fundamental categories.⁹ In all of this fundamental analysis Cantillon is conscious of the need to abstract

from the peripheral to the essential; as he puts it, to put aside ‘extraordinary’ events, ‘accidental’ circumstances and ‘accidental causes’ (Cantillon 1755:65, 45, 265).

One final point must be added. This interpretation of Cantillon’s treatment of production and allocation might convey the impression that production of necessary consumption output takes place in a self-contained ‘agricultural sector’. Strictly speaking, this is not a completely accurate characterization of the Cantillonian economy. It is truer to Cantillon’s argument to conceive of the sector producing necessary consumption as a self-contained *rural* sector (the ‘country’, including rural ‘villages’ and ‘market towns’) which also produces manufactured inputs for agricultural production proper. Hence Cantillon says that ‘there must...be [in villages] enough Farriers and Wheelwrights for the Instruments, Ploughs, and Carts which are needed [in agriculture]’ (Cantillon 1755:9). The rural sector is akin to a vertically integrated sector which produces an agricultural surplus for cities, by means of agricultural input as well as manufactured input produced within the rural sector.¹⁰ It is this conception which allows a one-way causal analysis running from rural surplus (a quantity of agricultural necessities) to surplus labour and land and surplus output as a whole.

This role which rural surplus plays in Cantillon’s theory of production and allocation ultimately rests upon two postulates: necessary consumption consists entirely of agricultural or rural commodities; manufactures produced in cities do not enter the rural sector as necessary inputs into production of agricultural (rural) necessities. Cantillon evidently proceeds on the basis of the former postulate. But with regard to the latter, Cantillon is not so unequivocal.¹¹ If he had yielded fully to the notion that city manufactures enter agriculture as necessary input, then his analysis would have been deprived of the special role it gives to rural surplus—and would have been deprived of the analytical transparency which results from that simplification. For if city manufactures enter into production of agricultural necessities, then the determination of the associated agricultural surplus, and everything which derives from it, would have to take into account the conditions of production in city manufacture. In particular, it would have to take into account labour employed in city manufacture to indirectly produce agricultural necessities, and Cantillon would have had to devote much more attention than he does to manufacture.¹²

5.2 DISTRIBUTION, INTRINSIC VALUE AND MARKET PRICE

Cantillon’s treatment of prices takes its bearings from a fundamental distinction between ‘intrinsic value’ and market price. The intrinsic value of anything is ‘the measure of the quantity of Land and of Labour entering into its production, having regard to the fertility or produce of the Land and to

the quality of the Labour'. Essentially, the intrinsic value of a commodity is a sum of the costs of the various kinds and quantities of labour and raw materials which are employed in its production. However, market price 'will not always follow this proportion [that is, intrinsic value]'; for it depends upon 'the Humours and Fancies of men and on their consumption' (Cantillon 1755:27–9). The values taken by market prices are inherently uncertain, depending upon unforeseeable contingencies (Cantillon 1755:47–53). Cantillon's most substantial statement on the determination of market prices—and it is little more than an identity—is that they are 'fixed by the proportion between the produce exposed for sale and the money offered for it' (Cantillon 1755:13; cf. 199). He also argues that a major function of markets is to bring about a *uniform* price for all exchanges (Cantillon 1755:11–13; cf. 27, 277–9). Market prices will diverge from intrinsic values; for example,

If the Farmers in a State sow more corn than usual, much more than is needed for the year's consumption, the real and intrinsic value of the corn will correspond to the Land and Labour which enter into its production; but as there is too great an abundance of it and there are more sellers than buyers the Market Price of the Corn will necessarily fall below the intrinsic...Value. If on the contrary the Farmers sow less corn than is needed for consumption there will be more buyers than sellers and the Market Price of corn will rise above its intrinsic value.

Cantillon makes the odd assertion that intrinsic values 'never' vary, perhaps a symptom of the almost complete absence of references to technical change in the *Essai*, already mentioned (Cantillon 1755:29–31; note 8 above). In any case, discrepancy between the production and consumption of commodities 'causes a daily variation, and a perpetual ebb and flow in Market Prices'; though 'in well organised Societies the Market Prices of articles whose consumption is tolerably constant and uniform do not vary much from the intrinsic value' (Cantillon 1755:31; cf. 117–21).

The evident difficulty with Cantillon's account of intrinsic values is the well-known circularity pertaining to all cost-of-production theories of prices: in general, costs of production cannot be known independently of prices. On the other hand, no such logical difficulty arises from treating wage rates as data. With regard to wage relativities Cantillon argues that the wage-rates of the various kinds of labour 'will necessarily be...in proportion to the time lost in learning the trade and the cost and risk incurred in becoming proficient'. Likewise, wage rates will be proportional to the 'Ingenuity and Industry', 'risks and dangers', 'skill' and 'trustworthiness' associated with the various kinds of labour (Cantillon 1755:19–21). It is also evident at many points in the *Essai* that Cantillon treats a real wage as given

by a customary mode of living, as discussed in section 5.1 (for example, Cantillon 1755:35–9). We may suppose that this real wage refers to the normal consumption of an ordinary hired labourer. In the country this was commonly paid in kind, and in town it determined a relation between money wages and nominal prices (of wage goods) (Cantillon 1755:123–5, 177). Thus Cantillon treats a normal real wage and wage relativities as determined independently of prices and outputs. Wages are assumed given, both in the analysis of production and allocation (section 5.1 above) and in the analysis of income distribution and prices (cf. Garegnani 1984: esp. 292–6).

From a latter-day standpoint, the most striking feature of intrinsic values is the virtual absence of profits as a conceptually distinct constituent element of price. The elusive status of profits is most clearly manifested when Cantillon considers the economic function of undertakers (*'entrepreneurs'*). His analysis of economic class is based upon a fundamental distinction between landowners, undertakers and hired labour (Cantillon 1755:43, 55). The distinction in agricultural production between landowners, farmers and labourers is included in this more basic taxonomy: farmers are a part of the undertaker class, which includes also merchants, manufacturers, retailers and others (Cantillon 1755:47–53). The defining characteristic of undertaker activity is that these 'Undertakers of all kinds adjust themselves to risks...[and] live at uncertainty'; 'except the Prince and the proprietors of Land, all the Inhabitants of a State...can be divided into two classes, Undertakers and Hired people;...all the Undertakers are as it were on unfixed wages and the others on wages fixed so long as they receive them'. Membership of the undertaker class is not invariably reflected in a social status superior to hired labour; for example, chimney-sweeps and water carriers are entrepreneurs, generals and courtiers are hired labourers (Cantillon 1755:53–5). The distinction is between those who are employed at a definite and given wage and those who are, in effect, self-employed.

The difficulty with regard to the status of profits in the *Essai*, which is revealed with particular force in the treatment of prices, is that Cantillon treats 'undertaking' as a species of labour, so that the returns to undertakers are a species of wages and as a result profits find no very definite role as a conceptually distinct income category. This is not to say that profits find no mention in the *Essai*. Indeed, even with regard to the theory of prices there are references to profit as a component of prices (for example, Cantillon 1755:27, 203, 227). The point to be emphasized is that profits enter the economics in a casual and incidental manner, without much system or theoretical significance. (The striking exception to this is Cantillon's discussion of interest as a deduction from profits in Part II, Chapters IX–X, discussed in section 5.3 below.) The treatment of undertaking gives at least the impression that profits (as quasi-wages) can entirely be explained in terms of premia for the risks associated with undertaker activity or labour. This serves to confirm, with respect to Cantillon, Marx's argument that

'Petty, Cantillon, and in general those writers who are closer to feudal times, assume ground-rent to be the normal form of surplus-value in general, whereas profit to them is still amorphously combined with wages' (Marx 1967: vol. in, 783–4). It certainly applies to Petty as well (*vide* section 3.6 above).

The treatment of undertaking—along with other aspects of the *Essai* which cannot be discussed here (in particular, Cantillon 1755:41–7 with 55–7)—are symptomatic of a transitional quality of the *Essai*: in a sense it stands between pre-capitalist and capitalist society, in some respects straddling both.¹³ This is understandable as a reflection of the transitional character of the economy itself: the characteristics of capitalist production and distribution are only incipient. On the other hand, Cantillon's rather cursory treatment of rents is much less understandable. For in the framework of a surplus analysis of production and distribution, and in the absence of a distinct profits category, rents would appear to be the central income form in which surplus product will be realized (along with tax revenues). The above-mentioned ambiguous status of entrepreneurial incomes as quasi-wages actually impinges upon the treatment of rents. Given the central role of agricultural surplus in Cantillon's theory, the question naturally arises as to the relation between agricultural surplus and income distribution. More pointedly, in relation to the distribution of the agricultural product between labourers, farmers (that is, agricultural undertakers) and landowners, is the farmers' share of the product to be treated as part of the agricultural surplus? At the beginning of the *Essai* Cantillon seems to construe the farmers' share as part of the necessary output, rather than as a share of the surplus, so that '*le surplus du produit de la Terre*' is identified with the landowners' share (plus the government's share) (Cantillon 1755:7; quoted in the first paragraph of section 5.1 above). But the question is not dealt with systematically anywhere else, so it is difficult to know how strictly this comment should be taken. Elsewhere, the usual point Cantillon makes with regard to the determination of rents is simply to refer to a kind of conventional division of agricultural product, with normally about one-third accruing to landowners (for example, Cantillon 1755:63, 75, 121, 201).

Perhaps the most remarkable aspect of Cantillon's treatment of prices is his analysis of the role that prices and markets might play as an allocative mechanism. Cantillon suggests how a certain allocation of land, labour and commodities, brought about by the 'command', so to speak, of a landowner (assumed to be the only one in the world), may also be brought about by market exchange at appropriate prices. In the first instance, the hypothetical landowner who directs production and distribution by command will, as the first priority, employ land in the production of corn, clothing and other food for the consumption of the various labourers and overseers employed by him. The remainder he can 'use for his [own] pleasure, etc.'. Alternatively, in the second instance, Cantillon supposes that the overseers become farmer-undertakers and

master-craftsmen who employ the various kinds of labourers for money-wages and sell the various commodities for money-prices. In this second schema a set of prices can be conceived

such as to give to the Master-Craftsman the same advantages and enjoyments as they had when Overseers, and the Journeymen Mechanicks also the same as before, the Labour of the Mechanicks will be settled by the day or by the piece: the merchandise which they have made...will be sold to the Landowner, the Farmers, the Labourers, and the other Mechanicks reciprocally at a price which leaves to all of them the same advantages as before; and the Farmers will sell, at a proportionate price, their produce and raw material.

...after this change [to a system of market exchange] all the people on this large Estate live just as they did before, and so all the portions and Farms of this great Estate will be put to the same use as it formerly was.

Thus Cantillon envisages how a definite set of prices can bring about or 'realize' a given distribution of the product and the associated allocations of land, labour and commodities. Markets likewise can serve to bring outputs into conformity to the given pattern of consumption associated with a given distribution. Variations in the structure of consumption arise primarily from changes in the consumption by landowners (Cantillon 1755:59–65).¹⁴

It may be said that Cantillon does not get very far in formulating a substantive theory of prices consistent with his theory of production and distribution (but see also Chapter 6). Nevertheless his achievement with regard to price theory should not be underestimated. The formal distinction between normal prices (that is, intrinsic values) and market prices and the forces which determine them, as well as the notion of real wages determined independently of prices and outputs, are ideas which were to play an important role in classical economics. Particularly remarkable is Cantillon's recognition that a distribution of the product, and a particular associated allocation of land, labour and commodities, may be conceived of as being brought about by decentralized market exchange at a definite set of prices.¹⁵ He thereby grasps that prices may be conceived of as a distributive and allocative mechanism consistent with the prior data of Cantillon's theory of production and allocation.

This was an important insight—and it is not merely an incidental fact that Cantillon should arrive at such a conception. The very analytical structure of his economics pointed to such a notion. For if the fundamental distribution and allocation of commodities is understood to be determined by technical conditions of production ($T/A, q$) taken in conjunction with real wages (c), the consumption propensities of the landowning class (k and 'mode of living') and labour available per head of population (n)—and if it is an

observable fact that commodities in part are allocated by markets—then the conclusion suggests itself: prices are determined posterior to those data, as a mechanism for bringing about the distributive and allocative outcomes associated with them.¹⁶

5.3 MONEY AND INTEREST

Cantillon's theory of production and distribution is confined largely to Part I of the *Essai*. Broadly speaking, Parts II and III examine money and interest, foreign trade and payments, and banking and credit. Cantillon's monetary analysis in itself is a remarkable, original contribution to economics and deserving of a careful interpretation in its own right. As Jevons (1881:353) suggests, it compares more than favourably with David Hume's celebrated *Political Discourses* (1752). There are two subjects in Part II which are of particular relevance to the scope of this inquiry and therefore may briefly be considered: monetary circulation; and interest, profits and prices.

Cantillon's treatment of monetary circulation in Part II, Chapter III, along with Part I, Chapter XII, caught the attention of Meek (1962:266–9) and in his opinion represents important evidence of Cantillon's influence upon Quesnay's theoretical development.¹⁷ It is evident from the interpretation presented in this chapter that very much more of the *Essai* is relevant to Physiocratic doctrine. Indeed, from the standpoint of the theory of Part I, the analysis of monetary circulation appears in proper perspective as nothing more (or less) than an explanation of how the allocation and distribution of commodities¹⁸ effected via exchange occurs, at least in part, via the agency of money. That is to say, the exchange or 'circulation' of commodities and labour which is associated with a certain distribution of the product is mediated via exchanges with money. Thus the analysis of the velocity of circulation of money in these three chapters takes its bearings from the analysis of production and distribution in Part I of the *Essai*. Cantillon's purpose in particular is to show how the distribution of the agricultural product and the exchanges between city and country are brought about in a monetary economy.

The agricultural product, which accrues initially to the farmers, is divided (in value terms) into 'three Rents', one-third accruing to the landowners and the remainder being divided between the farmers and labourers. The rents accruing to the landowners must be paid in money, as must the value of merchandise from cities that is consumed by farmers and labourers (for example, iron, salt, clothing); but the latter is only about one-sixth of the value of the agricultural product. The food and drink of the farmers and labourers, and to an extent also their clothing and housing, are produced in the country and can be provided without the agency of money. Hence the quantity of money required in the country (on the implicit assumption that money payments are made once a year: cf.

Cantillon 1755:127) is equivalent to about half the value of the agricultural product—the one-third required to pay rents plus the one-sixth required to purchase manufactures from cities—the other half of the product, to the extent that it enters exchange, being bartered (Cantillon 1755:121–5). (These are the same proportions employed in Part I, Chapter XII, pp. 43–7, discussed in the opening paragraphs of section 5.1 above.) The money paid to landowners is spent in town, in purchases from the various undertakers there (butchers, brewers, and so on), and thereby those undertakers acquire the money required for their purchases from the farmers (cattle, wheat, and so on) (Cantillon 1755:125–7).

Thus production, distribution and allocation can go on through time, the associated circulation of money reflecting the extent of monetary exchange (versus barter), the distribution of agricultural product, and exchange between town and country. If the monetary transactions between farmers and landowners and city and country are more frequent than annually, then the velocity of monetary circulation will rise and the quantity of money required for total transactions will fall as a proportion of the annual agricultural product. So Cantillon sums up his basic argument: ‘the amount of money needed for circulation...may be greater or less in a State according to the mode of living and the rapidity of payments’ (Cantillon 1755:127–31). Cantillon elaborates upon this fundamental analysis, examining complicating factors and the resulting qualifications (Cantillon 1755:131–59). Again, this is an example of the sequential method employed by Cantillon in relation to the determination of population, which was discussed in section 5.1.

With regard to interest, Cantillon’s fundamental position is that it depends merely upon the proportion between the number of borrowers and lenders (Cantillon 1755:199). The final chapter of Part II is designed to show that interest is not always an inverse function of the quantity of money; but rather, it varies in response to the complex of forces governing borrowing and lending, of which the quantity of money is only one (Cantillon 1755:213–21; cf. 321–3). In Cantillon’s view, the widespread use of borrowing ‘seems based upon the Profits which the Undertakers can make out of it’. The implication is that interest is at least constrained by profits; though on the other hand, the interest rate must compensate for the risk incurred by the lender. Considering a potential undertaker without capital who borrows, Cantillon (1755:201–3) points out that his profits must cover the interest plus his subsistence:

whether he borrow cash or goods there must be enough left to him for upkeep or he will become bankrupt. The risk of this is the reason why he will be required to pay 20 or 30 per cent, profit or interest on the amount of money or value of the produce or mehandise lent to him.

The causal analysis intended here is not very clear or explicit. Cantillon argues that, to the extent that entrepreneurs borrow to finance their production, the prices received must cover interest payments (see esp. Cantillon 1755:209), which at least include a compensation for risk.¹⁹ The risk premia associated with interest will differ for different entrepreneurs and activities (Cantillon 1755:201–11, esp. 211): Interest is always highest in proportion to the greater risk, and...diminishes from class to class up to the highest which is that of Merchants who are rich and reputed solvent.’ Interest payments are treated as primarily a deduction from entrepreneurial profits; though in principle interest can occur in the absence of profits, consumption loans being the *prima facie* case (Cantillon 1755:199–201, 211, 215–17). But it does not appear that the causation is intended to run unambiguously from interest to profits and prices, or vice versa (compare esp. Cantillon 1755:209 with 215–17).²⁰ Whatever its merits and difficulties, Cantillon’s treatment of interest serves to compound the difficulties in his treatment of profits and intrinsic values, discussed in section 5.2.

5.4 CONCLUSION

The purpose of this chapter has been to provide a quite comprehensive interpretation of the theory of production and distribution in Cantillon’s remarkable *Essai sur la Nature du Commerce en Général* (1755). That theory has been shown to be built around rural production, utilizing the concept of agricultural surplus grounded upon the notion of real wages given independently of outputs and prices, taken in conjunction with conditions of production. This provided the basis for a treatment of the allocation of land and labour which was ‘completed’, so to speak, by adding the consumption patterns of the landowning class. The economy which Cantillon’s *Essai* inhabits is dominated, on the level of production, by agriculture, and consequently, on the level of social class, by landowners. In the treatment of income distribution and prices, the pre-capitalist character of Cantillon’s economics becomes even more apparent and problematical. The uneasy intrusion of capitalist elements into a largely pre-capitalist theory is most evident in the ambivalent and uncertain treatment of profits and undertakers, which also has implications for the definition of agricultural surplus. These difficulties are compounded by Cantillon’s treatment of interest and profits. To these problems with the theory of distribution and value must be added the circularity of the cost-of-production approach to prices. Nevertheless, the treatment of prices articulates important notions. Without doubt, the most remarkable aspect of the price theory is Cantillon’s conception of prices as an allocative device for bringing about a given distribution of output. This

analysis of the ‘circulation’ of commodities is extended to a monetary economy in Part II of the *Essai*.

The task completed here is the necessary preliminary to an examination of Cantillon’s place in the history of surplus theories of production and distribution—and the main lines of this will be provided in the following chapters. The pertinent issue is not merely the existence of ‘family resemblances’ between Cantillon and others (the rather sterile search for ‘precursors’); but rather, the *sources* of Cantillon’s economics in earlier ideas and the extent to which it served as a source of later ideas. Two seventeenth-century English writers in particular stand behind Cantillon’s *Essai*, dominating its intellectual pedigree. With regard to the theory of production and distribution, Petty is the most important writer before Cantillon, and Cantillon’s treatment of these subjects, particularly agricultural surplus and the ratio between necessary and surplus labour, is heavily influenced by Petty’s ideas. Certainly, with regard to production and distribution, no one influenced Cantillon more than did Petty. Cantillon refers to Petty in the *Essai*, though not in a manner which does justice to Petty’s influence (Cantillon 1755:43, 83, 131). With regard to monetary analysis and the treatment of market prices, Cantillon owes a similar debt to John Locke, though again, Cantillon’s references to Locke do not adequately reflect that debt (Cantillon 1755:43, 113, 117, 161). Locke’s analysis of monetary velocity is in turn derived from Petty. With regard to the influence of Cantillon’s theory of production and distribution upon later economics, without doubt the most important was his influence upon Physiocracy and François Quesnay in particular. Schumpeter (1954:218) rightly states that ‘few sequences in the history of economic analysis are so important for us to see, to understand, and to fix in our minds, as is the sequence: Petty—Cantillon—Quesnay’. This is taken up in Chapters 6 and 7. Second to this, the influence of Cantillon upon James Steuart’s economics, as well as others, is substantial and some influence upon Adam Smith is discernible. These matters are taken up in Chapters 8 and 9. All this will serve to establish the crucial role which this remarkable thinker, Richard Cantillon, played in the formation of the classical tradition of economic analysis.

6

THE SIGNIFICANCE OF VALUE PARITY IN PETTY AND CANTILLON

One aspect of the economics of Petty and Cantillon not examined in the preceding chapters is the notion of a ‘par of value’ between land and labour. Petty invented this notion and it was subsequently utilized by Cantillon—or at least he employed a concept with the same nomenclature. The par does not go to the essence of the surplus theories of Petty or Cantillon, though it emerges quite naturally in the particular context of each writer’s thought and has a deeper significance for Cantillon’s economics than for Petty’s. In recent times there has been some considerable interest, not to say fascination, in the notion, perhaps because it lends itself to algebraic formalization.¹ The purpose of this chapter is to clarify the meaning and significance of value parity in Petty and Cantillon. Sections 6.1 and 6.2 outline the par as understood by Petty and Cantillon respectively. The relation between the two writers’ concepts is considered in section 6.3 and the significance of the parity is examined in section 6.4.

6.1 PETTY’S ‘NATURAL PAR BETWEEN LAND AND LABOUR’

In order to grasp the significance of Petty’s land/labour parity it is important to locate the concept within the context which provided the stimulus for its emergence in his thought. It is evident enough that the project of political arithmetic naturally would be associated with a focus upon measurement questions; but in fact, Petty’s consciousness of measurement problems and his first suggestion concerning the possibility of a land/labour parity arise in the *Treatise of Taxes and Contributions* (1662), thereby pre-dating the invention of political arithmetic by approximately a decade. This serves to confirm that political arithmetic was a response to Petty’s early theoretical and empirical inquiries and not conceived in any ‘inductivist’ manner, as a substitute for theory (*vide* section 3.5 above). Indeed, the labour theory of value proposed in the *Treatise* was in part stimulated by the problem of determining a reliable numeraire for empirical analysis. It is in this context that the possibility of a natural par is proposed.

In the second model of production in the *Treatise* (*vide* section 3.1 above) the labour theory is offered as an explanation of the ‘foundation’ of value in general and the money value of ‘natural’ corn rents in particular—this labour value being contrasted with the Variety and intricacy’ in the determination of actual prices. This serves to isolate two distinct difficulties with the use of silver money as a numeraire: variations in its labour value; and divergences of actual value from labour value. The search for an alternative numeraire—‘some other natural Standards and Measures’—is warranted because

Silver...rise[s] and fall[s] in its price, and be more worth at one place than another, *not onely for being farther from the Mines, but for other accidents*, and may be more worth at present, then a moneth or other small time hence; and if it differ in its proportion unto the several things valued by it, in several ages upon the increase and diminution thereof.

(Petty 1662:44, emphasis added; cf. Petty 1691a:183; Matsukawa 1977:47)

Similarly, Petty in the same context speaks of the labour time embodied determining ‘the true proportion’ between gold and silver, ‘which many times is set but by *popular error*, sometimes more, sometimes less, diffused in the world’ (Petty 1662:44, emphasis added). Petty’s second formulation of the labour theory in the *Treatise* also is intended to explain changes in the value of money and is prefixed with the observation that ‘the plenty of money...hath changed strangely since the discovery of the West Indies’.² The distinction between the two sources of variation is also well illustrated in the following (Lansdowne 1927: vol. II, 231–2):

Gold and silver seemes the standard and measure of power of all commodities in Europe,...but [only] one of them (*viz*: silver) can bee it. But silver itselfe rises and falls not onely upon difference of Time and place upon Exchange and Interest, but also in itselfe: *viz*: as workmen have more or lesse reason to bestow labour more or lesse upon it.

It is both sources of variation which persuade Petty against the reliability of silver money as a numeraire.

The formulation of the natural par is the most striking result of Petty’s search for a more reliable numeraire. As an alternative to money Petty turns instinctively to the ‘two natural Denominations’, land and labour—‘forasmuch as [for example] both Ships and Garments were the creatures of Lands and mens Labours thereupon’ (Petty 1662:44). But since a numeraire must be singular—as Petty is well aware (Petty 1662:44; 1691a:183; Lansdowne 1927: vol. II, 231–2)—it is desirable, in turn, to reduce these denominations to a common unit; ‘so as we might express the value by either of them alone as well or better then by both, and reduce one into the other as easily and certainly as we reduce pence into pounds’ (Petty 1662:45). Having

posed this question, all Petty offers in response is an argument that the natural years-purchase value of land is twenty-one years, at least in England, because this supposedly reflects a kind of natural rate of time preference. The concept of years-purchase value refers to the market price or value of a given piece of land expressed as a proportion of its annual rents (average annual money value of natural rents seems to be intended, for natural value): if v_j is the value of land j and R_j is the relevant rent, then the years-purchase value (y_j) is v_j/R_j . Hence v_j equals y_j times R_j , and Petty (1662:45) is arguing that the natural value of land is twenty-one times the appropriate measure of rents:

Having found the Rent or value of the *usus fructus* [that is, usufruct] per annum, the question is, how many years purchase... is the Fee simple naturally worth?... I apprehend [it] to be the number of years, which I conceive one man of fifty years old, another of twenty eight, and another of seven years old, all being alive together may be thought to live; that is to say, of a Grandfather, Father, and Childe; few men having reason to take care of more remote Posterity... Wherefore I pitch the number of years purchase, that any Land is naturally worth, to be the ordinary extent of three such persons in their lives. Now in England we esteem three lives equal to one and twenty years, and consequently the value of Land, to be about the same number of years purchase.

Petty seems to be saying that on average there are twenty-one years between intergenerational births; and/or that on average three generations simultaneously live twenty-one years (implying from the above quotation that the ‘grandfather’ dies at approximately sixty-four years of age). It may be added that as a matter of fact the normal years-purchase value of land appears to have been very stable, at twenty years, for a long period up to the seventeenth century (*vide* Habakkuk 1952: esp. 28–30).

The question arises as to the precise relation between the natural value of land so understood and the market price of land (p_j). Further on in the *Treatise*, and elsewhere, Petty argues that the rate of return on land will tend to equality with the rate of interest, plus an allowance for differential risk:

As for Usury, the least that can be, is the Rent of so much Land as the money lent will buy, where the security is undoubted; but where the security is casual, then a kinde of ensurance must be enterwoven with the simple natural Interest...

(Petty 1662:48; cf. 1695:447–8)

Ignoring differential risk, the interest rate (i) will equal R_j/p_j ; so that

$$p_j = R_j/i \approx R_j/(1+i) + R_j/(1+i)^2 + \dots + R_j/(1+i)^m \quad (6.1)$$

The price of land is the present value of the stream of given rents in perpetuity, discounted at the given interest rate. Elsewhere Petty is quite explicit that the causation runs from interest and rents to land prices: ‘From ...the yearely interest of money per cent, arises the valuation of Lands whose yearely rent is knowne’ (Lansdowne 1927: vol. I, 193). It is evident that the market land price so understood will conform to Petty’s natural land value if the reciprocal of the natural years-purchase conforms to the interest rate, *and* the same measure of rents is used to calculate both:

$$v_j = 21R_j = p_j = R_j/i \quad (6.2)$$

$$i = 1/21 \quad (6.3)$$

Natural value implies a natural discount rate of approximately 4.76 per cent; and obviously, if i is at this rate, then market price will equal natural value. In the discussion of natural value and the par in the *Treatise*, discussed directly above, Petty indeed does conclude that market land price at least tends to coincide with natural value. (Petty’s theory of interest and land prices is largely vindicated by Habakkuk, 1952: esp. 38–44, where the convergence [from above] of interest towards the rate of return on land over time is primarily explained by declining risk premia on financial instruments.)

However, the assertion is not very convincing, for Petty immediately goes on to indicate a wide range of other forces which influence years-purchase. Some of these forces can be construed as falling within the category of ‘accidents’ or extrinsic causes, which disturb market values in relation to natural values, or risk and other premia—‘errour’; ‘special honour,... privilege...annexed [to land]’; ‘[I]n Ireland,...perpetuity itself is but forty years long [due to “frequent Rebellions”]’; ‘difficulty of executing justice’. But they cannot all be so conceived. In particular, Petty also argues that years-purchase value is a positive function of population.³ He does not even attempt to explain how this can be made consistent with the natural discount rate theory (not to mention the interest rate theory), simply adding population as another force that acts upon years-purchase value. Furthermore the natural discount rate can differ from country to country—not a logical problem, but suggestive that ‘natural’ value is rather more conventional than its name suggests.⁴ Even ignoring these additional forces acting upon years-purchase, the notion that market price tends towards natural value entails that interest tends towards the natural discount rate, or vice versa. (The distinction between natural price and political price discussed in sections 3.1 and 3.6 is meaningless in relation to land.) But how is this process of equalization supposed to occur? And how, at the same time, do these two rates conform to the influence of population upon years-purchase? Petty is silent on these inherent difficulties. He does not really have a theory of interest, though, as indicated above, he perceives risk

premia to be embedded in interest rates; and he also asserts that ‘the natural fall of Interest, is the effect of the increase of Mony’ (Petty 1690:304, 243; 1662:47–8; 1695:446–8). Roncaglia (1985:34–5) offers a more generous interpretation which is partly based upon a mistaken denial that Petty conceived a causation running from interest to land prices. This causation was expounded by a number of seventeenth-century writers, as to be almost a commonplace (*vide* Habakkuk 1952: esp. 27, 35–6).

In any case, returning to the central theme, none of this gets Petty to a land/labour parity anyway. The only other direct and explicit discussion of the par in Petty’s published works occurs in *The Political Anatomy of Ireland*, where it is described as ‘the most important Consideration in Political Oeconomies’.⁵ The immediate context is a desire to find ‘some Rule in nature’ for land valuation, in the light of Irish land controversies—a matter in which Petty was intimately involved (*vide* sections 2.2 and 2.3 above). As in the *Treatise*, the purpose of the par is said to be ‘to express the Value of anything by either [land or labour] alone’. But again this objective is not achieved. Petty’s proposed solution, on this occasion by way of a thought experiment, is to suppose that a quantity of ‘Pasture-land inclosed’, without the assistance of labour, produces a certain quantity of meat in a year—the increase in weight of an unattended calf. (One may enquire, by whom the land was enclosed?) This product can be measured in ‘days food’, understood as necessary consumption per capita; and then compared with the (higher) product resulting from a labourer working the same land for a year, also measured in days’ food. The implication of Petty’s argument is that the former quantity of food and the difference between the latter quantity and the former in some sense measure the contributions of land and labour respectively. So understood, land and labour can be said to be reduced to a common measure of value in days’ food. The labour contribution so conceived is asserted to be ‘the Wages of the Man’, and the land contribution so conceived is asserted to be ‘the value or years Rent of the Land’ (Petty 1691a:180–1). (Note that land value is here identified with rents, not capitalized value or years-purchase; cf. Petty 1690:286.) Whatever the merits or otherwise of this implied conception of distinct and additive contributions of land and labour to total product—and the apparent identification of this with distribution between rents and wages—it has nothing to do with the measurement problems in response to which the par was originally posed in the *Treatise*. Furthermore, the implied interpretation of rents and wages is hardly consistent with the theory of rents in the *Treatise*, or Petty’s general views on real wages (*vide* sections 3.1 and 3.6 above). The *Political Anatomy* discussion of the par is obscure; but it seems evident that the nature and significance of the par, to Petty’s mind, has undergone a distinct change.⁶

There is another formulation of the par, even more problematic, in Matsukawa (1977:47–8). There Petty first suggests that the common denominator for the par is money and that parity is given by equating the quantities of land and labour which generate the same money income, rents

and wages respectively—notwithstanding that avoidance of monetary measures was the purpose for which the par was originally posed. (Matsukawa: 1977:33–4, tentatively dates this manuscript at *c.*1670 and certainly not earlier than 1667.) When this solution is contested by ‘A’—because ‘Mony is an artificiall Thing or rather No Thing’—Petty (‘B’) proposes an alternative. He calculates, for Ireland, the quantities of land and labour required to meet the necessary consumption of the total population and thereby determines surplus land and surplus population. (Note that there is a numerical error in the manuscript at p. 48:1700^m acres should be 17,000^m acres.) Petty’s alternative par is to equate these two surpluses. Remarkably, he then concludes that the latter parity will produce at least approximately the same measure as the former—where the former is, in effect, the ratio between the rate of money rents per unit of land and the rate of money wages per worker (or vice versa)—without providing any justification for this supposition. Indeed, there is none for such a conclusion. It may be added that it is not pertinent to Petty’s formulation here, that the ratio of the rate of wages to the rate of rents, suitably specified, captures a measure of the quantity of land directly and indirectly required to produce consumption per worker (*vide* sections 6.2 and 6.3 below). There is no evidence that Petty had this conception of a land/labour parity. As will be indicated below (p. 100), even Cantillon does not seem to have fully grasped it, though he got much closer than Petty.

There is another concept devised by Petty—‘the value of the People’—which has some kinship with the parity issue (especially in its *Political Anatomy* formulation). So much is this the case, that it is tempting to treat it as a solution; but Petty never says that it is so—and indeed, it would not be an adequate solution even if that were intended. The notion is first enunciated in *Verbum Sapienti* (which, we recall, was written *c.*1665) and with minor variations is employed in many of the subsequent works as well as in unpublished writings. Petty capitalizes total national wages, usually at the same rate at which rents are capitalized, and describes the result as the value of the population (or in one case, workforce). In some sense, wages are treated as the yield of population/labour in perpetuity and capitalized accordingly. The notion is employed in an attempt to demonstrate alleged national losses from deaths caused by the plague and rebellion, as well as to promote the ‘transplantation’ of population out of Ireland, the Scottish highlands and the American colonies, back to England (and the Scottish lowlands).⁷ Similar to the *Political Anatomy* formulation of the par, this concept implies a notion of separable and additive ‘contributions’ of land and labour to national product, and simply identifies these contributions with rents and wages. Petty’s editor actually succumbs to the temptation to treat this valuation as the par (Hull 1899: vol. I, lxxi-lxxii). But Petty does not describe it as such; and to the extent that land and population are capitalized at the same rate, the relative capital valuations merely mirror the

distribution of income between aggregate rents (R) and wages (w)—though at one point (1690:267) profit is also mentioned:

$$yR/yW = R/W \quad (6.4)$$

Furthermore, this valuation simply takes its bearings from monetary values of incomes—the avoidance of which was the very reason the problem of the par was posed and the search for a natural denomination instituted.⁸

6.2 CANTILLON'S 'EQUATION DE LA TERRE & DU TRAVAIL'

Cantillon's par can be treated more briefly, simply because it is both more elegantly presented and more coherent. In Cantillon's case, the notion of a land/labour parity emerges in the context of his theory of intrinsic values. In effect, intrinsic values are normal prices of outputs, which reflect the normal value of the quantities of labour (of various kinds) and lands (or natural resources from land) which enter into the production of outputs (*vide* Cantillon 1755:27–31; section 5.2 above). So at the end of the chapter in which this theory is presented (Part I, Ch. X) Cantillon quite naturally raises the question of the relation between the value of labour and the value of land (or the value of the product of land). This the following chapter—'*Du pair ou rapport de la valeur de la Terre à la valeur du travail*'—proceeds to answer (Cantillon 1755:31–43).

In its essentials, the resulting parity is arrived at by two consecutive steps: (a) determine the quantity of consumption required to reproduce a worker of a particular kind; and (b) then determine the quantity of land required to produce this consumption output. It must be stressed that Cantillon *identifies* the former with the value of (the particular class of) labour; that is to say, this is a definition of the value of labour. The latter quantity of land required to produce this value is then the sought-for parity: the land value of labour. (Asymmetrically, there can be no labour value of land since, implicitly, land is a non-reproducible primary input.) In short, the parity determines the quantity of land required to reproduce particular categories of labour at particular, given consumption levels. As to the consumption necessary to reproduce a worker, two points may be noted. First, this is calculated (for 'Labouring Slaves') in terms of 'subsistence and wherewithal to bring up their Children': consumption is explicitly calculated by reference to replacement of workers by their children; and this applies to other categories of labour as well, allowance being made for child mortality.⁹ Second, the relevant quantity of consumption in general is not subsistence in any strict sense but, rather, customary consumption patterns which differ for different labour categories (slave-labourers, slave-artisans, overseers, vassals, free peasants, free labourers, journeymen-artisans, farmers, master-artisans), and by geographical location (various parts of Europe, North America and China); though the methods of calculating replacement consumption and land value of

labour are then the same as for slave labour.^{10,11} As to land required to produce this consumption, though in the parity chapter (Part I, Ch. XI) Cantillon does not explicitly make allowance for direct agricultural input to (agricultural) production of consumption ('seed'), the same empirical calculations of land required to produce consumption are referred to in that chapter as are used in Part I, Ch. XV—and the latter discussion indicates that such input is explicitly taken into account (Cantillon 1755:37–9 with 65–73), as in the case of Petty's determination of natural rents. Hence the appropriate quantity of land is that which is required to reproduce the consumption (value) of labour as a *net* product (net of seed input); or, to put the same point differently, the quantity of land directly and indirectly required to produce worker replacement consumption.

Two additional aspects of Cantillon's formulation of parity may be noted. An analytical connection between intrinsic value and land/labour parity is suggested:

the intrinsic value of any thing may be measured by the quantity of Land used in its production and the quantity of Labour which enters into it, in other words by the quantity of Land of which the produce is allotted to those who have worked upon it...

(Cantillon 1755:41)

This may be taken to mean that intrinsic values can be reduced to quantities of land directly and indirectly required; that is, direct land required, as well as land required to provide natural resource inputs and land directly and indirectly required for labour replacement. Second, Cantillon then comments upon monetary values:

Money...is the most certain measure for judging of the Par between Land and Labour and the relation of one to the other *in different Countries* where this Par varies according to the greater or less produce of the Land allotted to those who labour.

If, for example, one man earn an ounce of silver every day by his work, and another *in the same place* earn only half an ounce, one can conclude that the first has as much again of the produce of the Land to dispose of as the second.

(Cantillon 1755:41; emphasis added)

This merely says that the relative consumption of different kinds of labour in any one place can be measured by relative money wages—not, as might first appear, that money wages can be used to compare parities *between* countries. Nevertheless, it indicates explicitly that Cantillon identifies replacement consumption of each labour category with the consumption purchasing power of its (normal) money wage.

Following and extending the formalization employed in Chapter 5,

suppose land, labour and necessary/customary agricultural consumption are homogeneous. Given agricultural consumption per capita (c)—now interpreted as the replacement consumption associated with the par—and now also allowing for given seed input (homogeneous with output) per unit of consumption output ($0 < a_{cc} < 1$); the land value of labour is

$$c/[(1 - a_{cc})T] \approx (c/T)(1 + a_{cc} + a_{cc}^2 + \dots + a_{cc}^m) \quad (6.5)$$

where $(1/T)$ is the land required to produce a unit of gross consumption output; and the second term in parentheses accounts for seed input (land directly and indirectly required to produce c as a *net* output). Heterogeneous labour with homogeneous consumption creates no difficulties: for each possible level of c , associated with different labour categories, expression (6.5) likewise will provide the appropriate parity. There are as many pars as there are kinds of labour. In the case of heterogeneous consumption with homogeneous land, suppose now that T_j, a_{jj} represents gross output per unit of land and seed input per unit of gross output, for one of any finite number of agricultural commodities. The land directly and indirectly required to produce a unit of net output of j is

$$1/[(1 - a_{jj})T_j] \approx (1/T_j)(1 + a_{jj} + a_{jj}^2 + \dots + a_{jj}^m) \quad 0 < a_{jj} < 1 \quad (6.6)$$

The land value of labour (heterogeneous or otherwise) associated with any possible pattern of consumption then can be determined by taking the inner product of the relevant vector of consumption quantities and the vector of land quantities implied by expression (6.6). As to heterogeneous land, of course Cantillon recognizes its existence; but land value of labour is calculated as an average for various regions of the world, so that heterogeneity is only explicitly taken into account at that level. Furthermore, it would have been difficult for Cantillon to do otherwise since he has no theory of differential rents in relation to fertility and commodity pricing.

Finally, with regard to intrinsic value, suppose that along with the necessary consumption good there is just one other agricultural commodity, j . Both are produced by means of homogeneous land, labour and seed input. Prices (p_c, p_j) equal to costs of production (including rents as a price-determining production cost) embody intrinsic values; and the money wage (w) is equal to the money value of necessary consumption (c):

$$p_c = w(1/A) + p_c a_{cc} + r(1/T) \quad (6.7)$$

$$p_j = w(1/A_j) + p_j a_{jj} + r(1/T_j) \quad (6.8)$$

$$w = p_c c \quad (6.9)$$

where $1/A, 1/T$ are the quantities of labour and land, respectively, required to produce a unit of necessary consumption output; $1/A_j, 1/T_j$ are symmetric labour and land quantities for the other commodity, j ; seed input requirements per unit of outputs are $0 < a_{cc}, a_{jj} < 1$; and money rents per unit

of land (r) are uniform, (Note that A , A_j , T , T_j refer to gross outputs whereas in Chapters 3 and 5, due to the absence of a formal inclusion of seed input, no gross/net distinction was drawn.) Expressing r and p_j in terms of the necessary consumption good and solving gives

$$r_c = r/p_c = [(1 - a_w) - (c/A)]T \quad (6.10)$$

$$p_{jc} = p_j/p_c = \{(c/A_j) + (1/T_j)(1 - a_w) - (c/A)T_j\}/(1 - a_{jj}) \quad (6.11)$$

$$\approx \{(c/A_j) + (r_c/T_j)(1 + a_{jj} + a_{jj}^2 + \dots + a_{jj}^m)\} \quad (6.12)$$

A pertinent alternative rendering is to express p_c , p_j in terms of r , thereby valuing commodities in terms of the quantities of land their value would 'command', by using it to pay the rental price:

$$p_c/r = 1/[(1 - a_w) - (c/A)]T \quad (6.13)$$

$$\begin{aligned} &\approx (1/T) \{1 + [a_w + (c/A)] + [a_w + (c/A)]^2 \\ &+ \dots + [a_w + (c/A)]^m\} \end{aligned} \quad (6.14)$$

$$p_j/r = \{(1/T_j) + (c/A_j)(p_c/r)\}/(1 - a_{jj}) \quad (6.15)$$

$$\begin{aligned} &\approx [1/(1 - a_{jj})T_j] + (c/A_j)(1/T) \{1 + [a_w + (c/A)] \\ &+ [a_w + (c/A)]^2 + \dots + [a_w + (c/A)]^m\}/(1 - a_{jj}) \end{aligned} \quad (6.16)$$

$$\approx \{(1/T_j) + (c/A_j)(p_c/r)\}/(1 + a_{jj} + a_{jj}^2 + \dots + a_{jj}^m) \quad (6.17)$$

where viability of the system with positive rents requires $(1 - a_w) > (c/A)$. This confirms Cantillon's intuition concerning intrinsic value and land value: with rents price-determining and land the only primary input, cost (that is, zero profit) prices ensure that intrinsic commodity values relative to rent will equal the quantity of land directly and indirectly required to produce each commodity. The monetary value of intrinsic values will equal monetary rent per unit of land times these land quantities; and the ratio of exchange between commodity j and the necessary consumption good will equal the ratio of quantities of land directly and indirectly required to produce the respective commodities. To put the same point differently yet again, if a commodity were marketed at its (monetary) intrinsic value, it would exchange for just sufficient money to rent the quantity of land directly and indirectly required for its production. The same result holds, in somewhat more complicated form, if commodity j forms part of necessary consumption. It should be added that this formal solution does not mean that Cantillon escapes the criticism raised in section 5.2, that his land-and-labour (cost price) theory of intrinsic value fails to grasp the dependence of costs upon prices. Rather, this *simultaneous* determination of costs and prices is a confirmation of that criticism (cf. Roncaglia 1985:82–8).

6.3 THE RELATION BETWEEN VALUE PARITY IN PETTY AND CANTILLON

There is little doubt that the possibility of a parity which would reduce the apparently original or natural production inputs, land and labour, to a common denomination was suggested to Cantillon's mind by Petty's original efforts. (In his parity chapter Cantillon explicitly refers to at least one of Petty's formulations. *Vide* section 7.1 below.) Petty variously proposed the possibility of reducing land to labour, labour to land, or reducing both to some other denomination. But Petty provided no satisfactory response, analytical or otherwise, to any of these possibilities. In effect, Petty had merely *wondered* whether any such reductions could be achieved; so much so that the question itself seemed to change from the *Treatise of Taxes* to the *Political Anatomy*: Petty himself was not clear what the par was for. In the end, all he offered was a dubious rationale for a natural rate at which rents and wages were capitalized; and a notion that rents and wages as income streams in some sense reflect the true value, or yields, or relative contributions to output, of land and labour/population.¹² Petty and Cantillon share the *concept* of reducing labour to land—only Cantillon actually offers a solution. To be sure, Petty would recognize them, from his own economics (equations (6.9) and (6.10)); but it never occurred to him to put them together along the lines of Cantillon's intuition.

Of the three reductions Petty raised as possibilities it was this reduction of labour to land which Cantillon pursued. This was based, to some extent implicitly, upon the fact that labour as conceived by Cantillon (and indeed, by Petty) was strictly reproducible, like any other produced commodity; so that for Cantillon land could be conceived as the only truly original or primary input. Having identified the value of labour with its customary replacement, consumption, Cantillon recognized that this could be reduced to land directly and indirectly required to produce this consumption. This land value is a measure of the real cost of labour reproduction: equation (6.9) is effectively an equation for the intrinsic value of labour, with labour price (w) equal to cost of production ($p_c c$), and the wage also will equal the rental price of the quantity of land directly and indirectly required to produce c as a surplus (consider equation (6.9) with equation (6.13)). Cantillon seems to have recognized also that the intrinsic values of commodities were reducible to the quantities of land directly and indirectly required to produce them, including in this the land value of labour input. For Cantillon, these land-embodied intrinsic values must also be translatable into monetary intrinsic values, for the latter are the cost prices which are centres of gravity for market prices, money intrinsic values coinciding with market prices when outputs balance demands. It may be added that the theory of value so conceived carries over from the theory of production, surplus and allocation, the same limited and submerged role for

manufacture: the labour and land theory of production and the derivative labour and land theory of value express the same primacy of agriculture relative to manufacture, at least at the level of inputs to production.^{13,14}

With regard to other recent interpretations of value parity in Petty and Cantillon, most attention has focused upon Cantillon. The ill-conceived comments of Hull (1899: vol. I, lxxi–lxxii) on Petty’s parity have already been discussed. Hicks (1983:17–21) argues that Petty’s par ‘was little more than a question’; but Hicks goes on to interpret the par (in both Petty and Cantillon) as a determination of the relation between real rates of rents and wages—an unjustifiable interpretation, though in Cantillon’s case there is a formal relation between the wage-rent ratio (p_c/r) and his parity. Brems (1978:670–3) does not really explain Cantillon’s par; though Brems correctly determines relative commodity prices in relation to quantities of land required in production along Cantillonian lines, but without accounting for seed inputs. A later book (Brems 1986:40–4) is more explicit about the relation between intrinsic commodity values and Cantillon’s parity. Brewer (1988:2–5, 8–12) provides a generalized n -commodity interpretation of Cantillon’s value theory but questions whether Cantillon correctly grasped the relation between intrinsic commodity values and value parity. In particular, in a careful examination Brewer queries whether (using the terms of the model above, rather than Brewer’s) Cantillon regarded $c/[(1 - a_w)T]$, or $c/[(1 - a_w) - (c/A)]T$, as the land value of a labourer. Our judgement is that Cantillon would recognize the former as his parity, and that he may well have thought (incorrectly) that this sufficed to account for the land value of labour input in the determination of intrinsic commodity values; in fact the latter term is required for that purpose. But it is not possible from Cantillon’s text to be certain how far his intuition extended on this subject. Brewer leaves the question open; though he indicates that even with Cantillon employing the former measure for parity, he would get intrinsic (land) values of commodities correct if he conceived labour input in terms of labour directly and indirectly required to produce a surplus unit of output; but this possible solution seems overly generous to Cantillon’s text. Vaggi (1987:79–80) is analytically correct in treating intrinsic (land) values along Cantillonian lines (with absence of seed inputs); but takes it for granted that Cantillon regarded $c/[(1 - a_w) - (c/A)]T$ (again, using the terms of the model above) as his par. A final point: in comparing the various and somewhat different models of Cantillon’s theory it is important to keep in mind the three-step underlying logic of that theory: (homogeneous) land is the only primary input; rents enter into costs of production (rents are price determining); prices equal costs (zero profits). Whatever their other particularities, all models which embody these conditions will generate a so-called land theory of value.

6.4 THE SIGNIFICANCE OF VALUE PARITY

The possibility of a value parity, which Petty proposed and to which Cantillon offered a particular solution, strikes some important resonances in subsequent classical and later economic analysis—though of rather different kinds for each writer. The most striking difference with regard to the significance of their respective contributions is that Petty’s par has essentially an empirical motivation, at least originally; whereas Cantillon’s intention is primarily theoretical, though empirical estimates of the resulting parities are provided. Petty was stimulated by a desire to distinguish sources of variation in the monetary values of economic variables, the empirical course of which he wished to measure, and to find a more reliable numeraire; though his parity later degenerated into a quite different and literally mystifying exercise of seeking to determine the ‘contributions’ to output of land and labour. Petty shifts from the proposition that use value arises from nature (land) and labour to the very different and spurious proposition that income shares reflect contributions to (the exchange value of) the national product.¹⁵ Nevertheless, the problem of empirical measurement—and the related distinctions between nominal and real variations, and associated categorization of sources of monetary (and real) variations—are enduring aspects of applied economics. Cantillon, on the other hand, via his parity was investigating more deeply the significance of his theory of production and value. The notion of the value of labour has a distinctively classical character in analytically treating labour as a reproducible input like any other (‘worth’ its cost of production).¹⁶ It is also an elaboration of an aspect of Cantillon’s theory of land allocation and population: the land value of labour is a determinant of population and constrains the proportion of available land devoted to non-necessary production. (Cantillon’s awareness of the connection between the par and land allocation is evident from his use of the same empirical calculations to illustrate both. See Cantillon 1755:37–9, 71–3.) In terms of the model employed in section 5.1 above (esp. equations (5.5), (5.10) and inequality (5.14)), though here with seed input incorporated:

$$(L - L_d)/L = 1 - [c/(1 - a_w)A](1/n) \tag{6.18}$$

$$P = kE/\{c/[(1 - a_w)T]\} \tag{6.19}$$

$$\frac{q}{q + \{n - c/[(1 - a_w)A]\} / \{c/[(1 - a_w)T]\}} \leq k \leq 1 \tag{6.20}$$

where

$$c/[(1 - a_w)A] < n \leq 1 \tag{6.21}$$

Population is determined by the ratio between the quantity of land devoted to necessary consumption and the land value of labour; and the latter enters into the constraint upon the proportion of land devoted to non-necessary production.¹⁷ The production-based theory of intrinsic value is also characteristically classical in approach; and its significance in Cantillon's particular formulation is deepened by the intuition that labour input (or cost) is reducible to land embodied in labour's consumption (or rental cost of that land)—even if it is doubtful whether Cantillon fully grasped the correct land measure of necessary labour consumption for specifying the land measure of intrinsic commodity value.

PETTY-CANTILLON-QUESNAY

The Formation of the Surplus Approach

It is now possible to bring together elements of the preceding interpretations of Petty and Cantillon in order to provide an account of the formation of the surplus approach. To begin with, it may be observed that the production and distribution of economic surplus is an organizing principle so fundamental to social theory in general, and economic theory in particular, that it is applicable to virtually any form of economic society. Of course, in different kinds of social economy the forms of production, appropriation, distribution and utilization of surplus will be different. In fact, for most of the history of economic theory this surplus approach has been applied largely to the analysis of one historically and institutionally specific form of social economy—capitalism—because for most of the history of theory capitalism has been the dominant form of social economy which has confronted theorists and required explanation. In this *specific* application, the theory of surplus takes the particular form, primarily, of a theory of non-wage income and especially profits on capital, in a system of price formation via decentralized competitive markets. It is just the ‘core’ of this analysis which Sraffa (1960) clarified (cf. Garegnani 1984:292–7). But Sraffa’s solution of some fundamental analytical problems in the theory of the capitalist economy does not in any way support the widespread tendency tacitly to confine the surplus approach to the analysis of capitalism—a tendency which obscures the fact that in virtually every kind of society, past and present, a surplus is produced and distributed in some systematic manner.

Although the surplus approach understood in this most fundamental generic sense, therefore, is equally applicable to pre-capitalist societies—or for that matter, to socialist and mixed economies—it has been a widely accepted opinion in recent decades that as a matter of fact, contingent or otherwise, the approach originates with François Quesnay (1694–1774); thus, the surplus approach becomes coeval with emerging capitalism. More recently, opinion on this matter seems to have become more equivocal.¹ The purpose of this chapter is to show that Quesnay’s theory of surplus, rather than being the beginning of a tradition, was a continuation and development of ideas developed earlier by Petty and Cantillon, essentially in application to

pre-capitalist economies. It may be emphasized that the argument is not merely that Petty and Cantillon employed variants of a surplus approach—though this would be important in its own right—but also that they *contributed* to the development of Quesnay’s theory: Cantillon built upon foundations laid by Petty, and Quesnay subsequently built upon Cantillon’s theoretical edifice. Petty-Cantillon-Quesnay constitute a cumulative intellectual development or ‘tradition’ in this sense.²

7.1 CONCEPTS OF SURPLUS

Having elucidated the pioneering notions of surplus developed by Petty and Cantillon, it is now necessary to clarify the concept of economic or social surplus and the causal role it is intended to serve in economic theories. Only with the benefit of such analytical precision will it be possible to determine clearly the sense in which Petty, Cantillon and Quesnay employed surplus concepts and used them as explanatory tools. It may be stressed that a *causal* role for surplus is as necessary as the conceptualization of a surplus, if a surplus approach is to be sensibly attributed to these thinkers.

In the generic sense, surplus refers to something ‘left over’ after ‘requirements’ have been satisfied. In the economics of production this generic notion can be applied in two forms. Most obviously, a commodity form of surplus can be specified by deducting from the gross outputs resulting from a production system the commodities required to produce those gross outputs (commodity inputs), so as to arrive at a commodity surplus. Along with the system’s direct commodity inputs, commodity inputs conceptually should include an accounting for the necessary consumption of labour input required in the production of gross outputs. These ‘requirements’—both direct commodity inputs and necessary consumption—are best regarded not merely as technical and physiological data, but also as having embedded within them historically specific social norms or conventions. Second, a labour form of surplus can be specified by deducting from the labour time worked in a production system (total social labour or average labour time per homogeneous worker, ignoring labour heterogeneity) the labour time required to produce the necessary consumption of total social labour or total population (necessary social labour time per worker or per capita), so as to arrive at a labour surplus.³

There is not quite a strict correspondence between these two forms of surplus. The commodity form refers to reproduction, with a commodity surplus, of the entire economic system; the labour form refers to reproduction, with a surplus of labour time worked, of the workforce (or population). Surplus labour is in general a free variable in a way in which surplus output is not, since the former leaves the composition of surplus output (the allocation of surplus labour) open, to be separately determined. By focusing upon the reproduction of the workforce it is possible, at least

with single production and some forms of joint production, to partition the production system and isolate a vertically integrated necessary consumption goods sector (Garegnani 1984:313–20; or 1987:570–3). It is the surplus labour time worked in this notional sector, and the associated surplus necessary consumption goods produced in this sector, which ‘finance’ the surplus employment and thereby the surplus output of the remainder of the production system.

With regard to causation, this framework provides an approach to the analysis of income distribution on the one hand and allocation of labour (as well as other primary inputs) and commodities on the other. Production, distribution and allocation of surplus can become a fundamental organizing principle for intellectual inquiry—the surplus approach becomes possible—when these three phenomena are understood to be governed in some measure by systematic forces. But the use of the surplus is free to vary, in a way which outputs to replace necessary commodity inputs (or necessary labour input) are not. A produced commodity surplus is distributed between various social classes and realized in income forms (in particular, worker versus non-worker incomes); and it is allocated between various activities (in particular, non-necessary consumption versus accumulation). Equivalency, ‘produced’ surplus labour is available for use by various social classes in various activities. Of course, at this lower level of abstraction the particular institutional form of the social economy will condition the explanatory principles governing distribution and allocation. A normative dimension may also enter since it is possible to argue for a *desirable* distribution and allocation. Within this framework of surplus notions and causation the successive approaches of Petty, Cantillon and Quesnay may be located and comprehended.

In the case of Petty, the surplus approach is crystallized in the three models presented in his *Treatise of Taxes and Contributions* (1662)—without doubt his most important theoretical work, predating the development of his political arithmetic by a decade. Of the three models, the one which most informs his broader economic concerns presents a theory of ‘the social division of labour’—the ratio between socially necessary labour and total (potential) employment—in terms of the relation between three variables: average output per worker and necessary consumption per worker in the production of ‘necessary food and raiment’; and the proportion of the population which is employable (Petty 1662:30–1). The primary focus here is to explain how taxation can finance surplus employment by extracting and redistributing surplus product from production of necessary consumption. In the second model corn rents are explained as a surplus remaining after deduction of the corn consumption of the worker and seed corn, as well as corn exchanged by the worker for ‘Clothes, and other Natural necessaries’. The monetary value of these corn rents is explained by the ratio of quantities of labour embodied in silver and corn (Petty 1662:42–3).

In this second model the specification of surplus depends upon exchange ratios between corn and other components of necessary consumption—a difficulty the significance of which Petty does not grasp. In the third model Petty provides greater analytical transparency to the notion of surplus by explicitly assuming a single homogeneous necessary consumption good, ‘Corn’—almost certainly the first statement in the history of economics of a ‘corn model’ assumption, in which one sector produces an output homogeneous with its input: an aspect of Petty’s thought to which Sraffa drew attention.⁴ The third model, like the first, is concerned with the social division of labour, but Petty here distinguishes between *actual* social labour devoted to production of necessary consumption and *necessary* social labour for that purpose, and also points to the role of labour productivity variations in altering the ratio of necessary to total labour (Petty 1662:89–90).

In all this, the causation is clear enough. Necessary consumption per capita and labour productivity in production of necessary consumption determine surplus necessary consumption output per worker in that production, and the ratio between necessary labour and total population. Taken in conjunction with the proportion of the population actually employed (or potentially employable) and total population, society’s actual (or potential) surplus labour is determined. Taxes and rents are conceived, though not very rigorously, as realizations of surplus as income. A substantial part of Petty’s economics proceeds from this foundation, dealing in particular with productivity and population growth, and the composition of surplus labour activities. Much of his writing is devoted to elaborate schemes of social reform, designed to maximize total employment and surplus labour, and effect what he perceives to be a desirable allocation of surplus labour. Petty’s political arithmetic was designed to give quantitative empirical expression to these concerns, as well as other politico-economic matters which concerned him (*vide* Chapter 3).

In Petty the systematic causation running from necessary consumption and labour productivity to commodity and labour surpluses is clear. He also has the conception of taxes and rents as income realizations of surplus but provides no very systematic or comprehensive explanation of this latter causation. Indeed, Petty’s dominant concern is to move on to a rather grandly conceived normative purpose: the reform of surplus labour employment and related matters. In Cantillon’s *Essai sur la Nature du Commerce en Général* (1755), theoretical explanation is primary, and causation from surplus to income categories which are unique to distinct social classes is much more systematic and transparent—save for one particularly telling ambiguity discussed in section 7.3 below.

The analytical focus is again upon agriculture though manufacture, and hence intersectoral relations, play a more systematic role than in Petty’s theory. The ‘rural’ sector of the economy *includes* production of manufactured inputs to agricultural production, so that this sector is

equivalent to a vertically integrated subsystem which produces an agricultural surplus for cities—though there is some equivocation as to the precise significance of city manufacture for rural production and necessary consumption. To the extent that rural production is vertically integrated, intersectoral relations between ‘country’ and city are exchanges of basics for non-basics, in the sense of Sraffa (1960:6–10, 47–55, 89; cf. Garegnani 1984:313–23).⁵ The necessary consumption to be netted out in arriving at agricultural surplus is clearly identified with customary consumption (*les choses nécessaires à la vie, suivant le consommation de notre Europe*), which in particular is geographically variable as to scale and composition.⁶

The ‘circulation’ of commodities between country and city is likewise explicit and systematic—an analysis not evident in Petty. Cantillon sketches how the division of the agricultural product between farmers and landowners, and exchange with cities, results in half the agricultural product finding its way to cities in exchange for city product of some kind, which returns to the country. The division between necessary labour and total employment and population is analysed in very similar terms to Petty, Cantillon empirically estimating a social rate of surplus (average surplus labour time worked per capita in proportion to average necessary labour time worked per capita) for France of 100 per cent. Cantillon goes beyond Petty in complementing the analysis of necessary and surplus labour with an analysis of the allocation of land between necessary and surplus uses—though this is actually a theory of population size, with the proportion of a society’s land which is devoted to surplus uses an independent variable, subject to certain constraints.⁷ With regard to causation, rural surplus per worker is determined by customary consumption and (implicitly) labour productivity, which, together with the proportion of the population available for employment, determine surplus labour per worker and per capita. Given population—which is primarily determined by the capacity of available land to generate necessary consumption, after part has been deducted for surplus uses—total (potential) surplus labour is also determined. Surplus is realized in income form essentially as rents and taxes, its commodity composition being explained by the mode of living of landlords and the nobility, as well as the economic demands of the state. The telling ambiguity mentioned above concerns the status of the class of ‘undertakers’ (*entrepreneurs*), which includes farmers—as distinct from the other two fundamental classes in Cantillon’s tripartite class structure (landlords, hired labour)—and so, the ambiguous status of entrepreneurial incomes (*vide* Chapter 5).

Turning directly to the influence of Petty upon Cantillon, we know from Cantillon’s own hand that he had knowledge of Petty’s writings: on three occasions in the *Essai* Cantillon explicitly refers to Petty, with regard to value parity, population growth and velocity of circulation of money.⁸ Now Cantillon does not praise Petty in any of these references; nor does Cantillon

acknowledge any intellectual debt to Petty. This is not of great significance. Indeed, a confession of intellectual debt would no more decide the issue than a denial, implicit or otherwise: it would still be necessary to assess the content of the two writers' economics in order to judge independently how substantial the common elements are. Furthermore, it would be ahistorical to expect Cantillon to acknowledge his intellectual debts in the accepted manner of modern scholarship. Finally on this matter, Cantillon's critical and neutral references to Petty should be judged in the context of *all* of his references to other writers, especially economic writers: Cantillon praises no one and acknowledges no intellectual debts.⁹ If the implication to be drawn from his references to Petty is that Cantillon had no substantial debts to Petty, then consistent application of this procedure would imply that Cantillon had no substantial intellectual debts to anybody. In short, Cantillon's references to Petty do not do justice to the debts which may be inferred from an examination of the relevant texts.¹⁰ These comments should not be read as necessarily suggesting that Cantillon's expressed views on economic writers are spurious—rather, they indicate how he chose to limit the nature of his references to other writers.

As to the common substantive elements of their economic views, four subjects may be mentioned in particular.

- 1 Most important is the common analysis of the social division of labour between necessary and surplus employment. The similarities here are striking and analytically the two approaches are essentially the same, though Cantillon is much more successful in being able to locate the analysis within a wider account of rural surplus, income distribution and intersectoral relations (sections 3.1 and 5.1). This is analytically the most fundamental common element because, together with the commonly held surplus theory of rents, it amounts to the kernel of the formation of the surplus approach.
- 2 For both writers, the question of how surplus labour ought to be used—the desirable composition of surplus activities and output—naturally follows from the purely explanatory theory of the determination of the social division of labour; and here again there are striking similarities. Petty's preference is for improved transport infrastructure, mining and metal manufacture, improvement of land and especially net export production for the accumulation of money. Like Petty, Cantillon favours employing surplus labour to produce relatively durable commodities—mining and metal manufacture for tools and instruments of production, durable (luxury) consumption goods, and again, especially accumulation of gold and silver. Similarly, they both allow that if a residual of surplus labour remains after these priorities have been met, then it may be devoted to certain luxuries. Consider in particular the following two parallels:¹¹

Petty

if Money be taken [by taxation] from him, who spendeth...upon eating and drinking,...and...transferr'd to one that bestoweth it on Cloaths;...the Commonwealth hath some...advantage; because Cloaths do not...perish so soon as Meats and Drinks:...if the same be spent in Furniture...the advantage is yet...more; if in Building...yet more; if in improving of Lands; working of Mines, Fishing, etc. yet more; but most of all, in bringing Gold and Silver into the Country: Because those things are not only not perishable, but are esteemed for Wealth at all times, and everywhere: Whereas other Commodities which are perishable, or whose value depends upon... Fashion; or which are contingently scarce and plentiful, are wealth, *but pro hic & nunc...*

computation must be made, what part of those who are fit for Labour...are able to perform the work of the Nation in its present State and Measure... It is to be considered, whether the remainder can make all or any part of those Commodities, which are [currently] Imported from abroad; which of them, and how much in particular: The remainder of which sort of People (if any be) may safely and without possible prejudice to the Commonwealth, be employed in Arts and Exercises of pleasure and ornament...

Cantillon

if [surplus labour]...were employed to produce permanent commodities, to draw from the Mines Iron, Lead, Tin, Copper, etc. and work them up into Tools and Instruments..., bowls, plates and Other useful objects much more durable than earthenware, the State will not only appear...richer... but will be so in reality. It will be so especially if these people are employed in drawing from the Earth Gold and Silver which Metals are not only durable but so to speak permanent,...which are generally accepted as the Measure of Value, and which can always be exchanged for any of the necessaries of Life: and if these Inhabitants...draw Gold and Silver into the State in exchange for... Manufactures and work [exported]..., their labour will be equally useful...

In a great State, [all surplus labour]... cannot be employed to make articles for foreign consumption.... If enough employment cannot be found to occupy [surplus labour]...upon work useful and profitable to the State, I see no objection to encouraging employment which serves only for ornament or amusement ... How little soever the labour of a Man supplies ornament or even amusement in a State it is worthwhile to encourage it unless the Man can find a way to employ himself usefully.

- 3 Petty had raised the idea of finding a natural par of value which would reduce the value of land and labour to a common denominator. Cantillon took up this notion, though in a manner much superior to Petty's confused and deeply flawed thoughts on the subject. This is discussed in detail in Chapter 6. Suffice it to say here that Cantillon's

par is concerned with determining the quantity of land directly and indirectly required to ‘reproduce’ the labourer; that is to say, the quantity of land required to produce the necessary (customary) consumption of the worker and sufficient children (allowing for mortality rates) to ensure that the worker is replaced. The value of labour in terms of land is just this quantity of land. This evidently was inspired by Petty’s par (see note 9); but is differently construed. No one other than Petty and Cantillon pursued this notion—notwithstanding Cantillon’s curious reference to Locke, Davenant and other English writers.

- 4 The concept of the velocity of circulation of money was invented by Petty and it became a fundamental element of Cantillon’s monetary analysis. However, as mentioned above, Cantillon evidently took his point of departure from Locke, who, while indebted to Petty’s monetary thought, himself made valuable contributions to monetary theory. So in terms of cumulative development, this is a case of Petty-Locke-Cantillon. This is taken up in section 7.2 below.¹²

Apart from these major common substantive elements, there are two common methodological elements which are worthy of mention—though it is not possible to say conclusively that Cantillon derived them from Petty.

- 5 Both make conscious use of abstract method to isolate systematic causes or forces from random or contingent ones—a pioneering scientific attitude which becomes characteristic of classical economics and is presumably generic to science as such. In Petty this is most explicit with respect to theorizing about value: labour embodied is ‘the foundation’ of value, but in ‘the superstructures and practices...there is much variety and intricacy’; a variety of ‘contingent Causes’ operate upon prices, as well as the ‘permanent Causes’ which concern Petty; there are ‘intrinsic’ and ‘extrinsic and contingent’ determinants of price, the former being pertinent to markets ‘at a midling pitch’ (Petty 1662:43–4, 49–51, 90; Hull 1899: vol. II, 625–6). Perhaps the most striking particular example of abstract method in Petty is the corn model in the *Treatise* (Petty 1662:89; and more generally, section 3.1 above). Similarly, Cantillon abstracts from ‘accidental circumstances’, and elsewhere ignores ‘variations in Market prices...from the good or bad harvest...extra-ordinary consumption...or other accidents, so as not to complicate my subject, considering only a State in its natural and uniform condition’; and in monetary analysis Cantillon again avoids ‘accidental causes’: ‘I confine myself always to the simple views of commerce lest I should complicate my subject, which is too much encumbered by the multiplicity of the facts which relate to it.’¹³

In a formal sense, Petty’s distinctions (permanent/intrinsic versus contingent/extrinsic) prefigure the classical method in price theory; and in

Cantillon this becomes entirely explicit and quite substantive, though bereft of capitalist competition in any meaningful sense (Cantillon 1755:11–13, 27–31, 47–53, 59–65, 117–21, 199; section 7.3 below). In fact, Cantillon uses the term intrinsic values, distinguished from market prices, to describe prices with properties similar to what would later be more commonly known as natural prices (cf. Chapter 6, note 2). It may be added that a subtheme to this use of abstract method—a subtheme which cannot be indicated by quotation but only by the whole shape of texts and long passages of argument—is the common use of a sequential method. This is tacit and submerged in Petty’s thought (section 3.1 above) but explicit and very transparent in Cantillon, particularly with respect to population, real wages and velocity of money. The treatment of real wages as exogenous in the analysis of economic or social surplus in Petty, Cantillon and classical economics in general, is just the most striking example of this kind of sequential procedure and the associated ‘separation’ of various parts of the economic phenomena to be explained, with complicating factors and interactions treated at a lower level of abstraction—in contrast to the general equilibrium method of the later marginalist theories (*vide* section 1.1 above and section 10.2 below; Garegnani 1984:292–9).

- 6 The second common methodological element is a certain ‘objectivism’ which informs the Petty-Cantillon economic inquiries and also is an enduring element of the classical tradition (*vide* sections 3.5, 4.2–4.3 above). This is particularly evident in their production-based theories of value which relegate subjective factors to a merely random influence. Related to this, particularly in Cantillon, is the theorizing of consumption as a social phenomenon grounded in objective social conditions (as well as geography, climate, and so on) rather than as individual and essentially idiosyncratic (except for its logical structure), in the manner of marginalist theory. As has been shown in Chapter 4, in Petty’s thought this objectivist methodological element has deep roots and derives from the strong influence of Hobbes’s views on mathematics and language.¹⁴

It is evident that some of the most fundamental elements of Cantillon’s theory of production and distribution are also basic elements of Petty’s economics: the role of agriculture as the sector producing necessary consumption goods; the role of agricultural surplus in therefore determining the social division of labour; the allocation of surplus labour; as well as other subsidiary matters discussed above. Cantillon could not have acquired a surplus approach from Boisguilbert, Davenant, Halley, King, Locke, Newton or Vauban because none of them had such a theory. Furthermore, prior to Cantillon it is improbable that any writer other than Petty had an economic analysis which could reasonably be described as a theory of

surplus. With all the fundamental elements peculiar to Petty which are to be found also in Cantillon, and Cantillon's explicit references to Petty, it is not plausible that Cantillon nevertheless did not derive from Petty his basic treatment of rural surplus and his understanding of its fundamental role, as well as the associated approach to the social division of labour, which Petty had modelled in the *Treatise* and employed in other writings.

This does not diminish the extent of Cantillon's achievement. The *Essai* surpasses Petty's writings in analytical structure, theoretical substance and formal elegance. Cantillon's analysis of the allocation of surplus labour is analytically superior and much more systematic. It pinpoints the dominant role of the landowning class in determining that allocation and there is a clear statement of class as a correlate of distribution. Only in very limited ways had Petty dealt with the relation between prices and intersectoral exchanges. Cantillon's explicit treatment of intersectoral relations between rural surplus and city manufacture—and the related notion of prices required to ensure a given distribution of output—are improvements upon Petty's economics which were of vital importance for the formation of classical economics. Petty's economics is systematic in the sense that various general principles consciously inform and underpin his writings. Cantillon's economics transcends this: it is a *system* in the sense that it aims to be a general theory of economic society embracing production, distribution, value, allocation—and all this integrated with monetary analysis and international economic relations.¹⁵

That Cantillon made a substantial contribution to Quesnay's economics—and that the latter employed a surplus approach—is more widely recognized and documented, if not fully understood, and there is no intention to renegotiate all that ground in detail here. Meek suggests that Marx was the first writer on the history of eighteenth-century economics to note Cantillon's influence upon Quesnay. Jevons also drew attention to fundamental debts of Quesnay to Cantillon, pointing out that this had been acknowledged with regard to the role of agricultural surplus by Quesnay himself in *Grains* and by his posthumous editor, Eugène Daire. More will be said about these connections below, but it is sufficiently evident that the fundamental element which links Quesnay's economics back to Cantillon is the primary causal role of agricultural (rural) surplus in distribution of income and intersectoral exchanges between agriculture and manufacture. Subsequent to Daire, Marx and Jevons, a host of writers have drawn the same or similar connections.¹⁶

In a curious if indirect manner, Cantillon's *Essai* was the catalyst for the Marquis de Mirabeau's first encounter with Quesnay in July 1757, which in turn was the seed out of which the Physiocratic movement developed. As was indicated in the introduction to Chapter 5, Mirabeau had possession of the manuscript of the *Essai* and intended to publish it, along with an extended commentary of his own. When the manuscript was reclaimed by

the rightful owner and published verbatim in 1755, Mirabeau instead wrote his *L'Ami des Hommes* (1756). It was this work which led to his meeting with Quesnay. Notwithstanding his later acknowledgement of Cantillon, it was at this initial meeting that Quesnay delivered an attack upon Cantillon which is somewhat evocative of Cantillon's earlier treatment of Petty in the *Essai*. Quesnay told Mirabeau that in construing population as the cause of wealth, he was putting the cart before the horse (implying an inversion of the correct causation); and that the writers he had drawn upon, notably Cantillon, were fools (Meek 1962:15–18; Higgs 1931b:381, 387). Since *Grains* was written in 1756, the economic writer who was a fool in July 1757 in Quesnay's view, had been regarded the previous year by Quesnay as recognizing fundamental truths (see note 16)—and Quesnay published this latter view four months after the Mirabeau encounter, in November 1757 when *Grains* appeared in print.

This is a strange episode, because Quesnay imputes to Cantillon a doctrine which he does not espouse; but the accusation nevertheless seems to have been accepted in much of the secondary literature.¹⁷ The irony is compounded by the fact that Quesnay essentially shares Cantillon's actual view: that wealth determines population. Cantillon opens the *Essai* with the statement that wealth (*la Richesse*) is nothing but 'the Maintenance, Conveniencies, and Superfluities of Life'; and he presents an unambiguous theory in which the quantity of customary consumption output (essentially determined by the quantity and productivity of available land for that production), along with customary subsistence per capita, determine population. It is true that in the chapter following this in the *Essai* Cantillon argues that the more *labour* (not population) in a state the more 'naturally rich' it may be considered; but this is in the context of using *surplus* labour to produce above-subsistence consumption. In other words, the more surplus labour, the more wealthy a nation is.¹⁸ This is entirely consistent with both the opening definition of wealth, which includes convenience and superfluity, and the theory of population which precedes it. Neither imply the 'populationist' doctrine. Whatever may have been Mirabeau's view on the subject—and whatever may have been his perception of how he acquired this view—it was Cantillon's view that population is determined by, and is not a determinant of, wealth. This is a view with which Quesnay concurs; though in Quesnay this is placed in a dynamic context of economic and population growth, in contrast to Cantillon's static analysis of population:

Rural inhabitants...multiply proportionately to the wealth which sustains agriculture and agriculture augments this wealth.
(Quesnay 1756:22)

It is cultivation...which is the most fertile source of wealth and the most important mainstay of population... Population increases much

more through revenue and expenditure than it does through the propagation of the nation itself.

(Quesnay 1757a:84)

The population of a state increases in the proportion that the nation's revenue increases...

(Quesnay 1757b:88)

One would imagine that the great wealth of a state is obtained through an abundance of men; but men can obtain and perpetuate wealth only by means of wealth... In order that the land should yield a revenue, work in the countryside must render a net product over and above the wages paid to the workmen, for it is this net product which enables the other classes of men who are necessary in a state to subsist.

(Quesnay 1759:19n.–20n.)¹⁹

On the role and significance of agricultural or rural surplus in general, Quesnay's most notable advances beyond Cantillon—apart from the subject of accumulation (discussed below)—are the more analytically clear and explicit treatment of intersectoral relations between the rural sector and manufacture; 'reproduction' (replacement of necessary input) with a surplus, with only the latter freely disposable; and taxes as a share of net revenue or surplus product. Of course, much of this advance is embodied in Quesnay's remarkable *Tableau* (1759); though as in Cantillon, the unique significance of rural production as the only source of surplus remains.

7.2 MONETARY CIRCULATION

Another aspect of the Petty-Cantillon-Quesnay nexus which is worthy of a brief separate treatment here is the relation between monetary analysis and the theory of surplus and income distribution. It is yet another striking feature of Cantillon's theoretical achievement in the *Essai* that the theory of rural surplus and intersectoral (country/city) exchange—that is to say, Cantillon's theory of the economic reproduction of commodities and labour—is integrated with an analysis of how the associated 'circulation' of commodities (*La circulation et le troc des denrées et des marchandises*) is effected by means of exchange between money on the one hand, and commodities and labour on the other. This is precisely what 'monetary circulation' (*la vitesse ou la lenteur de la circulation de l'argent, dans le troc*) means for Cantillon (1755:46, 138). His detailed and extensive treatment of velocity (that is, money demand) is thus integrated with the theory of production, distribution, consumption and intersectoral allocation. Velocity is a function of income distribution and the degree of country/city exchange (1755:121–59). As compared with Petty, in Cantillon surplus analysis

becomes much more systematically an analysis of intersectoral circulation of commodities. Similarly, Petty does not systematically link the velocity of money to reproduction and intersectoral circulation of commodities; but in inventing velocity, and in particular, linking it to income distribution, Petty makes an important beginning, with the latter aspect having definite resonances in Cantillon's contribution.²⁰ Nevertheless, Cantillon was almost certainly more directly building upon Locke; who in turn built upon Petty's monetary analysis, including the link between velocity and economic classes. But Locke does not derive velocity from a determinate account of income distribution—as Petty had suggested and Cantillon most certainly executed (Locke 1691:33–44; Harrison and Laslett 1971:207–8). Cantillon's analysis stands out for being so early an integration of monetary theory and production and distribution, in the framework of a surplus approach.

Quesnay's *Tableau* is a striking formal expression of the analysis of monetary circulation and the reproduction of commodities which Cantillon had undertaken more informally. Indeed, in this particular instance Quesnay as much as acknowledges his debt to Cantillon with respect to the central circulation idea (note 16); though it is Quesnay who introduces the nomenclature of 'reproduction' to articulate this approach (1757c:105; 1759:20n.; also 1757b:98–9; 1759:i–ii, ixn., 1n., 3–4, 6n., 8, 13n., 17n., 21 n.):

the wealth which constitutes the costs of agriculture differs greatly... from industrial wealth.... A nation subsists only through perpetual consumption and reproduction; the wealth which maintains a nation in being consists only in perpetual reproduction; thus sterile [that is, industrial] wealth...is destroyed by consumption itself, and is unable, unless it is reproduced through other wealth, to perpetuate the existence of men and the successive existence of their wealth.

The more wealth a nation possesses for the purpose of enabling wealth to be annually regenerated, the fewer men does this annual reproduction employ, the more net product it yields, and the more men the Government has at its disposal for services and public works; and the more wages there are to enable them to subsist, the more useful are these men to the state by virtue of their occupations, and by virtue of their expenditure, which causes their pay to be brought back into circulation.

With regard to monetary circulation, the relation between monetary flows, expenditures and intersectoral (and inter-class) allocation and exchange of commodities and labour was quite clearly grasped by Quesnay before his invention of the *Tableau*—indeed, to some extent intimated in *Fermiers* (Quesnay 1757a:77; 1757c:104; also 1756:23–4; 1757a:76, 87; 1757b: 92–3; 1757c:102–3):

A husbandman who sells his corn to a merchant is paid in money. With

this money he pays the proprietor, the *taille*, and his servants and workmen, and buys the commodities which he needs. The merchant who sells the corn to a foreign country, and buys another commodity from it,...resells on his return the commodity he has brought back and with the money he receives once again buys corn.

It is necessary that the proprietors of landed property, who receive ...revenue, should spend it annually so that this kind of wealth is circulated among the whole nation. Without this circulation the state would be unable to subsist... The proprietors are useful to the state only through their consumption...and if their revenue was not circulated among those in the remunerative occupations, the state would be depopulated.

But it is not a matter of controversy that the *Tableau* was a triumph of formal analysis of these (and other) matters, which unambiguously transcends the achievements of Quesnay's two predecessors. In all this, Cantillon and Quesnay link money balances to the requirements of the production system and industry, in contrast to modern orthodox monetary analysis which is so largely restricted to 'household' money demands. A brief statement of the monetary aspect of the *Tableau* may be offered in conclusion (Quesnay 1759:17n.; also iii-v, 3, 18n.-19n.; Meek 1962:283-6; Eltis 1984:23-5):

money is an active and really profitable form of wealth in a state only so far as it continually returns wealth for wealth, because money in itself is only sterile wealth. It possesses no utility for a nation other than its employment in sales and purchases, and in the payment of revenue and taxes, which puts it back into circulation in such a way that the same money continually and by turns meets these payments and fulfils its function in trade.... Although taxes are paid in money, it is not money which provides them: it is the wealth annually regenerated from the land. It is in this renascent wealth, and not as the vulgar believe in the nation's money stock, that the prosperity and power of a state consist.

7.3 CAPITAL AND PROFITS

As was indicated in section 3.4, the term 'capital' embraces two notions which are related but conceptually distinct: on the one hand, 'capital' can refer to produced means of production, distinguishable from labour and non-reproducible natural resources as means of production; on the other hand, 'capital' can refer to a right of ownership in produced means of production which carries with it a right to a definite stream of income—profits, distinguishable from wages and rents. The latter notion, which has embedded

within it a particular kind of social and property system, obviously presupposes the former—at least so long as necessary consumption goods (necessary ‘wage goods’) are treated as produced means of production (see Chapter 6, note 16); but the former may exist without the latter.

It is particularly important to keep this distinction in mind when examining developments in economic theory from the seventeenth to the eighteenth century, a period in transition from pre-capitalist to capitalist socio-economic organization. In Petty there are references to both produced means of production (albeit predictably primitive) and ‘profits’; but neither notion of capital really enters his theoretical framework. Though present in Petty’s economics, the limited significance of the former is evident in particular from its minor place in the uses of surplus labour. The latter notion of capital has no place in his theory—a completely pre-capitalist economy is being theorized, with profits only intruding into the Petty texts in an incidental and unsystematic manner. Whether or not there was anything resembling a capitalist social class in Petty’s England, it did not find its way into Petty’s thought (*vide* Chapter 3, esp. sections 3.4, 3.6).

With regard to Cantillon, produced means of production take on a more distinct significance both as inputs to production and as outputs (use of surplus labour). But there remains no distinct role for a manufacturing *sector* which produces necessary inputs to production: manufactured inputs to agriculture effectively are submerged within a *de facto* vertically integrated rural sector, and country/city exchange in real effect is exchange of rural surplus for manufactured non-basics.²¹ In the case of both writers, the significance of produced means of production can be gauged from the uses of surplus labour, with accumulation of gold and silver occupying the kind of position which capital accumulation would occupy in mature classical economics. With regard to capital in the second sense and capitalist social relations, they are not completely absent from Cantillon’s theory, as in the case of Petty. Rather, there is a deep ambivalence: Cantillon seeks a theoretical grasp of a social economy in transition towards at least distinct and significant elements of capitalism—seeks and does not succeed (section 5.2 above). There are three aspects of Cantillon’s theory in which this becomes strikingly apparent.

The first concerns the *status of entrepreneurs*. In the Cantillonian social economy there are three fundamental classes of economic agents: landowners, hired labourers and entrepreneurs—farmers are rural entrepreneurs. The distinction between hired labourers and entrepreneurs is that the latter earn uncertain incomes, due to either uncertain wages (*gages incertains*) or uncertain prices for which they sell their commodities or services. Furthermore, some of these entrepreneurs have ‘capital’ (*fonds*), some do not; and at least some entrepreneurs do not labour at all (Cantillon 1755:39–41, 43–57, 87). The difficulty with Cantillon’s conception of the entrepreneurial class is that, at the same time, it captures a species of

labouring activity and some incipient elements of capitalist activity, thereby unsatisfactorily conflating two qualitatively distinct economic functions and income categories (profits as quasi-wages). In one respect in particular, this difficulty goes to the heart of Cantillon's economics: the question of whether farmers' incomes are a share of the rural surplus or reflect a part of necessary input (in particular, necessary consumption) for agricultural production. Certainly, in his one clear statement on the matter Cantillon (1755:7) identifies the realization of the surplus with landowners' rents and the state's tax revenues, so excluding farmers' incomes; but this implied treatment of farmer-entrepreneurs as labourers certainly could not be applied to all those placed by Cantillon in the entrepreneur category—a point he was forced to acknowledge himself (see the third point below).

The statement clearly identifying realization of rural surplus with landowners' rents plus tax revenues occurs at the very beginning of the *Essai* and is worth quoting at length:

Supposing...that the Land of a...country belongs to a small number of persons, each Owner will manage his Land himself or let it to one or more Farmers: in this case it is essential that the Farmers and Labourers should have a living whether they cultivate the Land for the Owner or for the Farmer. The overplus of the land [*le surplus du produit de la Terre*] is at the disposition of the Owner: he pays part of it to the Prince or the Government, or else the Farmer does so directly *at the Owner's expense*.²²

As for the use to which the Land should be put, the first necessity is to employ part of it for the Maintenance and Food of those who work upon it and make it productive: the rest depends principally upon the Humour and Fashion of Living of the Prince, the Lords, and the Owner: if these are fond of drink, vines must be cultivated; if they are fond of silks, mulberry-trees must be planted and silkworms raised, and moreover part of the Land must be employed to support those needed for these labours; if they [that is, the Prince; Lords and Owners] delight in horses, pasture is needed, and so on.

(Cantillon 1755)

Pendergast (1991: esp. 420 n. 1, 424–8) disputes that Cantillon excludes farmers' incomes/profits from the social surplus, and also argues that some of Cantillon's discussions of entrepreneurship suggest a theory of profits earned in proportion to capital employed. Without going into considerable detail here, the following points may be noted: (a) the notion of intrinsic values as prices which equal costs would *alone* suffice to explain Cantillon's propositions about entrepreneurs' prices covering interest costs, if they borrow (*vide* sections 5.2 and 5.3). The authentic test of whether Cantillon has a notion of profitability of capital is whether he has a conception of

prices including profits on capital *in the absence of borrowing*. He does not; (b) entrepreneurial incomes as including a return for the risks and difficulties of entrepreneurship, rather than a pure remuneration for capital advanced, is the most plausible explanation of Cantillon's discussion of profits—and sits more comfortably with his discussions of wage relativities (Cantillon 1755:19–23); (c) it should be recalled that Cantillon has a notion of multiple customary consumption patterns in relation to the various classes of workers and (at least some) entrepreneurs (section 6.2, esp. nn. 10 and 11). The mere observation that some farmers live 'comfortably' (Cantillon 1755:123) in and of itself is of no significance for the issue of the distribution of the surplus; (d) if correct, Prendergast's conclusions would place Cantillon in advance of Quesnay on these two issues and closer to Turgot and Smith—a claim as much remarkable as it is untenable on the currently available textual evidence. Prendergast provides no convincing alternative textual evidence to Cantillon (1755:7). Walsh (1987: vol. I, 319) is likewise fanciful in suggesting that Cantillon's entrepreneur-farmers embody a conception of capitalist agricultural production and a (uniform) rate of profit.

The second aspect deals with the '*independence*' of landowners. Cantillon begins the *Essai* with a tripartite division of economic agents into landowners (including 'the Prince'), farmers and hired labourers, thereby tacitly pointing to the economic primacy of agriculture in his theory of production and distribution; though, as just indicated, this is later extended to the more general landowners/entrepreneurs/hired-labourers division. The fact that the entrepreneur category does not capture a distinct capitalist class points also to the socio-economic primacy of the landowners in Cantillon's conception of contemporaneous socio-economic organization. This dominant position of landowners finds pervasive expression in the *Essai*. For example, the consumption patterns of the Prince and landowners dominate the determination of outputs, employments and land use, both directly via their control of surplus and via a kind of imitation effect upon the consumption of the lower classes; landowners' consumption patterns are also the primary source of variations in demand and thereby market prices, as well as being a key determinant of population size via the proportion of total land which is used for surplus purposes.²³ But this socio-economic primacy finds most striking expression, and is given an ideological complexion, in Cantillon's doctrine that 'none but the Prince and the Proprietors of Land...live independent'; 'all the [other] classes and inhabitants of a State live at the expense of the Proprietors of Land'. The basis for this claim is that if the landowners withdrew their land from production there would not be subsistence for any of the population. But the conclusion does not follow: 'consequently all the Individuals are supported not only by the produce of the Land which is cultivated for the benefit of the Owners *but also* at the Expense of these same Owners from whose property they derive all that they have' (emphasis added). With agricultural

consumption necessary for subsistence, the social fact of private landownership makes the population socially dependent upon the landowners; but this does not mean that the population in any meaningful sense lives at the expense of the landowning class. Indeed, Cantillon himself observes that land would be 'useless' to owners if it were not cultivated; so 'the Proprietors have need of the Inhabitants as these have of the Proprietors'. But at the economic (production) level, what the inhabitants 'have need of is land, not landowners (just as they would have need of other, produced means of production, not capitalists). Cantillon confuses a technical and a social relation: as a matter of technical fact, land is necessary to the production of necessary social consumption; but private landownership by a few is merely a social fact which is not 'necessary' in the same sense, even if it has the historical basis which Cantillon suggests at the beginning of the *Essai* (Cantillon 1755:3–7, 15, 41–7, 123, 137; cf. Marx 1967: vol. I, 83). With or without its ideological element, the unique independence of landowners is a pre-capitalist doctrine par excellence.

The third point deals with *income-earning, non-land wealth*. Whatever the ideological flaws in the independence doctrine, Cantillon himself had an uneasy, self-conscious sense that the doctrine was compromised by the existence of large-scale rentiers and, more generally, large-scale concentrations of income-earning, non-land wealth, which gave an independence similar to that of the landowning class. This is the most uncomfortable intrusion of distinctly capitalist elements into the argument of the *Essai*:

It is true, however, that if some person on high wages or some large Undertaker [*Entrepreneur*] has saved capital or wealth, that is if he have stores of corn, wool, copper, gold, silver or some produce or merchandise in constant use or vent in a State,...he may be justly considered independent so far as this capital goes.

...as the Proprietors of money lend considerable amounts for which they receive interest...the sums due to them usually exceed all the money in the State, and they often become so powerful a body that they would in certain cases rival the Proprietors of Lands if these last were not often equally Proprietors of money, and if the owners of large sums of money did not always seek to become Landowners themselves.²⁴

Here Cantillon recognizes a species of economic agent, and associated income category (interest in particular, as well as capital gains) and income-earning wealth (money capital in particular), which do not fit comfortably into the landowners/entrepreneurs/hired-labourers trichotomy; yet this class possesses a socio-economic independence or dominance akin to that provided by land wealth. That these agents acquire land is an entirely contingent fact and therefore irrelevant to Cantillon's problem. It must be

said that they are not exactly the capitalists of mature classical economics. Nevertheless, we see here a distinct class whose income arises from neither land nor labour, and which has the capacity to acquire a socio-economic dominance rivalling that of the landowners. Cantillon struggles to fit this 'new class' into his theory. He is uncomfortable with it and resistant to the significance of this category of non-wage income. There is a double irony here. While some have lauded Cantillon's treatment of entrepreneurship as an important precursor of later non-Walrasian forms of marginalism (for example, West 1980:25–7), in truth it points to the essentially pre-capitalist character of the world that his theory inhabits. Second, the intrusion of the rentier into Cantillon's theory naturally would have forced itself upon Cantillon's mind because he was himself a very prominent example of just this phenomenon of independent income based upon money capital, not land (*vide* Murphy 1986). To this extent, Cantillon's theory of economic society could not comprehend the economic basis of Cantillon's own income and socio-economic position.

It is evident from the foregoing that Petty's theory is entirely pre-capitalist, whereas Cantillon's theory, though essentially pre-capitalist, has a certain transitional quality, with some embryonic elements of a capitalist economy intruding into it but finding no very comfortable place there. What of Quesnay? Without doubt he develops in his writings a definite conception of capital employed in the production system as 'advances' prior to the resulting output, both in agriculture and manufacture; though given the special role assigned to agriculture as the only surplus-producing sector, it is natural that he concentrates on the significance of capital advances in that sector. In fact, there is a clear enough conception of capital so understood even in *Fermiers*, the earliest of Quesnay's economic writings (1756:17–18; also 1–2, 7–8, 10, 13–15, 21, 23):

The rich *farmer* employs and maintains the peasant. The peasants provide the greater part of the necessities of life for the poorer people. Especially where *farmers* are lacking...peasants languish in poverty. The poor sharecropper cannot employ them, they abandon the country side or...live off...low grade crops which they cultivate themselves and from the harvest of which little else is left. Cultivation of wheat requires too much time and labour, they cannot wait two years before getting a crop.... *Farmers* themselves can only profit from the superiority of their method of cultivation, and from the good quality soils which they till, for they can only profit from the surplus of their harvest over their expenses.... But it is impossible to hope for success in [agricultural production]...so long as it is believed that agriculture only requires people and labour, and when no attention is paid to the security and the revenue of the funds which the husbandman has to advance.

Quesnay emphasizes the role of superior methods of agricultural production, embodied in relatively large-scale capital advances, in increasing the surplus-producing capacity of agriculture; and in later writings the necessity of capital inputs for this purpose is expanded upon and refined, especially in the *Tableau*, which so brilliantly analyses the reproduction (replacement) of capital together with production of a surplus. Furthermore, Quesnay's treatment of capital came to include a distinction between *avances primitives* and *avances annuelles* (roughly, fixed and circulating capital) and was connected with a treatment of capital accumulation and a theory of economic growth.²⁵ All these dimensions of Quesnay on capital transcend the achievements of Petty and Cantillon, who have none of this. Neither has a theory of the role of capital in production in any significant sense. Petty had a strong interest in the dynamics of growth (especially of population) and technical change but offered only fragmentary insights, rather than anything which could reasonably be called a growth theory. There is no role at all for growth in Cantillon's economics of production.

The above discussion pertains to the significance of capital in the first of the two senses distinguished in section 3.4 above and reiterated at the beginning of this section—produced means of production. What of the role in Quesnay's economics of capital in the second sense—an ownership right which returns a distinct income (profits)? On this issue there is more contention. While Quesnay's theory of capital is an unambiguous and profound advance (no pun intended!) upon his predecessors, the significance of his accompanying treatment of profits is more ambiguous. Petty has no systematic treatment of profits. It has also been shown above that Cantillon's treatment of profits gives no systematic role to profits as a functional income category, clearly distinct from wages and connected with capital, thereby largely confirming Marx's judgement that in Cantillon (as well as in Petty and others) wages and profits are 'amorphously combined' (Marx 1967: vol. in, 783–4). In fact, Marx makes a similar judgement with respect to Quesnay, though at the same time treating Quesnay's capital theory as a crucial watershed in political economy: 'the Physiocrats...regarded rent as the only surplus, and capitalists and labourers together merely as the paid employees of the landlord' (Marx 1968:162; cf. section 1.1 above). What became the subsequent orthodox interpretation of Quesnay on profits, indeed, is that farmers do not share in the social surplus, as is the case with Cantillon, discussed earlier in this section (Meek 1962:280, 297–312; also Chapter 5, note 17). But this view has recently been challenged by Vaggi (1987: esp. 121–64). There are very considerable difficulties in bringing forward substantial textual evidence from Quesnay's writings to support this view—as opposed to other, later Physiocratic writings (*vide* Gilibert 1989).²⁶ However, there is also a strong analytical point to Vaggi's argument: it is evident in Quesnay that farmers are the primary source of capital accumulation in agriculture; but this is incompatible with farmers not sharing in the surplus, since strictly speaking

the social surplus can be the only source for financing net accumulation, as distinct from mere replacement of capital (cf. Meek 1962:307–8, 384–5). In part, therefore, the choice is between logical consistency and textual evidence.²⁷ The latter seems more compelling and leads to the conclusion that Quesnay does not satisfactorily incorporate farmers' profits into his treatment of surplus; though Vaggi (1987) demonstrates the fundamental significance of price theory for Quesnay, as against earlier interpretations. Certainly, farmers' profits play a much more significant and systematic role in Quesnay than in Cantillon; but Quesnay has no conception of the rate of profit, as Vaggi (1987:13, 190–2, 193 n. 1) acknowledges. The key development with respect to the incorporation of the capitalist social economy into the theory of surplus and distribution is just this notion of a general rate of profit upon capital advanced in production—linking competition, prices and the income 'realization' of the surplus as rents and profits, as well as capital accumulation. Quesnay's economics certainly constitutes a fundamental development beyond Cantillon, as Cantillon's economics transcends Petty, though the magnitude of the breakthrough seems greater in the case of Petty-Cantillon than of Cantillon-Quesnay. But if a watershed in terms of the advent of a theory of the distribution of surplus in a competitive capitalist economy is to be nominated, it must be sought elsewhere.

7.4 THE FORMATION OF THE SURPLUS APPROACH

Petty seems to be the first writer in the history of economic theory to construct and employ notions and models which constitute a theory of surplus. This cannot be stated with certainty since that would require a knowledge of all other economic writers in all times and places prior to 1662. Nevertheless, for what it is worth, the present writer is confident that Petty's surplus theory is unique in seventeenth-century English economic literature—and would be very surprised if anything which reasonably could be called a surplus theory were to be found in other seventeenth-century or earlier literature. In any case, as this chapter has sought to show, Petty's thought was certainly the original and unique stimulus for further intellectual developments around the notion of surplus. In Petty's thought the surplus approach was primarily an instrument for investigating the division of labour within society and advancing a programme of reform. In the hands of Cantillon the approach became the basis for a systematic theory of economic society. The *Essai* is a theoretical treatise in a way which applies to none of Petty's writings. To draw a substantial line between Cantillon and Quesnay, such that Quesnay may be regarded as a decisive watershed, is problematic for reasons suggested immediately above. Recently there has been wider recognition of a prehistory to Quesnay's surplus approach, but the view persists of Quesnay as the crucial development. On the basis of the foregoing it should be concluded that Petty as originator and Cantillon as

first system-builder around this fundamental notion are the more decisive developments. Certainly, their original achievements seem greater than Quesnay's—there is too much of Cantillon in the latter to grant him a similar originality, though this judgement depends upon one's estimate of the significance of the *Tableau* as an intellectual innovation. This does not belittle the achievements of Quesnay, it merely shows that he has a pedigree—and without doubt the achievements and contributions of Petty and Cantillon have been underestimated. In any case, the foregoing chapters should establish that Petty-Cantillon-Quesnay form a cumulative tradition of thought which constitutes the central element in the formation of the surplus approach.

It may be inquired why, if the theory of surplus in principle is applicable to all pre-capitalist societies as suggested above, it should apparently happen to have found its first distinct expression in Petty? Why 1662 rather than earlier? This is not an easy question to answer and there is of course a contingent element in the formation. Nevertheless one suggestion may be made here.²⁸ Economic understanding only becomes problematic as economic organization comes to involve complex integrated systems (economic *systems* in the generic sense); so that a scientific effort is required in order to grasp their mode of operation. This renders explicable why so much of early economic explanation was so concerned with money and foreign trade: in a real sense there was an international 'economy' (integrated and interdependent economic relations) *before* there were national economies. In the seventeenth century London was more economically integrated with Amsterdam than it was with large parts of England. From one vantage point, Cantillon's analysis of circulation between city and country can be understood as an intellectual expression of the historical economic integration of city and country within the nation state—and, in particular, the dissolution of rural production as a self-contained (vertically integrated) economic organization. Of course, the same applies, with even greater force, to the more thoroughgoing intersectoral relations captured in Quesnay's *Tableau*. With regard to the theory of surplus, in a world of self-subsisting village societies, for example, the economics of surplus may well be more or less trivial, though not necessarily its sociology or politics. Similarly, in social systems in which extraction of surplus is via explicit and direct forms of coercion, untutored perception may suffice to render visible the mode of its operation. It is only when economies become more complex systems that a systematic intellectual or scientific effort is required in order to render their operation transparent. It may be that economic theory is in large part, though in a rough and ready way, coeval with capitalism because capitalism is coeval with the emergence of such systems (cf. Roncaglia 1988:163–5). But the coincidence seems far from complete; and the theoretical transition from Petty to Quesnay has reflected

within it as a major motif the transition towards capitalist socio-economic relations.

There is a potential danger in the search for ‘origins’: every idea has an intellectual pedigree, so that the inquiry can become a quest which would only end with the beginning of written human records—assuming that economic subjects are so primary as to have been discussed wherever and whenever humans kept written records. Nobody falls out of the sky. An approach to the history of economics which proceeds in this manner does indeed tend to become coeval with written human records, as the case of Schumpeter’s *History* (1954) testifies. We must employ a more substantial conception of economic theory in general and the theory of surplus in particular in order to avoid this fruitless regress: a conception of theory (and especially of the theory of surplus) as explanation of the causes governing the determination of abstractly conceived phenomena (surplus and its distribution and allocation in particular), intended to capture the systematic forces governing human economic organization. It is by means of this ‘strong’ conception of the history of economic theory that we arrive at the notion of Petty as founder of the theory of surplus in particular. This pre-capitalist historical origin of the surplus approach is also important from a contemporary vantage point because it reminds us that the theory of surplus is not limited in its applicability to capitalism. It is, for example, as much applicable to the theory of the socialist economy or of mixed regimes; though the principles governing at least the distribution and allocation of surplus (if not its production) are likely to be different.

WAGES, PRICES AND ECONOMIC SURPLUS IN STEUART'S *PRINCIPLES*

In the preceding chapters the central line of cumulative development in the formation of the surplus approach has been examined and clarified, with particular emphasis on its role as a theory of distribution. There is one additional figure involved in this formative development whose economics is worthy of close examination here: the undeservedly neglected James Steuart (1713–80). Steuart spent a considerable part of his life in continental Europe, especially France and Germany. He apparently began to pursue his interest in political economy in France at the end of the 1740s and in the 1750s, meeting Mercier de la Rivière, Montesquieu and probably Mirabeau. Books I and II of his *Inquiry into the Principles of Political Oeconomy*—which contain all the essentials of his theories of production, population, employment, distribution and value—were drafted in Germany by 1759, and the complete work (including books III–V on money, banking and public finance) was published in 1767. It is therefore contemporaneous with Quesnay and Physiocracy. It is a matter of obvious historical fact that, as a comprehensive statement of the infant science, Steuart's book was eclipsed by Smith's *Wealth of Nations* which makes no reference to the former work—and Smith may have deliberately chosen to ignore it in print. In a letter of 5 September 1772 to William Pulteney, Smith writes:

I have the same opinion of Sir James Steuart's book that you have. Without once mentioning it, I flatter myself that any fallacious principle in it will meet with a clear and distinct confutation in mine.

(Skinner 1966:xxxvi–xxxvii, xli, lii).

This chapter provides an interpretation of Steuart's theory of distribution and value. Little will be said here about the relation between Steuart's theory of distribution and, on the one hand, Petty-Cantillon-Quesnay; on the other, Adam Smith. Of course both comparisons beg to be addressed and they will be, in Chapter 9, where the wider domain of developments in the theory of distribution and value from 1662 to 1767 is examined.

8.1 COMPETITION AND PRICES

A widely employed notion running through Steuart's *Principles* is that the exchange values of things are regulated by the relation between demands and supplies, at least in modern commercial societies. With regard to labour, both money and real wage rates adjust in response to demand/supply imbalances: 'If...there be found too many hands for the demand, [the price of] work [that is, wages] will fall too low for workmen to be able to live; or, if there be too few, work will rise' (Steuart 1767:195; also 100–1, 147–8, 183, 282, 288–9).¹ Similarly the price of food or subsistence—'grain' is the proxy Steuart commonly focuses upon—adjusts to the proportion between output and demand: 'in a year of scarcity..., the...quarters [of grain] produced, will rise in their price' (Steuart 1767:254; also 129, 138, 203, 246–7, 347–8). More generally, with regard to commodities:

The value of things depends upon many circumstances, which however may be reduced to four principal heads: First, The abundance of the things to be valued. Secondly, The demand which mankind make for them. Thirdly, The competition between the demanders; and Fourthly, The extent of the faculties of the demanders.

(Steuart 1767:409).

(This conception will be further clarified below.) Similar demand/supply mechanisms can apply to the exchange value of gold and silver (Steuart 1767:418, 426); as well as to the rate of interest on money:

there is...a certain sum of money demanded by...borrowers, and a certain sum offered to be lent. The borrowers desire to fix the interest as *low* as they can; the lenders seek, from a like principle of self-interest, to carry the rate...as high as they *can*.

(Steuart 1767:449).

The resulting competition 'between borrowers and lenders occasions the rise and fall of the rate of interest' (Steuart 1767:451). The rate of foreign exchange is also so regulated (Steuart 1767:585–6). But these price adjustment mechanisms via demand and supply do not embody a universal principle:

What can increase [supply of] commodities, but a demand for them? If the demand be equal to the augmentation, there will be no alteration in the price.

Let extraordinary plenty increase [supply of] subsistence, it will naturally fall in price; but it may be hoarded up, and made to rise in spite of the plenty; it may be demanded from abroad...

Let the production of superfluities, not exportable, be produced by workmen whose branch is overstocked, prices will undoubtedly fall.

The same observations are true of a diminution in the quantity of commodities...

[With regard to an increase in the quantity of money,] nothing can be concluded as to prices, because it is not certain that people will increase their expenses in proportion to their wealth [that is, money]; and although they should, the moment their additional demand has the effect of producing a sufficient supply, prices will return to the old standard.

(Steuart 1767:354–5; cf. 344–5)

In the first instance, the behavioural underpinning of these demand/supply adjustment mechanisms is a particular notion of competition—or rather, an elaborate (perhaps too elaborate!) taxonomy of competition. Demand is ‘reciprocal’, entailing another demand on the other side of the exchange. Demand is ‘high’ or ‘low’ depending upon ‘the height of the price offered’, not ‘quantity demanded, or number of demanders’, the magnitude of ‘*quantity* demanded’ being related to ‘great’ or ‘small’ demand. High demand is associated with strong (price) competition among buyers; low demand, with strong price competition among sellers. In brief, these notions distinguish price competition and price adjustment in response to demand/supply interaction, from quantity adjustment in response to demand/supply interaction:

the consequence of a great demand, is a great sale; the consequence of a high demand, is a great price. The consequence of a small demand, is a small sale; the consequence of a low demand, is a small price.

But great, high, small, low relative to what? The norm in terms of which Steuart evaluates the operations of demand and supply is a situation wherein demand equals supply (at normal/expected magnitudes), and the price associated with that balance, with an intimation that demand plays the more autonomous role (at least under ‘regular’ conditions):

The nature of demand is to encourage industry; and when it is regularly made, the effect of it is, that the supply for the most part is found to be in proportion to it, and then the demand is commonly simple. It becomes compound from other circumstances. As when it is irregular, that is, unexpected, or when the usual supply fails; the consequence of which is, that the provision made for the demand, falling short of the just proportion, occasions a competition among the buyers, and raises the current, that is, the ordinary prices. From this it is, that we commonly say, demand raises prices.

Steuart’s more precise categories are intended to clarify ‘common’ understanding: ‘compound’ demand entails a situation of excess demand (or

supply) wherein competition adjusts prices; ‘simple’ demand, a situation of supply adjustment without price competition (Steuart 1767:151–4, 172–3).

A little further on in Book II Steuart provides an illustration of (supply) price versus quantity adjustments to demand conditions and the role of competition on (what would now be called) the supply side, introducing the further notion of ‘double competition’ (Steuart 1767:169–71 with 164–6). The entry of additional merchants to a market—in this example, to a foreign market—due to ‘the large profits of... [existing] merchants ... [being] discovered by [these] others’, leads ‘[T]he last comers...to lower...prices’, via ‘the natural effects of competition’: ‘the fall of prices is...not voluntary...; not consented to from expediency; not owing to a failure of demand, but to the influence of a new principle of commerce, to wit, a double competition’ (Steuart 1767:171). In the following, very important chapter the meaning of this competition is clarified. *Simple* competition—a synonym² for the ‘compound demand’ associated with high/low demand and price adjustment to demand/supply imbalance—operates when ‘*competition* is much stronger on one side of the contract than on the other’—on the demand side (raising prices) or the supply side (reducing prices). On the other hand, double competition operates ‘when, in a certain degree, it [competition] takes place on both sides of the contract at once, or vibrates alternately from one to the other’, thereby restraining prices ‘to the adequate value of the merchandise’.³ This double competition—a process which Steuart understands ‘to take place in almost every operation of trade’—‘prevents the excessive rise of prices; [and]... their excessive fall’; it ‘confines the fluctuation of prices within limits which are compatible with the reasonable profits of both buyers and sellers’.

Steuart conceives of the process of competition and price formation occurring in large measure via specialist ‘merchants’ who intermediate between consumers and producers—as is indicated by the immediately preceding reference to profits of sellers *and* buyers. He also regards simple competition on the demand (supply) side, via the resulting price rise (fall), as tending naturally to give rise to simple competition on the other side, as suppliers (demanders) respond to the high (low) price—at least in the absence of collusion (not his term) and monopoly. This *alternation* of simple competition from side to side is not explicitly identified with the *simultaneous* pressure of (double) competition on both sides—though there is an intimation of this; and in practical effect, the only difference would seem to be the amplitude of price fluctuations, the duration of non-normal prices, and the associated speed of quantity adjustments. Finally, Steuart argues that only in extreme circumstances, wherein demand and supply are incapable of balance, will competition necessarily be confined to one side only (Steuart 1767:172–8). It is interesting that in these cases Steuart conceives of the extreme rise or fall (to zero) of price which would result

from ‘the activity of the principle of competition’ in such circumstances as being curtailed by ‘humanity’ or ‘a certain degree of fair-dealing’ (Steuart 1767:177).

8.2 WAGES AND SUBSISTENCE

It is evident from the above that some notion of normal prices lies behind Steuart’s competitive process; but what determines them (and, for example, what determines the ‘reasonable profits’ he mentions in passing) is yet to be explained. Before considering that question it is necessary to examine the relation between wage rates, subsistence and labour consumption. Regarding the concept of normal commodity prices, this amounts to inquiring as to whether there are normal rates of wages which, in a characteristically classical manner, would provide an ‘anchor’ or parameter for the theory of normal commodity prices.

As it turns out, there are considerable ambiguities in the treatment of wages and subsistence in the *Principles* with regard to a number of key issues. It must be stressed that a definite notion of subsistence, or ‘necessary’ labour consumption (and hence, a definite notion of surplus), is employed widely throughout the *Principles*—in particular, in examining population, money wages and commodity prices, and tax incidence. A whole chapter is devoted to systematically explicating the notion of necessary consumption (Book II, Chapter XXI). The central matter at issue here is the relation between subsistence and wages, and the implications for the theory of prices and income distribution. The pertinent difficulties in Steuart’s treatment of wages are captured in three questions:

- 1 Is subsistence consumption identified with ‘food’ or ‘grain’ (agricultural product), even if only as a simplifying assumption, or does it include manufactures?
- 2 To what extent are wages regulated by subsistence, or inclusive of a surplus or luxury consumption element?
- 3 Related to the second question, but distinct, do the prices of subsistence commodities to some degree regulate money wages and hence the costs of production of all commodities?

The notion that subsistence may be identified with grain, food or agriculture is employed extensively in the *Principles*, especially in the context of his doctrine (particularly elaborated in Book I) that population size is proportioned to agricultural net product. This is evocative of the kind of simplification embodied in Cantillon’s vertically integrated rural sector, whereby this sector is conceived as a self-sufficient (self-replacing) necessary consumption goods production system—though their population theories differ (cf. section 5.1 above). Hence, for example, Steuart argues:

mankind have been, as to numbers, and must ever be, in proportion to the food produced;...

...the most essential requisite for population, is that of agriculture, or the providing of subsistence...

...Nobody can dispute that agriculture is the foundation of multiplication...

(Steuart 1767:36–7)

These statements evidently identify agricultural output with subsistence (see also Steuart 1767:30–43, 87–8, 94, 96–8, 102–3, 114–19, 149–50, 259, 294, 300, 371). But other passages in the *Principles* may be read to include manufactures in necessary consumption. In a number of places Steuart refers to ‘food and other necessaries’, ‘other necessaries, as well as food’, ‘bread and every other necessary of life’ (Steuart 1767:235, 154, 239; also 28, 35, 42–3, 231); though these may refer to non-food agricultural necessities. With regard to manufactures, Steuart sometimes refers, for example, to ‘wants [not necessarily necessities] in manufactures, salt, &c.’ (Steuart 1767:92). The issue is further complicated by agriculture’s sometimes being treated as a species of manufacture (Steuart 1767:178 n. 5, 235–6; Steuart 1777:737). Textiles (‘wool’) and clothing are characteristic examples of Steuart’s notions of subsistence consumption of manufactures (Steuart 1767:36, 239). (Recall again, Cantillon’s vertically integrated rural sector.) Elsewhere Steuart calculates that for Scottish day-labourers and English country labourers—each ‘the lowest class,...and the most numerous’ in their respective regions, except for foot soldiers in the latter case—food expenditure constitutes approximately one-half of their wages (Steuart 1767:398–9). A final piece of evidence, suggesting that subsistence is understood to extend beyond agriculture as well as food, is Steuart’s description of food and/or agriculture as (only) ‘the *first* necessity for life’ (Steuart 1767:178, emphasis added; also 231, 233, 235, 246).

Do wages tend to an equality with the value of subsistence in any case, whatever the content of the latter? In a lengthy explanation of the concept of subsistence Steuart distinguishes between ‘*physical-necessary*’ and ‘*political-necessary*’. The former is defined as ‘*ample subsistence where no degree of superfluity is implied*’: physical-necessary—which Steuart argues, it is difficult to determine the content of—is defined as absence of luxury or surplus (Steuart 1767:269–70). On the other hand, political-necessary, which varies according to social rank, is entirely conventional:

The nature of man furnishes him with some desires relative to his wants, which do not proceed from his animal oeconomy, but which are entirely similar to them in their effects. These proceed from the affections of his mind, are formed by habit and education, and when once *regularly established*, create another kind of necessary.

(Steuart 1767:270; cf. 155).

As in Cantillon (*vide* sections 5.2 and 6.2), there are multiple customary subsistences; though here as well Stuart finds often ‘great difficulties in determining [their]...exact limits’. In fact, Stuart argues, physical-necessary also ‘is not fixed to a point, but...may vary’; though ‘[T]he difference between the highest class [of physical-necessary] and the lowest, [he does]...not apprehend to be very great’ (Stuart 1767:269, 271–2; cf. 114–16). In any case, Stuart seems to expect the wages of most labour to be governed by physical subsistence, with above physical subsistence wages occurring due to ‘superior *ingenuity*’, ‘extraordinary dexterity’, or a degree of monopoly over labour supply (‘confraternities, which prevent competition’ and ‘corporations’) (Stuart 1767:271–6, 297, 302, 377–8, 400–1, 681).

These notions are echoed elsewhere in the *Principles*, particularly in the final chapter of Book II (Chapter XXX, especially Question 9, 397–404). At least in commercial societies ‘of agriculture, of industry, and of free-trade with the world’, the price of subsistence fluctuates ‘within certain limits, namely, they cannot rise higher than the faculties of the buyers can afford to pay for the *shortest* subsistence; they cannot sink lower than what the goods can be exported for with profit’ (Stuart 1767:397, emphasis added). In commercial societies it is the ability to pay (that is, faculties) of the lowest-income, ‘most numerous’ class which constrains subsistence prices: ‘the proprietors of subsistence mechanically adjust the price they sell at, to the abilities of the lowest class to purchase the shortest subsistence; and beyond this prices *never* can rise’ (Stuart 1767:398, emphasis added; also 165, 170, 175, 397–401, 342–3, 345–6, 409).⁴ At another point Stuart suggests the possibility of a persistence of above-normal wages causing habitual or conventionally necessary consumption (presumably he has political-necessary in mind) to adjust upwards in response to wages, rather than vice versa (Stuart 1767:192–3; cf. Garegnani 1984:320 n. 49). At a number of points in the *Principles* Stuart also seriously entertains wages falling *below* subsistence:

when hands become too many for the work,...the industrious enter into competition for the physical-necessary, and hurt one another.

...

If...the exportation of subsistence [occurs]...while some... remain in want,...the most probable cause...may be an unequal competition between those of the lower classes, who work for a physical-necessary.

(Stuart 1767:288, 297; also 33, 195, 204, 269, 271, 273–6, 299, 694–5)

But this can only be interpreted as referring to extreme and non-permanent circumstances (not least because of the population mechanism: see below). It could not be otherwise.⁵

The question of the relation between wages and subsistence in Steuart is further complicated by three other aspects of the *Principles*: the population doctrine (already discussed in relation to the content of subsistence), the treatment of tax incidence, and the relation between wages and import prices. Steuart is well aware that wages equal in value to a given necessary labour consumption entails that money wages—and to that extent, labour costs of all commodities (which require labour input)—are regulated by subsistence prices. He views population as varying, or being codetermined, with society's quantity of subsistence, via a mechanism of population expansion/contraction in response to variations of per capita consumption around subsistence (Steuart 1767:30–43, 85–8, 94–103, 115–21, 149–50, 167–9, 195, 245–7, 259). This seems to imply, at least for commercial societies, a gravitation to subsistence wages (physical-necessary or political, agricultural or otherwise) for the most numerous part of the population, whose numbers may be understood to dominate population size (see especially 40, 100–1, 85, 120). On the other hand, if wages are regulated by subsistence then the imposition of taxes on subsistence commodities, the taxes being assumed shifted forward into prices, would lead to a rise in wages and all labour costs. This is a result Steuart is well aware of but seeks vigorously to deny. The essence of his position is that taxes on commodities (or subsistence wages) are forward shifted into higher commodity prices, including commodity input prices, and higher subsistence wages—so ultimately falling upon surplus consumption. But Steuart wishes to deny that such taxes increase wages and labour costs; and so (again, with complete self-consciousness), must deny that wages are normally at subsistence, and argue that tax-induced price rises, rather than raising wages, fall upon the surplus component of wages (as well as surplus consumption out of non-wage incomes). We may speculate that Steuart's 'mercantilism' is a subterranean element motivating his ambivalence on wages and subsistence:⁶ on the one hand he wants to avoid the conclusion that commodity/expenditure taxes raise export prices; on the other, he wants to reject the argument that cheap (grain) imports will reduce wages, labour costs and thereby all commodity prices. Both 'uncongenial' possibilities are avoided by denying that wages are regulated by subsistence prices. The consequences of changes in taxes and import prices are particular examples of this more general issue: the responsiveness of money wages to changes in consumption prices, whatever the source of the latter—a potential causation which becomes straightforward if wages are at subsistence.⁷

It is evident that Steuart's arguments concerning wages and labour consumption are at least ambivalent. At this stage it is preferable to leave open a range of possible wage equations which, in an abstract form, might capture his views. The specification of such simplified wage equations depends upon resolution of the following issues:

- 1 Subsistence per (homogeneous) worker consists of a quantity (c) of a necessary, homogeneous agricultural consumption good.
- 2 Subsistence per homogeneous worker consists of c and a quantity (c_j) of a necessary homogeneous manufactured consumption good j .
- 3 Subsistence per homogeneous worker, whether agricultural or agricultural and manufactured, is associated with a spectrum of quantities of necessary consumption goods:
 $[(c_1 \leq c \leq c_2) \text{ or } (c_1 \leq c \leq c_2, c_{1j} \leq c_j \leq c_{2j})]$
- 4 Money wages per homogeneous worker (w) are equal to the money value of subsistence or are constrained within the values of a spectrum of subsistences.
- 5 Money wages per homogeneous worker exceed the value of subsistence, so that money wages include a surplus component (w_s).
- 6 There is heterogeneous labour—for simplicity suppose two classes of labour, ‘primary’ and ‘secondary’—one class receiving subsistence wages (w'), the other possibly receiving above subsistence wages (w'').
- 7 Money wages may take values below the value of subsistence (but presumably positive), whether or not they may also take values above subsistence.

Even this simplified range of possibilities can plausibly give rise to at least fourteen wage equations (or sets of wage equations) and inequalities. These can sensibly be reduced to three possibilities by assuming:

- 1 The possibility of below subsistence wages may be excluded, for the purposes of analysing normal conditions in a commercial society;
- 2 Necessary agricultural consumption is required for all labour;
- 3 Heterogeneous labour is an essential part of Stuart’s wages theory;
- 4 At least one labour class is restricted to subsistence;
- 5 If labour at a subsistence wage consumes manufactures, then labour receiving a surplus wage also consumes manufactures as part of its necessary consumption;
- 6 The notion of a spectrum of subsistences may be ignored.

With regard to the last assumption, the subsistence spectrum adds nothing of substance which is not embodied in the possibility of a surplus wage—other than placing an explicit upper bound upon real wage rates. These restrictions generate three possible sets of wage equations:

$$w' = p_c c' \tag{8.1}$$

$$w'' = p_c c'' + w_s$$

$$w' = p_c c' + p_j c'_j \tag{8.2}$$

$$w'' = p_c c'' + p_j c''_j + w_s$$

$$w' = p_c c'$$

$$w'' = p_c c'' + p_j c''_j + w_s \tag{8.3}$$

$$w_s \geq 0 \tag{8.4}$$

where p_c, p_j are the money prices of the agricultural and manufactured outputs respectively and $(c', c'_j), (c'', c''_j)$ are the subsistence consumption of primary and secondary labour. Equations (8.1)–(8.3) are alternative specifications of Steuart’s wages theory.

8.3 REAL VALUES, PROFITS AND EQUILIBRIUM PRICES

Steuart’s treatment of prices is built around a concept of equilibrium price as the sum of the ‘real value’ of a commodity and a measure of profits per unit of output (‘the profit upon alienation’ [that is, exchange]). Real value reduces to three elements: average (direct) labour time required in production; the average value of ‘the workman’s subsistence and necessary expense, both for supplying his personal wants, and providing the instruments belonging to his profession’; and the value of material inputs. Real value is cost of production; and at least with regard to the last element, Steuart recognizes the dependence of costs upon prices: if material input ‘be the manufacture of another, the same process of inquiry must be gone through with regard to the first [the price of the material input], as with regard to the second [the commodity under consideration]: and thus the most complex manufactures may be at last reduced to the greatest simplicity’—though Steuart nowhere attempts this reduction. Here, he adds that price ‘cannot be lower than the amount of all the three, that is, than the real value; whatever it is higher, is the manufacturer’s profit’ (Steuart 1767:159–61, also 246–7). Prices are conceived of as being regulated by real values understood as costs of production exclusive of profits, with an element of profit added in. Though the notion of real value as a lower bound of price is repeated elsewhere (Steuart 1767:178), the possibility of price falling below real value or cost is suggested also (Steuart 1767:192). In other discussions Steuart identifies real value with ‘intrinsic value’ (Steuart 1767:193–4, 198–200, 202, 204), though in another place confusion is created by an implicit distinction between the two (Steuart 1767:312; see also 225, 420). Cantillon employs both terms in characterizing his own cost prices, but more commonly the latter (*vide* section 5.2; Cantillon 1755:29). The conceptions of the two writers are essentially the same though Steuart is more explicit about the content of costs—in particular, the above-mentioned purchased commodity inputs, from which flows his recognition of costs, as price-dependent; has a more thorough-going conception of competition, and

places more emphasis upon manufacture. Yet elsewhere, ‘prime cost’ seems to be identified with real value (Steuart 1767:192; but see also 239, 519).

Three evident difficulties confront this approach to price determination. First, it is unclear whether the second element of real value listed above—which obviously refers to some measure of wages—is intended to include only *necessary* labour expense (consumption and instruments of production), or above-necessary wages as well. In terms of the possible money wage values expressed in equations (8.1)–(8.3) above, if wages include a surplus component, then is the measure of labour cost associated with real value inclusive of the surplus wage—or is the latter part of ‘profits? Indeed, this ambiguity may also be understood as a symptom of the ambiguity concerning wages and subsistence. Second, if Steuart is arguing that prices are not only proportional to costs plus profit, but are *explained* by the latter, how does he reconcile this with the dependence of costs upon prices? Finally, what determines the element of profit which apparently independently enters into the determination of prices, along with real value?

As to the significance of surplus wages for real values, Steuart elsewhere seems to associate real value with total wage cost. Referring back to Book II, Chapter IV (159–61) he comments: It has been said, that the price of a manufacture is to be known by the expense of living of the workman, the sum it costs him to bring his work to perfection, and his reasonable profit’ (Steuart 1767:340). However, the idea that in Steuart surplus wages might be assimilated with profits is by no means absurd, as this quotation itself suggests, with its reference to profit *of the workman*. Often in the *Principles* Steuart treats (surplus) ‘wages’ and ‘profits’ as interchangeable terms (for example, Steuart 1767:161, 288, 684, 695). Though Marx’s accurate comment (quoted in section 5.2) concerning the amorphous combination of wages and profits in Cantillon and Petty does not apply with quite the same force to Steuart, it applies nevertheless. As to the dependence of costs upon prices, Steuart evidently does not grasp the analytical significance of this—in particular, the consequent necessity for a simultaneous determination of costs and prices—as is made clear by his frequent characterization of costs as if they are independent variables to which prices adjust (for example, Steuart 1767:174–5, 178). It should be noted that this problem arises not only due to produced material inputs, but also because of the subsistence component of wages, which may result in wage cost also being a function of prices. Hence in the characterization of Cantillon’s price theory in section 6.2 above, necessary labour consumption was sufficient to generate a form of price—cost interdependence even in the absence of any other basic commodities. (On basics, see Chapter 7, note 5.) As to the complex question of determination of profits, we shall return to this following a formalization of Steuart’s real values and prices. Suffice it to say here, that in the absence of a determination of profits per unit of outputs *independent of prices*, Steuart’s cost-plus-profit treatment of prices would come close to being a tautology.

A ‘rational reconstruction’ of Steuart’s equilibrium price theory assists in clarifying these issues—a rational reconstruction in the sense that it conforms to Steuart’s major propositions about price determination, but also takes the theory analytically beyond the limits of his text, or what reasonably could be interpreted to be contained therein. Following the assumptions employed in the wage equations of section 8.2 above, there are two homogeneous commodities—one agricultural (‘corn’), one manufactured (‘iron’). There is a single, constant-returns-to-scale technique of production with each commodity produced by means of material commodity inputs, the two kinds of labour, and in the case of corn, homogeneous land input:

$$a_{cc}, a_{jc}, (1/A'), (1/A''), (1/T) \quad \text{produces 1 unit of corn;}$$

$$a_{cj}, a_{jj}, (1/A'_j), (1/A''_j) \quad \text{produces 1 unit of iron.}$$

There is a uniform production period, identical to the time period associated with wage equations (8.1)–(8.3); a_{cc}, a_{jc} (a_{cj}, a_{jj}) are quantities of corn and iron input required per unit of corn (iron); A', A'' (A'_j, A''_j) are corn (iron) output per unit of primary and secondary labour input respectively; and T is corn output per unit of land. The commodity input coefficients may be taken to represent both material inputs and instruments of production, as Steuart characterizes them. Money prices equal to costs plus profits are given by

$$p_c = p_c a_{cc} + p_j a_{jc} + (w'/A') + (w''/A'') + \pi_c + (r/T) \quad (8.5)$$

$$p_j = p_c a_{cj} + p_j a_{jj} + (w'/A'_j) + (w''/A''_j) + \pi_j \quad (8.6)$$

where π_c, π_j are money profits per unit of corn and iron output respectively, and r is money rents per unit of land. (The treatment of rents as a price determining cost of production, similar to the treatment of Cantillon in section 6.2 above, is further discussed in section 8.4 below.) Of the three alternative sets of wage equations specified above, equations (8.2) are the most general, since equations (8.1) and (8.3) may be treated as special cases of (8.2). Substituting equations (8.2) into equations (8.5), (8.6) generates

$$p_c = \alpha_{cc} p_c + \alpha_{jc} p_j + (w_s/A'') + \pi_c + (r/T) \quad (8.7)$$

$$p_j = \alpha_{cj} p_c + \alpha_{jj} p_j + (w_s/A''_j) + \pi_j \quad (8.8)$$

where

$$\alpha_{cc} = a_{cc} + (c'/A') + (c''/A'') \quad (8.9)$$

$$\alpha_{jc} = a_{jc} + (c'_j/A'_j) + (c''_j/A''_j) \quad (8.10)$$

$$\alpha_{cj} = a_{cj} + (c'/A'_j) + (c''/A''_j) \quad (8.11)$$

$$\alpha_{jj} = a_{jj} + (c'_j/A''_j) + (c''_j/A''_j) \quad (8.12)$$

Real values per unit of outputs may be defined inclusive of surplus wage cost (v_c, v_j) or exclusive of surplus wage cost (v_{ec}, v_{ej}); so that

$$v_c = p_c - \pi_c = v_{ec} + (w_d/A'')$$
(8.13)

$$v_j = p_j - \pi_j = v_{ej} + (w_d/A'')$$
(8.14)

These price and value equations represent a plausible rendering of Steuart's arguments; and they make explicit the dependence of values, by either definition, upon prices. Certainly in the case of values conceived as v_{ec}, v_{ej} , there is no plausible escape from the conclusion that values cannot be independent magnitudes which regulate prices. In the case of values conceived as v_c, v_j there is almost as little room for escaping the dependence, save for the possibility of compensating variations in surplus wages (and money rents, in the case of corn) offsetting price-induced changes in other unit costs. The notion that surplus wages can bear the burden of price changes, thereby breaking the causal link from prices to costs, is used by Steuart, especially in tax discussions. But so long as at least some labour is at subsistence and/or produced inputs generate price-dependent commodity input costs, there is no plausible mechanism for ensuring this. In short, a cost-of-production theory of prices requires production with no basic commodities, including no necessary labour consumption. Nevertheless, relative prices can be determined for the above model, though not on the basis of any suggestions of Steuart. Specifying corn as numeraire and rearranging equations (8.7) and (8.8),

$$p_{jc} = (p_j/p_c) = [\alpha_{cj} + (w_{sc}/A''_{jj}) + \pi_{jc}] / (1 - \alpha_{jj})$$
(8.15)

$$r_c = (r/p_c) = T \{ [1 - \alpha_{cc}](1 - \alpha_{jj}) - \alpha_{cj}\alpha_{jc} \} - \{ [(1 - \alpha_{jj})(1/A'') + \alpha_{jc}(1/A''_{jj})] w_{sc} - (1 - \alpha_{jj}) \pi_{cc} - \alpha_{jc} \pi_{jc} \} / (1 - \alpha_{jj})$$
(8.16)

$$[(1 - \alpha_{cc})(1 - \alpha_{jj}) - \alpha_{cj}\alpha_{jc}] > \{ [(1 - \alpha_{jj})(1/A'') + \alpha_{jc}(1/A''_{jj})] w_{sc} + (1 - \alpha_{jj}) \pi_{cc} + \alpha_{jc} \pi_{jc} \} \geq 0$$
(8.17)

where $\alpha_{cc}, \alpha_{jj} < \text{unity}$ and $w_{sc}, \pi_{cc}, \pi_{jc}$ are surplus wages and profits per unit of outputs, measured in corn. Relative prices and real rents are determined at economically meaningful values if real surplus wages and real profits are exogenously given subject to the indicated constraints. Briefly stated, the constraints ensure that a surplus over and above necessary labour consumption is producible (the system is 'productive') and that surplus real wages plus real profits do not completely exhaust the surplus, thereby ensuring that rents are positive. The necessity of exogenously determining three of the four variables — $\pi_{cc}, \pi_{jc}, w_{sc}$ and r_c —in order to determine relative prices and the remaining distributive variable, points to the indeterminacies in Steuart's system.

Turning to the issue of profits, does Steuart have any principle for their

determination, which might reduce the indeterminacy of this system by eliminating two of the three degrees of freedom? The answer is in the negative, save for one possible avenue of interpretation. In referring to determination of the profit component of prices Steuart makes only vague reference to, for example, ‘necessary’, ‘moderate’, ‘moderate, but sure’ and ‘reasonable’ profits (Steuart 1767:173–4, 195, 263, 395, 695); ‘profits within the narrowest bounds’ (Steuart 1767:264); profits per unit of output as a ‘small addition’ to real value (Steuart 1767:189); ‘the perfect standard’ of profits (Steuart 1767:192; also 248, 391–2); price as ‘justly proportioned to the real value’ (Steuart 1767:175). To put it mildly, this does not tell us very much. However, he also often refers to the possibility of profits being ‘consolidated’ into the real value of commodities:

if the scale of demand...keeps profits high,...not only the immediate seller of the goods, but also every one who has contributed to the manufacture, will insist upon sharing these new profits...and by such profits subsisting for a long time, they insensibly become *consolidated*...into the intrinsic value of the goods.... [T]hese profits become, by long habit, virtually *consolidated* with the real value of the merchandize,

...so soon as...profits become *consolidated* with the intrinsic value, they...cease to have the advantage of profits, and, becoming in a manner necessary to the existence of the goods, will cease to be considered as advantageous.

[One cause of high price is] consolidation of high profits with...real value... This cause operates in countries where luxury has gained ground, and where domestic competition has called off too many of the hands...⁸

Profits, at least in part, are metamorphosed, so to speak, into customary necessary consumption and hence production costs of commodities. This concept of consolidation assists in clarifying whether real values include total wage costs, while at the same time exposing more visibly the blurring of wages and profits: on the one hand, consolidation favours the judgement that real values include total wage costs; on the other, it indicates that profits are not related to any clear notion of capital as advances in production.⁹ Profits, in this context, are the profits of *labour* (Steuart 1767:161, 192–4, 395, 684). If we take this wages/profit fusion to its logical conclusion, then the amorphous combination can be made explicit by treating surplus wages and profits as a single distributive variable: if profits per unit of outputs are not proportional to capital-output ratios in the usual capitalist sense, but are profits of labour, then they can only be understood as proportional to labour, and π_c, π_l may

simply be comprehended *within* w_{sc} . Thereby, the distribution and price system may be represented with distinct profits zero:

$$p_{jc} = [\alpha_{cj} + (w_{sc}/A''_j)] / (1 - \alpha_{jj}) \quad (8.18)$$

$$r_c = T\{[(1 - \alpha_{cc})(1 - \alpha_{jj}) - \alpha_{cj}\alpha_{jc}] - [(1/\alpha_{jj})(1 - A'')] + \alpha_{jc}(1/A''_j)]w_{sc}\} / (1 - \alpha_{jj}) \quad (8.19)$$

Then the remaining indeterminacy is the distribution of the surplus between rents and surplus wages (including quasi-profits); and once either r_c or w_{sc} is given, distribution and value are determined. However, this resolution renders real values (inclusive of surplus wages) and prices identical, which is inconsistent with Steuart's views; but the fault lies with his system: once wages and profits are blurred, so too, almost inevitably, are prices and real values.¹⁰

In section 8.1 (note 3) Steuart was quoted to the effect that a determinate theory of supply price is possible, whereas a theory of equilibrium demand price is not. More specifically, Steuart's argument there was that *supply prices—and competitive forces acting upon supply prices—are fixed within determinate bounds*. In Steuart's conception, regular market exchange and competition in commercial societies, with specialist merchants intermediating commodity exchange, adjusts prices to a 'balance' in which prices reflect real value plus a profit element. It is in this sense that independently given real values are understood to regulate competition and thereby prices, while competition apparently continues to regulate profits:

In every transaction between merchants, the profit resulting from the sale must be exactly distinguished from the value of the merchandize. The first *may* vary, the last never *can*. It is this profit alone which can be influenced by competition; and it is for this reason we find such uniformity every where in the prices of goods of the same quality.

The competition...takes place among the sellers, until the profits upon their trade prevent prices from falling lower.

(Steuart 1767:174; also 171, 172–8, 202–4, 250, 389–93, 695)

It is this conception which makes possible for Steuart a determinate theory of supply price—or at least, a theory of supply price within determinate bounds. But the lack of any principle for the determination of profits (or indeed surplus wages as quasi-profits) remains; and thereby, the indeterminacy of equilibrium prices: equilibrium prices are a function of competition via π_{cc} , π_{jc} . The asymmetry between the real value lower bound of prices and the profit-determined upper bound of prices is most strikingly evident in the following:

[When exchange] come[s] to be carried on between merchant and merchant...profits may rise and fall, in the proportion of quantity to demand; that is to say, if the provision is less than the demand, the

competition among the demanders, or the rise of the price, will be in the compound proportion of the falling short of the commodity, and of the prospect of selling again with profit. It is this proportion which regulates the competition, and keeps it within bounds. It can affect the profits only upon the transaction; the intrinsic value of the commodity stands immoveable: nothing is ever sold below the real value; nothing is ever bought for more than it may probably bring. I mean in general.
(Steuart 1767:177–8)

Furthermore, the independence of real values from competition and prices is flawed in Steuart's scheme on two counts: first, as already indicated, because of the dependence of production costs upon prices—a problem capable of being side-stepped via simultaneous determination of prices and costs, though Steuart did not grasp this; second, due to surplus wages being also a function of competition in Steuart's scheme; so that at this point also real values become a function of competition—if real values are inclusive of surplus wages.¹¹ Only in Ricardo, Marx and, most coherently, Sraffa, would there emerge a theory of 'equilibrium' or 'normal' prices (values), determined by production and distribution conditions, and with respect to which values, competition could be conceived to regulate actual (market) prices. Finally, it may be noted that Steuart's equilibrium commodity prices are understood to be realized in conditions of balance between supplies and demands—the 'balance of work and demand', as he commonly calls it:

when we say that the balance between work and demand is to be sustained in equilibrio, as far as possible, we mean that the quantity supplied should be in proportion to the quantity *demanded*, that is, *wanted*. While the balance stands justly poised, prices are found in the adequate proportion of the real expence of making the goods, with a small addition for profit to the manufacturer and merchant.

As long as any market is *fully* supplied...and *no more*; those who are employed...live by their trade, and gain no unreasonable profit: because there is then no violent competition upon one side only, neither between the workmen, nor between those who buy from them, and the balance gently vibrates under the influence of a double competition.

In the framework of double competition demand/supply imbalances primarily generate output adjustments, price fluctuations being thereby limited (*vide* section 8.1 above). Thus Steuart elsewhere describes price and output adjustments: 'the moment...additional demand has the effect of producing a sufficient supply, prices will return to the old standard'.¹²

8.4 INCOMES AND SURPLUS OUTPUTS

The bulk of Steuart's discussions of incomes and income distribution is taken up with wages and profits in manufacture, as well as merchant profits. Though rents are explicitly treated as a residually determined surplus, the discussion of rent determination is surprisingly limited and casual, given the fundamental role of agriculture in the *Principles* and the extensive significance given to intersectoral exchange between agriculture and manufacture. In particular, it is impossible to draw any definite theory of rents in relation to agricultural prices from the *Principles* (Steuart 1767:52–5, 678; also 66, 183, 198, 341–2, 347–8, 371, 397, 433, 646, 727–8). It is as if Steuart largely treats rents as given, as had Cantillon (*vide* section 5.2).¹³ With regard to merchant profits, it becomes evident at a number of points in the *Principles* that Steuart conceives of two distinct categories of profits: profits of producers and profits of specialist merchants (for example, Steuart 1767:156, 158–9, 171–8, 189, 393–4, 396–7). Furthermore, it is evident that the latter class of agents are arbitrageurs; so their profits are brought into a systematic relationship with interest conceived of as the alternative rate of return, including an accounting for differential risk (for example, Steuart 1767:447–70). (There is also international arbitrage of financial instruments.) But it must be stressed that these merchant profits are not proportional to advances of means of production during the period of production; rather, they are proportional to the purchase price of commodities which merchants pay and the period over which merchants hold those commodities as stocks. In effect, merchant profits determine margins between buy and sell prices, in proportion to the interest rate. Double competition operates upon the interest rate, as upon commodities in general, with average profitability of trade and industry apparently determining the 'standard' or normal interest rate, though there is ambivalence concerning causation. Thus the income forms in which commodity surplus is realized in Steuart are: surplus wages, rents, producer profits (quasi-wages), merchant profits, interest payments and tax revenues.

With regard to the latter—which Steuart treats extensively in the framework of a rich and sophisticated analysis of public finance (in particular, Book IV, Part iv and Book V)—just one fundamental point may be made here. The issue arose in section 8.2 above: as intimated in Petty, and recognized by Cantillon and especially Quesnay, Steuart recognizes that the incidence of taxation can only fall upon the social surplus; and therefore, if wages are at subsistence, a forward-shifted tax on a necessary consumption good will raise the prices of all commodities—not only in proportion to the direct effect of the tax itself and tax-induced rises in material input costs, but also due to a rise of wages. Suppose a commodity tax rate (t) on the producer price of corn. The corn price equation becomes

$$p_c = (1 + t) [\alpha_a p_c + \alpha_j p_j + (w_s/A'') + \pi_c + (r/T)] \quad (8.20)$$

Combining this with equation (8.8) and solving for the relative commodity price and corn rents:

$$\hat{p}_c = [\alpha_{cj} + (w_{sc}/A''_j) + \pi_{jc}] / (1 - \alpha_{jj}) \quad (8.21)$$

$$r_c = T\{[(1/1+t) - \alpha_{cc}](1 - \alpha_{jj}) - \alpha_{cj}\alpha_{jc} - \alpha_{jc} [(w_{sc}/A''_j) + \pi_{jc}] - (1 - \alpha_{jj}) [(w_{sc}/A''_j) + \pi_{cc}]\} / (1 - \alpha_{jj}) \quad (8.22)$$

$$[(1/1+t) - \alpha_{cc}](1 - \alpha_{jj}) - \alpha_{cj}\alpha_{jc} > \{\alpha_{jc} [(w_{sc}/A''_j) + \pi_{jc}] + (1 - \alpha_{jj}) [(w_{sc}/A''_j) + \pi_{cc}]\} \geq 0 \quad (8.23)$$

Equation (8.21) is apparently identical to the no-tax relative price equation (8.15); but the constraints upon w_{sc} , π_{jc} have been tightened. Put briefly, what is really at issue in Steuart's text is the extent to which commodity taxes fall upon wages and producer profits, versus rents, merchant profits, interest payments—and the purchasing power of tax revenue itself. The indeterminacy of tax incidence is an expression of the underlying indeterminacy of the distribution theory.

With regard to the commodity composition of the surplus, it is sufficiently evident from the preceding comments that the most obvious element of commodity surplus is above-necessary consumption out of surplus wages and non-wage incomes, identified with 'luxury'. In fact, there are extensive discussions of luxury consumption in the *Principles* (for example, Steuart 1767:43–7, 136–9, 154–7, 264–9, 279–309, 334, 377–87); and it is clearly the dominant use of surplus in Steuart's world. Nevertheless, as indicated above, Steuart's treatment of prices and production costs incorporates produced intermediate ('material') inputs and workers' instruments of production (ibid.: 160). There is also some discussion of machinery (ibid.: 121–5, 255–6, 702); and the concept of wealth accumulation as accumulation of durables—present in Petty, Cantillon and others—is also present in Steuart (ibid.: 310–22, 365, 382–3, 735). But Steuart does not have a theory of net accumulation or saving (ibid.: 230–31, 256, 302, 324 with 516, 357, 709–10, 731, 734–5, for some fragments). It is certainly true that there is in the *Principles* a notion of demand or 'wants' playing an autonomous role (with respect to outputs and employment) in economic development; but it would be generous beyond sense to see this as a primitive theory of effective demand along Keynesian lines.¹⁴ The two remaining notable uses of surplus are public expenditure, associated with the tax share of the social surplus, and foreign trade flows. A surplus on the balance of foreign trade is a form of accumulation (ibid.: 236–41) and public expenditure *may* be accumulation, for example, 'public works' (ibid.: 381–8). With regard to both, Steuart offers extensive and detailed discussions of public finance and international economic relations—subjects which have been put aside here in order to focus upon the fundamental character of the price and distribution theory.

8.5 A SUMMING UP

Steuart's treatment of distribution and prices is a powerful and insightful analysis of competition and the formation of equilibrium supply prices, placed in the framework of production and allocation of economic surplus, in which agriculture plays an important role as primary necessary consumption, but manufacture also figures very prominently. Its two most striking weaknesses are the lack of any definite principle for determining the distribution of the surplus and the lack of any clear conception of capital advances and profitability in relation to pricing—the latter weakness evidently depriving Steuart of the notion of competition as a force governing the systematic behaviour of prices in general, via the absence of profitable arbitraging opportunities in equilibrium (in its simplest form, the uniform rate of profit on capital, at equilibrium prices). The latter weakness also points to the fundamental advance of Adam Smith's system over that of Steuart, as well as over Petty, Cantillon and Quesnay: in Smith, capitalist competition *is* the central organizing principle of price formation; and to that extent, Smith has more clearly grasped the character of the ascendant form of social economy. The former weakness—distributional indeterminacy—does not exist in the same degree in Petty, Cantillon and Quesnay because their conception of wages is governed by customary necessary labour consumption. This is not to say that Steuart's somewhat equivocal movement away from a subsistence wages theory is regressive—on the contrary, it is an advance: labour is not merely like 'cattle' input (*vide* Chapter 6, note 16) and the theory of wages finds a wider domain. The difficulty is that no clear principle replaces subsistence wages as a determinant of distribution, other than an appeal to competition—a doctrine which does not even reach so far as Smith's 'balance-of-contending-forces' conception of conflictual bargaining and natural wage determination, itself a theory of limited content and determinacy.

The indeterminacy of surplus wages indicated in section 8.2 and the indeterminacy of prices indicated in section 8.3 suggest a certain symmetry in Steuart's treatment of wages and prices: surplus wages are set subject to a lower bound of subsistence (cost of production of labour, so to speak); prices are set subject to a lower bound of real value (commodity cost of production). But to the extent that Steuart blurs surplus wages and producer profits—so that, in the limit, surplus wages per unit of output *are* profit per unit of output—the two indeterminacies are in fact the same indeterminacy. And likewise, the aforementioned notion of customary necessary consumption adjusting upwards in response to above-subsistence wages becomes identical to the concept of profit consolidating into the real values of commodities (Steuart 1767:192–3). From the standpoint of a rational reconstruction, the most consistent and determinate rendering one can give of Steuart's theory—though it is one which Steuart himself does not

unequivocally offer—is to identify surplus wages and producer profits and treat real values as exclusive of surplus wages. This satisfies two of the key *intentions* of his theory: real values are independent of at least *direct* surplus wage competition—though they are still price dependent and thereby *indirectly* a function of surplus wage competition—and equilibrium prices remain distinct from real values. Furthermore, the only degree of indeterminacy remaining is the $w_{sc} - r_c$ curve entailed by equation (8.16) with π_{cc}, π_{jc} equal to zero:

$$r_c = T \{ [(1 - \alpha_{cc})(1 - \alpha_{jj}) - \alpha_{cj}\alpha_{jc}] - [(1 - \alpha_{jj})(1/A'') + \alpha_{jc}(1/A''_{jj})]w_{sc} \} / (1 - \alpha_{jj}) \quad (8.24)$$

The notion of real values as independent variables which would regulate competition, or with respect to which competition would regulate actual prices, is deeply flawed in Steuart—both because of the additional profit and/or surplus wage element in prices, which are functions of competition; and the dependence, in any case, of costs upon prices, even if wages were at subsistence and producer profits zero ($w_s = \pi_c = \pi_j = 0$):

$$v_c = v_{cc} = p_c = \alpha_{cc}p_c + \alpha_{jc}p_j + (r/T) \quad (8.25)$$

$$v_j = v_{jj} = p_j = \alpha_{jj}p_j + \alpha_{cj}p_c \quad (8.26)$$

But the notion of values which would regulate actual prices via competition was not vacuous as such, as Ricardo, Marx and, especially, Sraffa would later demonstrate. Steuart's error was to suppose, in the manner of untutored common sense, that costs of production could play such a role, notwithstanding his intuition of the dependence of costs upon prices. It may be stressed that there is no more reason to believe that Steuart grasped the constraint binding distributive variables together, than there is to believe that he grasped the solution for cost prices in a system where costs and prices, being interdependent, must be simultaneously determined.

Finally, a comment on the significance of the alternative sets of wage equations specified in section 8.2 above may be offered. Throughout the foregoing it was assumed that primary and secondary labour both require consumption of both agricultural and manufactured output (equations 8.2), as opposed to the supposition that both primary and secondary labour require only agricultural consumption (equations 8.1), or that primary labour requires only agricultural consumption while secondary labour requires both agricultural and manufactured consumption (equations 8.3). If equations (8.1) are combined with a_{jc} equals zero (no iron commodity input to corn production)—or equations (8.3) are combined with a_{jc} as well as A'' equal to zero (each form of labour is sector specific as well)—then a_{jc} will be zero. Thereby, under either of these sets of restrictions, the production system can be 'partitioned' such that the agricultural sector becomes a free-standing production subsystem which is able to reproduce its necessary input

including necessary labour consumption, independently of manufacture. Under this condition the ratio between the quantity of labour directly and indirectly required to produce necessary consumption ('necessary labour') *in the agricultural sector alone*, and total employment in that sector, will be given by

$$L'_c/L' = L''_c/L'' = [(c'/A') + (c''/A'')]/(1-a_w) \quad c''_j = 0, A'' > 0 \quad (8.27)$$

$$L'_c/L' = (c'/A')/(1-a_w) \quad c''_j > 0, A'' = 0 \quad (8.28)$$

where L'_c , L''_c are necessary primary and secondary labour and L' , L'' are total primary and secondary labour, in the agricultural sector. These expressions recapture the Petty—Cantillon notions of surplus labour in a corn model or vertically integrated rural sector respectively; and Steuart also discusses the division between necessary and total employment (for example, Steuart 1767:51–66). In relation to the social division of labour equation employed in earlier chapters to interpret Petty and Cantillon (section 3.1, equation (3.3); section 5.1, equation (5.5)), there are just three differences: non-working population is here ignored; seed input was there ignored ($a_{cc} = 0$), though both Petty and Cantillon take it into account (*vide* section 6.2); and heterogeneous labour is here taken into account.¹⁵ If, along with a_{jc} equal to zero, wages are at subsistence and profits are zero, then rents and prices are given by

$$r_c = T(1-\alpha_w) \quad (8.29)$$

$$= T(1-a_w)[1-(L'_c/L')] \quad (8.30)$$

$$p_{jk} = \alpha_{gj}/(1-a_{jj}) \quad c''_j = 0, A'' > 0 \quad (8.31)$$

$$= \alpha_{gj}/[(1-a_{jj}) - (c''_j/A''_j)] \quad c''_j > 0, A'' = 0 \quad (8.32)$$

This rent equation is likewise evocative of the Petty-Cantillon treatment of rents as a surplus determined independently of non-agricultural sectors, and would throw light upon some aspects of Steuart's discussions of rents and the division of employment between agriculture and manufacture, though it is not possible to enter into a discussion of them here (see, for example, Steuart 1767:51–5). The exclusion of surplus wages and profits also restores the Cantillonian land theory of value (*vide* section 6.2), though commodity j there was an agricultural good, while here it is a manufacture. But Steuart does not propose such a doctrine.

DEVELOPMENTS IN THE THEORY OF DISTRIBUTION AND VALUE, 1662–1767

The preceding chapters have examined the origin and development of the theory of economic surplus with particular focus upon the determination of income distribution and exchange value, tracing the dominant line of theoretical development from Petty to Cantillon to Quesnay and Steuart. This interpretation involves two undemonstrated assertions: that Petty is indeed the originator of the surplus approach (there are no precursors); and that Petty-Cantillon-Quesnay is the most significant formative and cumulative development of the approach. The first of these two suppositions, in particular, is subject to the inherent limitations of any negative argument: it cannot entirely be ruled out that an earlier version of the approach exists or existed; though it is evident that even if this were so, no such writer exercised any influence upon Petty. But certainly no convincing evidence of other surplus analyses is to be found in the seventeenth-century English economic literature.¹ Indeed Petty's own surplus formulations seem to have exercised little influence upon economic thought prior to Cantillon.

The purpose of this penultimate chapter is to place the developments outlined in the preceding chapters in the wider context of developments in economic thought from Petty to Steuart, though no claim to comprehensiveness is made or implied for this account. The first section considers the wider influence of Petty and Cantillon, direct and indirect, and compares the achievements of Quesnay and Steuart. The following section focuses on an issue considered at a number of points above—the place of profits and capital in the formation of the surplus approach to distribution. Section 9.3 draws together developments in the theory of value and competition. Finally, we return to Petty to consider the fate of political arithmetic in section 9.4. The following, final chapter sketches the 'aftermath', so to speak, of the formation: key developments in the surplus approach from Adam Smith to the late twentieth century, including an indication of how it can be applied to contemporary economic analysis.

With regard to the negative argument required to demonstrate Petty's uniqueness as a theorist of surplus in the seventeenth century, provision of further evidence for this would require working through the extant literature

in order to show what is *not* there—a tedious exercise, to put it mildly. It is worth recalling that estimates of Petty in the secondary literature, outlined in the introductory comments to Chapter 3, overwhelmingly judge him to stand out clearly from the body of other seventeenth-century economic writers in general. To be sure, the criteria (explicit or otherwise) employed in that secondary literature to evaluate Petty's achievement do not coincide with our criterion, which, it may be reiterated, is the origin of a *substantive* economic idea. Nevertheless, these estimates confirm Petty's stature as an economic thinker; though it must be said that the quest for the origins of political economy as a science in some *formal* sense is a much more elusive project for which one could not seriously hope to find a clear-cut singular source. Here, it is as a theorist of surplus that Petty's achievement is argued to be without precedent or parallel. Of course, the common notion of surplus in the seventeenth-century literature is as a positive balance of foreign trade, which bears no connection to the classical notion of economic surplus—or rather, no connection comprehended by any writer other than Petty (section 3.3 above), though King (1697:62–4) and Davenant (1698: vol. I, 140–1, 354–8, vol. II, 106) achieved a quite clear conception of the relation between accumulation and the balance of foreign trade, following Petty's lead. Furthermore, the mere use of a term such as 'overplus', for example by Barbon (1690:21–2, also 10–11), signifies nothing once it is recognized that it refers only to national exports. Likewise, Child's notion of usurers as unproductive appropriators of others' labour is not political economy so much as 'moral economy': 'swelling their own Purses by the sweat of other mens brows, and the contrivances of other mens brains: And how unprofitable it is for any Nation, to suffer IDLENESS TO SUCK THE BREASTS OF INDUSTRY (Child 1668:14). There is no genuine notion here of surplus product and, in any case, Child would have regarded this largely in terms of a deduction from merchants. Sheridan (1677:11–15, and ch. XIII) is somewhat more significant in portraying taxation as a surplus, within the context of a conjectural history of the origins of government—an argument with evident feudal undertones. It is highly likely that Petty influenced Sheridan—he posits the same, very unusual relation between population growth, rents and land prices as does Petty (*vide* Chapter 6, note 3); and the value-of-the-people notion (note 13 to this chapter).

Even in terms of more formal criteria of evaluation, as distinct from the substantive doctrinal criterion employed here, sheer analytical quality and clarity of theoretical purpose places Petty above all other economic writers of the seventeenth century. If that literature is to be searched for early 'scientific' contributors prior to the emergence of the discipline in the quarter century from 1750 to 1775, then it is first and foremost to Petty that attention should be directed. Yet there has been a tendency to place great store by the contributions of the 1690s, most notably Locke and Dudley North. Cossa (1880:130) suggests a possible reason why North has gained

such widespread accolades: ‘Though inferior to Petty in economic learning and in width of view generally,... North...was far more explicit in his treatment of the freedom of exchange, being its most energetic defender in the seventeenth-century.’²² Notwithstanding Letwin’s judgement, North’s economics is much narrower and shallower than that of Petty—both with regard to substance and method—and is preoccupied with the immediate practical issues of interest abatement and recoinage; though North’s views on government regulation are interesting. (Letwin 1963:251–72, himself demonstrates that the prefatory statement on Cartesian method in fact was written by Roger North—and there is nothing distinctively Cartesian about the actual content of the *Discourses*, as opposed to the way in which method consciously informs Petty’s economics.) Certainly, any disinterested evaluation of Barbon and North as economic writers would award the greater honour to the former and place Petty ahead of both. Locke’s economic writings are elaborate expressions of a single-minded practical intention deeply embedded in his political theory—the preservation of individual property rights (more against threats from monarchy than from ‘below’). Locke’s economic writings are as good examples of axegrinding as the worst of seventeenth-century literature (cf. Fay 1933). If it is less obvious in Locke’s case, this is only because he is very much abler than most of the rest. Having said all this, Petty’s achievement need not be exaggerated. The political and policy content of his economics reflects his historical location. It is the theoretical ideas, not the practical views, which single Petty out from his contemporaries, though together these formed a largely consistent corpus. His methodological views are neither unique nor original, though they are certainly unique in the seventeenth-century economic literature. It is the basic theoretical scheme in particular which is unique—and sufficiently fundamental in its economic significance to endure after the practical preoccupations of Petty’s writings had in large part been rendered obsolete; indeed, to endure to the present day.

9.1 THE PETTY-CANTILLON HERITAGE

It is a remarkable aspect of the formation of the classical surplus approach to distribution that it has such a clear-cut, singular beginning in Petty and that it is only in Cantillon, some seventy years later, that a systematic theoretical analysis of surplus superior to Petty comes into being. The subsequent further formation of the surplus theory—especially in Quesnay, Turgot, Steuart and Smith—therefore must be approached, historically, in the light of the Petty-Cantillon heritage. The Petty-Cantillon-Quesnay line of development has been extensively dealt with in Chapter 7. What of other influences of Petty and Cantillon?

Apart from the transference of the surplus analysis to Cantillon and thereby to Quesnay, Petty’s most enduring legacy was political arithmetic

(examined in section 9.4 below)—and, of course, velocity of money, which has been largely beyond our concerns here. Petty also exercised other influence. Indeed, the very fact that his works were republished in the eighteenth century indicates that he was being read; though it is worth noting that none of these works was translated except the *Two Essays* (into French, 1686) and an abstract of the *Five Essays* (German, 1693, 1724), both works quite peripheral to Petty's major economic ideas (*vide* Appendix A below). Quesnay had some knowledge of Petty but probably only through some translated extracts from *Political Arithmetick*—and Quesnay clearly had a taste for political arithmetic (Groenewegen 1983:xvii, xix, xxi–xxii). There is no reason to suppose that Quesnay has any direct debt to Petty with regard to the surplus approach to distribution. Turgot read Petty and cites him; but as with Quesnay, there is no evidence that Petty exercised any direct influence upon Turgot. Sen (1957:45–6; also 68–9)—evidently followed by Akhtar (1978:59n.)—supposes that Steuart derived his agricultural surplus analysis primarily from Petty. Steuart (1767:52, 100, 112) cites Petty, but in at least the first of these three cases is referring only to extracts from Petty. It seems more likely that the greater influence was from Cantillon and perhaps Quesnay. With regard to Petty and Smith, the high likelihood that Smith was indebted to Petty in relation to the treatment of technical division of labour was noted in section 3.4 above. Others have speculated, though not very convincingly, about some debt with regard to taxation (for example Sen 1957:128; cf. Chapter 3, note 18). As to Petty's influence on others, apart from the case of political arithmetic, there are no doubt many fragmentary influences which need not and cannot be examined here. For example, Malachy Postlethwayt made some incidental use of Petty's writings (Johnson 1937:407); and Benjamin Franklin adopted Petty's labour theory of value, taking it over virtually verbatim from the second model of production in the *Treatise*, without acknowledgement (Hull 1899: vol. I, lxxiii).

It may be reiterated that even if the only role Petty played in the development of economic theory were his influence upon Cantillon and thereby Quesnay and beyond, this would justify assigning him a crucial place in the formation of classical economics. Cantillon's debt to Petty also means that Petty's contribution is transmitted, from 1755 (and to some extent, earlier), via Cantillon's development of Petty's seminal work. For once the *Essai* was available, a much superior formulation of the theory of surplus and distribution thereby was available—and prior to Cantillon no writers seem to have similarly grasped the significance of this fundamentally important aspect of Petty's economics. Turgot possessed a copy of Cantillon's *Essai* and evidently held it in very high regard (Groenewegen 1993b:764; Higgs, 1931b: 391). It is difficult to believe that he was not directly influenced by Cantillon in some significant measure. In the case of Turgot, we have the problem that apparent signs of a Cantillonian influence

may in fact be merely evidence of the Cantillonian element in Quesnay. In the case of Steuart, we confront a similar problem: both Petty and Cantillon may have exercised independent influence.³ Sen's view of Petty's influence on Steuart has been noted immediately above, and Sen himself may have been influenced by Johnson (1937:210, 220) in taking this view. It is surprising that Sen (1957:21, 41-2, 48, 67-9, 101) relegates Cantillon's influence to a rather secondary role. There are many traces of such an influence and many of these are indicated by Steuart's editor (see the Skinner (1966) index)—for example, with respect to population and agriculture; the determination of rents as a surplus; value theory; and the location of economic activity—to which may be added Steuart's treatment of multiple (partly customary) subsistence levels and relative wages, and the wealth-as-durables doctrine (Steuart 1767:269-76, 398-9, 496, 365), though the latter is also shared with Petty. Suffice it to add that if in developing his ideas Steuart was not indebted to Cantillon (or Quesnay), then Steuart's achievement would be greatly enhanced. With regard to Smith, there is one reference to Cantillon's *Essai* in *The Wealth of Nations* (1776: bk. I, ch. viii, 85), on the subject of subsistence wages; but given Smith's 'austere', by modern standards, approach to citing sources, it is natural that many have speculated about a range of possible influences, including Cantillon (for example, Jevons 1881:343-4, 354-6; Murphy 1986:279; Brewer 1992b:191-4). It seems virtually certain that Cantillon had little direct influence, for a similar reason to that offered above with respect to Cantillon—Quesnay—Turgot and Petty—Cantillon—Steuart: in Smith's case, virtually anything which could have been derived from Cantillon could have been derived in a more refined form from Quesnay or Turgot. As to other influences of Cantillon, no doubt the most notable English routes were via Malachy Postlethwayt (1749), which contains approximately 6,000 words of the *Essai* without acknowledgement, and Postlethwayt (1751, 1755), which contains virtually the entire *Essai* unacknowledged, as well as Postlethwayt (1757), which contains similar but less-extensive borrowings; together with Joseph Harris (1757-8), the early sections of which also borrow quite extensively from the *Essai* without acknowledgement—or perhaps borrow from Postlethwayt's version of it (*vide* Jevons 1881:355-6; Higgs 1931b:383-4, 386, 390; Johnson 1937:190, 204-5, 402-8). Johnson (1937:205) concludes that the 'influence of Cantillon upon British economic thought can...be ascribed largely to Postlethwayt's writings'. Higgs (1931b:386) described Cantillon as 'the economist's economist' in the eighteenth century, and this seems amply borne out by the set of diverse influences detailed by Spengler (1954:283; also 420-4), including (apart from the above) Cesare Beccaria, François de Forbonnais and Vincent de Gournay.

All this indicates in a suggestive way the significance of the Petty-Cantillon heritage, additional to the Quesnay connection.⁴ It is evident that a more comprehensive and clearer picture of the transmission of ideas from

Petty and Cantillon to eighteenth-century (and later) economic literature—a picture which does not yet fully exist—would be very valuable in providing a key element of the wider cumulative development of economic science in this nascent period. Bits and pieces of this puzzle have been provided by many writers; but much remains to be done. In order to complete the mere sketch provided here, some comments may be added on relations between Quesnay, Turgot and Steuart. (The influence of Quesnay and Turgot upon Smith will be examined briefly in the following section.) It is well known that Quesnay exercised a strong influence upon Turgot with respect to production, distribution, value and related topics (for example, taxation); though he was never a mere disciple in thrall to Quesnay. As to Quesnay and Steuart, we have already suggested that Cantillon was probably the decisive influence upon Steuart's treatment of production, distribution and value. Attention was also drawn to Sen's argument emphasizing Petty and downplaying Cantillon. Sen (1957:45–6) also doubts that there was much influence of Quesnay upon Steuart—on the basis that a draft of Books I and II of the *Principles* (which cover all the essentials of Steuart's treatment of production, distribution and value) was in existence by 1759 (*vide* Skinner 1966:xli, 741–2), too early to allow a significant Quesnay influence in Sen's judgement. But there is no compelling reason why the draft of 1759 could not have been significantly influenced by the Quesnay publications of 1756–7, any more than to suppose that it could not have been influenced by Cantillon's *Essai* of 1755 (or the 1756 Amsterdam edition, which appears to be the one to which he had access: Johnson 1937:364 n. 37). Two to three years is long enough for such influence to be exerted. Furthermore, with regard to Cantillon-Steuart, Steuart's probable acquaintance with Mirabeau—who had possession of the manuscript of the *Essai* (see introduction to Chapter 5)—in 1754 is notable (Skinner 1966:xxxvii). The more plausible basis for rejecting a substantial influence of Quesnay upon Steuart is not the brevity of the period from 1756–7 to 1759, but rather, the lack of many evident traces of Quesnay in Steuart's text.⁵ Certainly in general, Steuart's economics is closer to the pre-capitalist character of Cantillon's economics, notwithstanding Steuart's more systematic treatment of profits. With regard to Turgot and Steuart's *Principles* there is no reason to suppose any influence at all.

Of all the major figures in the classical formation—Petty, Cantillon, Quesnay, Turgot, Steuart and Smith—a comparison of Quesnay and Steuart is particularly interesting because they represent virtually contemporaneous but distinct ways in which attempts were made to further develop the Petty-Cantillon heritage. Consider the abstract formulation of the essence of Quesnay's production, distribution and value system presented by Gilibert (1989:93–4):

$$C_c p + I_c + R = C p \quad (9.1)$$

$$C_i p + I_i = I \quad (9.2)$$

where the C , I magnitudes are quantities of corn and iron respectively, with subscripted quantities being inputs to each production process or sector, and p is the price of corn expressed in iron. Iron output (I) equals its cost of production whereas production of corn output (C) generates a net revenue (R) over and above its cost of production. These price equations are formally equivalent to the price equations for Steuart's system employed in Chapter 8 above (esp. equations (8.15), (8.16)), with these differences: surplus wages and profits are zero; no assumption is made concerning returns to scale; iron is numeraire.⁶ Restating the Steuart price equations with zero surplus wages, zero profits in corn production, and iron as numeraire:

$$p_j \alpha_{\alpha} + \alpha_{\kappa} + (r_j/T) = p_j \quad (9.3)$$

$$p_j \alpha_{\alpha_j} + \alpha_{\beta_j} + \pi_{\beta_j} = 1 \quad (9.4)$$

Rearranging,

$$p_j = [(1 - \alpha_{\beta_j}) - \pi_{\beta_j}] / \alpha_{\alpha_j} \quad (9.5)$$

$$r_j = T \{ (1 - \alpha_{\alpha}) [(1 - \alpha_{\beta_j}) - \pi_{\beta_j}] - \alpha_{\alpha} \alpha_{\kappa} \} / \alpha_{\alpha_j} \quad (9.6)$$

$$[(1 - \alpha_{\alpha})(1 - \alpha_{\beta_j}) - \alpha_{\alpha} \alpha_{\kappa}] / (1 - \alpha_{\alpha}) > \pi_{\beta_j} \geq 0 \quad (9.7)$$

Equations (9.5) and (9.6) show that p_{c_j} rises as p_{j_j} falls, and r_j (or for that matter, r_c) rises as p_{c_j} rises; so that net revenue in agriculture (here identified with the rent rate) is maximized when the price of agricultural output (corn) relative to manufacture (iron) is at its maximum feasible value (that is, consistent with the iron price covering cost), which occurs when manufacturing profits are zero. As Gilibert indicates, this captures a key element of Quesnay's economics—the importance of high price (*bon prix*) in agriculture in order to enable the development of agriculture (cf. Vaggi 1987:129–31). Quesnay's (at least implied) price system being so understood leads to the conclusion that Steuart's treatment of profits and prices in manufacture places him to some extent above Quesnay with regard to value and distribution theory, but this is qualified by recognition of Steuart's blurring of surplus wages and profits. In other respects, Quesnay's superiority to Steuart relates particularly to the treatment of capital, which places Quesnay in advance of everyone prior to Turgot—and of course, the *Tableau* formalization of intersectoral relations.

9.2 THREE CONCEPTS OF PROFIT

The problematic treatment of profits in relation to surplus in Cantillon, Quesnay and Steuart has been a major theme in the preceding chapters. In order to bring this issue to a resolution it is useful to distinguish three concepts

of profit in relation to functional distribution of income: payment for ‘superintendence’ of production (and exchange); returns for risk and ‘trouble’ in production, investment and finance; pure remuneration for capital advanced. The key analytical distinction which needs to be drawn in this context is between income payments for forms of labour—and therefore proportional to a kind of labour input—and income payments proportional to capital advances (in production in particular). Superintendence or supervision of economic activities (particularly production) is a species of labour, so the income received for it should be regarded as a species of wages. Whether such managerial labour is (entirely) technically necessary to production—or rather, is particular to specific forms of social economy (for example, ‘necessary’ managerial input which is particular to *capitalist* production)—is a question which may be left aside here; except to note that even under competitive conditions such ‘socially necessary’ (but perhaps technically unnecessary) labour, and associated income, would not be eliminated.

The notion of remuneration for risk and trouble (see, for example, Turgot 1766:70–1, 85–6) comes closest to capturing the notion of returns for an entrepreneurial function—normal profit of enterprise (putting aside temporary and windfall entrepreneurial gains due, for example, to innovation and new profitable opportunities, gains which will not persist under competitive conditions). In fact, returns for ‘trouble’ or ‘care’ belong with wages of superintendence, being best understood as a species of managerial labour—and indeed, in modern capitalism such managerial functions have been increasingly divorced from risk-bearing and capital provision in practice as well as conceptually. Risk in investment and production, on the other hand, is best understood as proportional to capital advanced, and implies a premium over and above the ‘pure’ remuneration of capital conceived as a return proportional to the value and duration of advances in production as such. Of course, in practice (and in non-technical language) these functionally distinct economic activities and associated income categories are commonly confused, particularly when two or three of these functions are combined in one person or corporate entity; for example, when one entity advances capital to a risky venture, bears the risk, and manages the same enterprise. Furthermore, as Meek (1954: esp. 21–8) points out, in the formative phase of capitalism (which includes the period under consideration here) the capitalist/worker distinction and associated functional distribution was still in the process of emerging out of earlier forms of production relations.

From the standpoint of these conceptual demarcations the developments after Petty on the subject of profits—in Cantillon, Quesnay, Steuart, Turgot and Smith—can most clearly be understood. Cantillon’s ‘undertakers’—overseers, farmers, master artisans, water carriers, chimney-sweeps, and so on—in our terms here, are superintendents of production and allocation, and/or risk bearers: there is no conception of a pure (or ‘general’) rate of

profit on capital, notwithstanding the intrusion of large-scale rentiers into Cantillon's text. Nor is there any such conception in Quesnay; though there certainly are capital advances and a notion of persistent farmers' profits, as well as more transitory industrial and mercantile profits, but great difficulties in his treatment of accumulation, profits and surplus. Steuart has a somewhat more systematic treatment of profits, and certainly a more generalized treatment (embracing production as such, not merely agriculture); but he lacks any distinct treatment of capital, so that profits are difficult to rationalize systematically on any of the three grounds noted above, other than the first (quasi-wages).

All the difficulties and contradictions in the treatment of profits, capital and surplus in Cantillon, Quesnay and Steuart may be seen as expressing pioneering attempts by economic theorists to come to grips with emerging capitalism in an age of transition. It is probably Turgot's most significant claim to a fundamentally important place in the history of economics that he was the first to theorize distribution (of surplus) in an analytical framework which draws clearly the threefold distinction stated above. Economic surplus, by definition the only source of accumulation, is generalized to manufacture as well as agriculture, notwithstanding obeisances to Physiocracy; and (like Steuart) at least some wages are apparently above subsistence:

not only the Proprietors of landed estates...accumulate...surplus produce. Although the profits of industry are not, like the revenue of the soil, a gift of nature...a man who is more expert, more active, and above all, more thrifty... [may] earn...a little more than... necessary for...subsistence...and...set...aside this surplus to create therewith a little store.

Whoever, either from the revenue of his land, or from the wages of his labour or industry, receives each year more value than he needs to spend, may set aside this surplus and accumulate it: these accumulated values are what is called *a capital*.

(Turgot 1766:65, 69)

The pure (net) remuneration of capital is distinguished from returns for risk and superintendence, with the last clearly perceived as a form of wages:

It is the Owners of large capitals who, in order to make them productive in agricultural enterprises, take leases of land, and pay the Proprietors large rents, taking on themselves the whole burden of advances. Their position is essentially the same as that of Entrepreneurs of Manufacturing Industry: Like them,...they have to obtain...apart from the return of their capital, i.e. their original and annual advances, firstly, a profit equal to the revenue they would be

able to acquire with their capital without any labour; secondly, the wages and the price of their labour, of their risk and their industry...

...money employed in agriculture, in industry or in commerce, ought to produce a more considerable profit than the revenue of the same capital employed in the purchase of estates, or the interest of money placed on loan; for since these employments require, in addition to the capital advanced, much care and labour, if they were not more lucrative, it would be more advantageous to secure an equal revenue which might be enjoyed without having to do anything. It is necessary then, that, besides the interest of the capital, the entrepreneur should draw every year a profit to recompense him for his care, his labour, his talents and his risks...

(Turgot 1766:71, 86)

And, as implied in the last quotation, there is a systematic tendency towards equalization of the advantages of alternative employments of capital: the returns to different uses of capital establish ‘a kind of equilibrium amongst themselves’:

as soon as the profits resulting from an employment of money, whatever it may be, increase or diminish, capitals turn in that direction or withdraw from other employments, or withdraw and turn towards other employments; and this necessarily alters in each of these employments, the relation between the capital and the annual product [that is, its return].

(Turgot 1766:87)

Turgot thus grasped the role of competition in equalizing rates of return on capital net of differential risk and other returns for entrepreneurship or superintendence. None of his predecessors had so generalized the notion of arbitrage operating to eliminate differential returns, beyond the realm of commodity prices, wages, and to some extent interest in relation to land prices. (See also section 9.3 below.) Also, he had escaped the Physiocratic restriction of surplus to agriculture. The key remaining weakness in Turgot’s account of profit equalization is that the notion of competition generating a general rate of profit (as well as distribution in general) is not clearly integrated with the determination of prices—a weakness which was to be overcome in Smith’s *Wealth of Nations*. How much he learnt from his two French predecessors, Quesnay and Turgot, has long been a subject of speculation. In part this has been fuelled by the intervention of Smith’s 1765–6 sojourn in Paris and exposure to Quesnay and Turgot, between Smith’s extant early lectures and draft of the *Wealth of Nations*, on the one hand, and the complete 1776 version of the book on the other. Two key

elements in particular have been proposed as appearing in the latter but not (or not very clearly) in the former: capital accumulation and growth; and even more so, the general rate of profit or pure remuneration of capital. The former element is suggestive of a possible Quesnay influence. The latter element is suggestive of a possible influence of Turgot, who was almost certainly writing his *Reflections* (1766) during Smith's 1766 stay in Paris (Groenewegen 1977:xvii–xxi). The possibility that Turgot rather derived his treatment of profits from Smith (Walsh and Gram 1980:40, 61, 71) can be discounted by this chronology.⁷ In any case, whatever the extent of the Quesnay—Turgot influences upon Smith, his integration of distribution, value and capital accumulation in a quite comprehensive treatment of capitalist economic development better captured the essentials of the prevailing trend of historical development than had any of his predecessors; and this alone must have gone a long way towards ensuring the dominant place of his text in the new science, notwithstanding Turgot's great merits. Relative to this, the fate of James Steuart's *Principles* was sealed, first and foremost, by its failure to grasp just this capitalistic character of the dominant historical trend, as well as its wider conception of the role of the state (cf. Meek 1958:298).

9.3 VALUE AND COMPETITION

The above discussion of profits and capital points to the limitations of all conceptions of competition prior to Turgot and Smith, with regard to capturing the character of the capitalist social economy: the absence of a systematic role for competition in eliminating differential advantages in employments of capital means that pricing of commodities and distribution of income (including rents) in a capitalist framework could not possibly be adequately conceptualized. It therefore is not surprising, indeed it is predictable, that the theory of value prior to Smith also would be essentially pre-capitalist in character. Nevertheless, elements for the classical approach to prices were assembled prior to Smith. The key elements of the classical approach are: the concept of natural prices as a 'centre of gravity' with respect to which actual prices are regulated via the forces of competition, in particular, expressed in variations in quantities supplied and/or demanded in response to profitable arbitraging opportunities; and the concept of natural prices (normal or fundamental exchange values) as determined by objective forces, in particular, production and cost conditions and distribution.⁸ With regard to the latter classical concept, Petty's analysis of labour-embodied natural price and political price—and Cantillon's treatment of intrinsic values and prices necessary for reproduction, which is carried over into Quesnay and Steuart—are the most striking early instances. As has been indicated at a number of points in the preceding chapters, to the extent that these objective theories of normal prices conceive some measure of production costs as (at least partly)

determining such values, they all suffer from the defect that in general costs are not independent of prices. Furthermore, even putting aside the interdependence of prices and costs, unless a notion of normal or equilibrium costs is employed, the cost ‘explanation’ of prices could come close to being a tautology. The post-classical resolution of the interdependence of ‘natural’ or equilibrium costs and prices, in an essentially classical framework, is outlined in section 10.3 below.

With regard to the notion of competition adjusting actual values towards natural/normal values, it may first be noted that the idea of prices adjusting in response to demand/supply imbalances is by no means an innovation of Petty and the eighteenth-century economists. Indeed, this idea should properly be regarded as merely expressing an aspect of market processes that was widely observable before the eighteenth century. Hence in the seventeenth-century economic literature there are many observations concerning such price changes induced by quantity imbalances:

it is the plenty or scarcitie of commodities, their vse or Non-vse, that maketh them rise and fall in price... Merchants of experience know, that commonly one Commodity riseth, when another falleth: and that they fall and rise, as they are mor or lesse in request and vse.

(Misselden 1623:21)

North (1691:518, 522; also 537) speaks of a ‘universal Maxime’ that ‘plenty makes cheapness in [commodities]...when they come to Market in greater Quantities than there are Buyers to deal for, the Price will fall’; ‘more Buyers than Sellers raiseth the price of a Commodity’. Locke (for example, 1691:169–70), far more than any other seventeenth-century writer, sought to deploy this idea as a general principle of wide-ranging and supposedly deep significance:

The value or price of any thing, being only the respective estimate it bears to some other, which it comes in Competition with, can only be known by the quantity of the one, which will exchange for a certain quantity of the other. There being no two things in Nature, whose proportion, and use does not vary, ‘tis impossible to set a standing regular price between them. The growing plenty or scarcity of either in the Market; (whereby I mean the ordinary places, where they are to be had in Traffick) or the real Use, or changing fashion of the place bringing either of them more into demand than formerly, presently varies the respective value of any two Things. You will as fruitlessly endeavour to keep two different Things steadily at the same price one with another, as to keep two Things in an Æquilibrium, where their varying weights, depend on different Causes.⁹

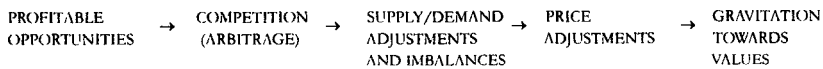
These accounts at most explain only price *fluctuations*. There is no conception of what might determine the values that prices take when

quantities supplied and demanded balance. The theoretical innovation in Petty—further developed by Cantillon—is to conceive this fluctuation of prices to be underpinned by, or ‘moored’ to, systematic forces captured in ‘values’ which would prevail under (conceptual) conditions in which all such disturbances are eliminated or resolved: to conceive of a centre of gravity, in other words. Hence follows Cantillon’s (1755:115–19, emphasis added; cf. 107, 113) acute comment upon Locke:

The real [that is, intrinsic] value of everything used by man is proportionable to the quantity of Land used for its production and for the upkeep of those who have fashioned it [*vide* section 6.2].... Mr. Locke who, like all the English writers on this subject [*sic*- Petty!], *has looked only to Market Prices*, lays down that the value of all things is proportionable to their abundance or scarcity, and the abundance or scarcity of the silver for which they are exchanged.... I consider that Mr. Locke’s idea is correct *in the sense of the following Chapter, and not otherwise....*

The quantity of Produce or of Merchandise offered for sale, in proportion to the demand or number of Buyers, is the basis on which is fixed...the actual Market Prices; and...*in general these prices do not vary much from the intrinsic value.*¹⁰

Thus Cantillon provides an objective mooring for market prices in relation to quantities supplied and demanded (cf. Chapter 6, note 2). Furthermore, the role of the idea of price adjustment in response to the *proximate* cause of demand/supply imbalance, in this Petty-Cantillon theoretical framework takes on an additional and deeper meaning: in addition to random disturbances and shocks, quantity adjustments *in response to differential advantages* generate imbalances and consequent price adjustments in the direction of eliminating those differential advantages, by shifting prices towards values. Hence there is a longer and much more substantial chain of causation:



The demand/supply-imbalance-price-adjustment idea captures only the third of these four causal links.

Very few other than Petty, before Cantillon, intimate anything resembling this conception of a centre of gravity or normal price which regulates market phenomena. Davenant (1695:19), for example, employs the ‘scarcity’ explanation of price variations—‘the particular price of Goods is ambulatory, sometimes high, sometimes Low...this arises from...their being at that time either Scarce or plentiful’—and also comments cryptically that ‘in a small compass of time, all commodities whatsoever find their just and natural price, in which they settle at last’ (Davenant 1698: vol. I, 286). This is more evocative of a residual scholasticism than a prefiguration of the

classical approach to price theory. In other statements Davenant (1695:13, 16, 18–21) seems to imply something like a normal price but no explanation of its determination is offered. He also makes some use of a cost-price notion (for example, Davenant 1698: vol. I, 427–32).

Misselden (1623:97–9) refers to the parity at which commodity currencies exchange in accordance with their silver (or gold) content as the ‘Natural Exchange’—‘that Cynosure [that is, pole-star] or Center, wherevnto all Exchanges have their naturall propension’. The actual exchange rate (the ‘Politique Exchange’) ‘is...vncertaine, because it is greater or lesse, according to the circumstances of time, and place, and persons’. This is a very special and rather obvious case of gravitation—the centre (or equilibrium price equation) merely involves the equation of quantities (and qualities) of silver or gold of different nominal currency denominations. (Note also the similarity to Petty’s language—natural and political price—in his third model of production.)

Locke (for example, 1691:71–2, 164–7) also uses the language of natural value, but merely to refer to unregulated market price. Others, like Davenant, make some use of a cost-price notion (for example, Coke 1670:49–51, 54–7, 60–3). Barbon (1690:15–16) offers the scarcity/plenty explanation of prices: ‘present Value...ariseth by Computing the occasions or use for [commodities], with the Quantity to serve that Occasion;... So that Plenty, in respect of the occasion, makes things cheap; and Scarcity, dear.’ But he also suggests that ‘[T]here are two ways by which the value of things are a little guessed at’: by considering the merchant’s price and the artificer’s price. The former is determined ‘by reckoning Prime Cost,¹¹ Charges and Interest’. The artificer’s price is set by ‘reckoning the Cost of the Materials, with the time of working them’, the ‘Price of Time’ depending upon ‘the Value of the Art, and the Skill of the Artist’. It is not clear how the scarcity/plenty and cost explanations fit together; but the implication seems to be that market prices must adjust to the latter, sort of cost-determined ‘supply prices’; though he adds: ‘But the Market is the best Judge of Value; ... Things are just worth so much, as they can be sold for’—which is hardly more than a tautology.

Neither in Petty, Cantillon, Quesnay and Steuart, nor in the faint glimmers about cost-prices in other writers, is the principle of competition or the role of arbitrage extended to the elimination of differential profits on capital advanced. Arbitrage and competition have extensive but decisively limited domains of operation. Uniformity of prices is projected by Cantillon. Even international arbitrage of the prices of silver and gold is recognized—for example, in Steuart and, indeed, already implied in Misselden (quoted above)—but there is no arbitrage of producers’ profits. The only clear instance of equalization of rates of return prior to Turgot—and it is striking precisely because of its singular character—is the equalization of rates of return on land and money (credit), net of differential risk; that is to say, the

determination of land prices by reference to the present value of rents discounted by the rate of interest. Petty and Cantillon both had this notion and it was shared by others in the seventeenth century (Barbon 1690:20–1; North 1691:517–18). Locke (1691:55–61, 102–6) equivocates on the issue though tending against it. In the context of his opposition to legal abatement of interest one suspects that the equivocation is due to a desire to avoid the conclusion that interest rate reductions would generate capital gains to landowners—which would evidently make abatement attractive to legislatures made up of landowners. Whatever the reason, his position is certainly regressive, analytically speaking, since demand for and supply of land are not understood to be disciplined by competition. Barbon (1690:20) suggests an extension of the notion of equalization of returns beyond land (rent) and credit (interest), to include interest and merchants’ returns, a quite significant innovation: interest is

the Rule by which the Trader makes up the Account of Profit and Loss; The Merchant expects by Dealing, to get more then Interest by his Goods; because of Bad Debts, and other Hazards which he runs; and therefore, reckons all he gets above Interest, is Gain, all under, Loss; but if no more than Interest, neither Profit, nor Loss.

He explicitly defines trade to include production and ‘Stock’ refers explicitly to all natural and manufactured (‘Artificial’) ‘Wares’, not merely money (Barbon 1690:9, 21–2). This emphasis on production is evidenced, for example, by a comment on rent, evocative of Petty: ‘Mony is an Imaginary Value... It is the Natural Stock that is the Real Value, and Rent of the Land’. Barbon (1690:20) argues similarly that to treat interest as the rent of money is a ‘mistake’: ‘the Interest is paid for Stock: for the Mony borrowed, is laid out to buy Goods... No Man takes up Mony at Interest, to lay it by him, and lose the Interest of it.’

Finally, the absence of a thoroughgoing conception of capitalist competition has a further significance—for the theory of rents. This absence means that the theory of rents in Petty, Cantillon, Quesnay and Steuart (and for that matter, all other writers of the period) is itself essentially pre-capitalist in character. As has been noted in passing in relation to Cantillon and Steuart in particular (sections 5.2, 6.2, 8.3, 8.4), rents appear as a price-determining cost of production in circumstances in which land is essentially homogeneous—that is to say, differential land quality is not systematically taken into account in the analysis of rents and prices. (The only significant exception to this in Petty and Cantillon is the discussions of differential rents and agricultural prices in relation to location of land—where ‘location’ is precisely the differential quality—noted in Chapter 3, note 29 and Chapter 7, note 12.) What can also be said of all four writers, and Turgot, is that the magnitude of rents is essentially of *conventional* determination, though Turgot

has heterogeneous land fertility and heterogeneous agricultural production methods, as well as increasing and decreasing (intensive) returns (Turgot 1767:109–13; Groenewegen 1982:120, 131). The character of their surplus theories points to just this conclusion: rents as a surplus left over after deduction of the conventionally (or historically) determined necessary labour consumption and other inputs (and profit on capital, in Turgot's case), where output and input are in turn dependent upon technical conditions of production including land quality. But in a framework of generalized capitalist competition (cost minimization, profit maximization by all producers; no profitable arbitraging opportunities in equilibrium), positive rents and homogeneous land are only simultaneously possible if land is 'scarce'. That is to say, scarce, not in the marginalist sense (see note 9), but in the specific sense that the total social demand for the output from land cannot be satisfied in the absence of more-intensive and, at the same time, more-productive per unit of land, methods of agricultural production (*vide* Kurz 1978:120–8; and section 10.3 below). It is only under these conditions that (homogeneous) landowning in a competitive capitalist economy would provide a claim to a share of the social surplus.¹² No such appeal to scarcity in relation to multiple production methods is to be found in the treatment of rents in Petty, Cantillon, Quesnay and Stuart; though alternative methods of agricultural production certainly play a systematic role in Quesnay's economics in other respects. In short, land and rents have not been incorporated into capitalist social relations by these writers. But the inconsistency between these early theories of rents and capitalist competition should be seen in proper historical perspective: the determination of rents in a classical competitive framework was not really clarified until Sraffa (1960: ch. XI); though the Ricardian theory of rents (associated with Malthus, Ricardo, Torrens and Edward West) was a vital if flawed breakthrough (*vide* Kurz 1978).

9.4 THE FATE OF POLITICAL ARITHMETIC

What of the subsequent fortunes of Petty's project of political arithmetic? The subject of accumulation grew naturally out of Petty's economics (*vide* section 3.4). From out of the considerable scope of Petty's economics, Gregory King (1696, 1697) took this one subject and in his political arithmetic gave it both rigorous analytical form and careful empirical expression. By working with fairly rigorously defined identities and Petty's incipient notion of accumulation of social wealth, King was able to develop the first really reliable empirical analysis of national income and its division between current consumption and accumulation so understood. King's analysis of the accumulation or growth of wealth was concerned with income net of (nondurable) consumption. The underlying principle was that accumulation would be the greater, the greater net income so understood. Petty's statement that 'Where a People thrive,...the income is greater than the expence' (Petty 1690:306) provides the appropriate

motto for King's analysis. Hicks's (1983:17) characterization of political arithmetic as 'social accounting', discussed in section 3.5, applies with more force to King than to Petty.

Charles Davenant (for example, 1698) took over King's analysis wholesale, though in some cases changing the empirical magnitudes. Minus the benefit of King's analysis, Davenant's economics looks much more insubstantial.¹³ The fact that Davenant (1698: vol. I, 127–49) could identify political arithmetic *merely* with calculation applied to statecraft (and so believe that there were ancient practitioners such as Hannibal) indicates his failure to grasp, or rise to, Petty's ambitious vision for a new 'mixed' science devoted to the goal of prosperity (*vide* section 4.2 above). King provided an important analytical contribution, albeit of limited scope. Davenant provided no such distinct contribution and narrowed the meaning of political arithmetic, as evidenced, on the one hand, by his preoccupation with a narrow politico-military agenda; and on the other, by his emphasis on public finance and foreign trade. It will be recalled that part of Petty's explicit intention for political arithmetic was the extensions of quantitative analysis beyond merely public finance (*vide* section 3.5). Petty's grand scheme was emasculated. Furthermore, neither King nor Davenant made any significant use of the theory of surplus.

King's analysis represented important progress in a significant if limited part of Petty's economics. Furthermore, as empirical research, King's contribution was much more careful than Petty's empirical estimates and robust enough for Deane and Cole (1962) to begin their study of English economic growth at 1688, the year from which King's data begin.¹⁴ King's achievement was not to be paralleled for some seventy years, until the work of Arthur Young. Indeed, Deane and Cole (1962:1) comment: 'In their completeness and internal consistency his [King's] estimates remained unique until the twentieth century' (cf. Hutchison 1988:47).

Davenant (1698: vol. I, 129–30; cf. 135) attributes inaccuracies in Petty's empirical work at least in part to dubious personal motives—desire for political preferment. King (1696:13) rather implies that the causes were lack of accurate information and a kind of nationalistic 'Vanity'. Davenant's accusation is at the very least dubious (cf. Deane 1955:4–5)—Petty was hardly a 'yes-man', as his biography indicates (Chapter 2, esp. section 2.4). The following is also worth consideration, concerning Davenant himself (Waddell 1958:288):

[He] lacked the...integrity necessary for the role which he...tried to play—that of a partisan pamphleteer who was yet a man of independent judgement and not a mere hack...his enemies had some excuse for regarding him as a purely self-seeking and mercenary time-server.

In the subsequent century, certainly in the first half of the eighteenth century,

quantitative analysis was much inferior to that developed by King and it was employed in quite sophistic ways. The quality of this latter-day political arithmetic was also compromised by the fact that these later writers were going back to Petty's writings because King's manuscripts were not then published, except piecemeal in Davenant's writings (Deane 1955:12–14). Arthur Young's works 'were the first considered and original estimates of national income since Gregory King' (Deane 1955:19; cf. Bauer 1894).¹⁵

It is impossible to know whether it was in response to these eighteenth-century developments—rather than, or as well as, Petty—that Adam Smith (1776: bk IV, ch. v, 534) declared: 'I have no great faith in political arithmetick...'. Certainly it cannot simply be assumed—as, for example, by Eatwell (1987:537)—that Smith was alluding to Petty; and even if so, alluding to Petty's economics as a whole. Whatever Smith's target precisely was, Schumpeter (1954:212) responded to the comment with outrage, evidently judging it as evidence for an indictment of Smith rather than of political arithmetic:

[Petty's] inspiring message...[and] suggestive program...wilted in the wooden hands of the Scottish professor and was practically lost to most economists for 250 years: A.Smith took the safe side that was so congenial to him when he declared...that he placed not much faith in Political Arithmetick.

The '250 years' of course refers to the birth of econometrics as an explicit discipline in the 1930s, as embodied in the Econometric Society (established 29 December 1930) and *Econometrica* (first published January 1933), Schumpeter being a founding member of the Society and its Council, and of the Advisory Editorial Board of its journal (cf. Schumpeter 1933: esp. 6–7). As our story concerning the formative period of classical economics comes to an end, Marx's view of political arithmetic—which definitely refers to Petty's political arithmetic (quoted in section 1.1)—may be repeated, with us emphasizing the element of self-consciousness: 'political arithmetic [is] the first form in which political economy is *treated* as a separate science' (Marx 1970:53–4, emphasis added).¹⁶

ADAM SMITH AND AFTER

The aftermath of the history presented in the preceding chapters, from the mid-eighteenth century to the late twentieth century, has as its main themes the rise and decline of classical economics (including Marxian economics); the emergence and eventual dominance of marginalist economics, challenged in particular by Keynes; and Sraffa's reconstruction of the classical approach to distribution and value, which also entailed a critique of the marginalist approach. This final chapter sketches some main elements of these subsequent developments and outlines the contours of a generalized treatment of the classical approach, applicable to the contemporary economy and an alternative to marginalism. Sections 10.1 and 10.2 examine aspects of mature classical economics and marginalism. Sections 10.3 and 10.4 outline the generalization of the classical approach and indicate the significance of some aspects of the economics of Sraffa and Keynes, for this modern reconstruction.

10.1 MATURE CLASSICAL ECONOMICS

Cantillon, Quesnay, Steuart and Turgot—if not Petty—were no less authors of systems of political economy than was Adam Smith. At least this is so if 'system' is taken to mean a quite comprehensive account of economic life based upon general explanatory principles; that is to say, a set of causal principles for determination of the salient features of economic life, as they confronted each of them. The dominant position which Smith acquired as a founder of the new science cannot be due to his being the first author of a system of political economy. Whatever extra-scientific reasons may assist in explaining the historical position of Smith in the formation of political economy as such (for example, nationality, ideology), in purely intellectual terms his superiority over his predecessors would seem to rest upon the combined effect of three aspects of his thought:

- 1 a thorough integration of manufacture into the theory of production and allocation;

- 2 a clear conception of equilibrium prices which includes a general rate of profit on capital as an element of normal production costs, thereby placing capitalism at the centre of the theory of distribution and value, and connecting this with capital accumulation;
- 3 a satisfying conception of the scope of political economy conceived as a distinct project, though not thereby independent of other human sciences.

The economic writers discussed in the preceding chapters (and all others before Smith) fail on one or both of the first two elements and all fail on the third (formal) element. For this reason Smith (1776) may be regarded as the advent of ‘mature classical economics’ (cf. Walsh and Gram 1980:48)—a tradition which was in decline by the mid-nineteenth century, save for the Marxian stream.

But did Smith himself employ a surplus approach? In particular, is income distribution in Smith explained by reference to conditions of production of a social surplus, together with some principle for distributing that surplus? In the first instance, two comments are in order. Marx, who invented the notion of classical economics, had no doubt that Smith belonged to that tradition and employed its characteristic surplus approach (see section 1.1; O’Donnell 1990:142–70). Second, whether or not Smith articulated a surplus theory of distribution and value, there is no trace in Smith of the later marginalist theories of distribution and prices. In this regard, the core structure of marginalist theory must be kept firmly in mind. The concept of supply and demand functions for ‘factors of production’ and commodities, which would offer an explanation of distributive variables and commodity prices in general, proceeds from the notion that optimization under conditions of well-behaved substitutability between factors (with respect to factor prices) and/or substitutability in consumption (with respect to commodity prices), together with ‘endowments’, generates stable equilibria. This is *essential* to the theories of 1871 and after—whether or not that was clearly understood in the formative period of marginalist theory. It cannot be found in the pages of the *Wealth of Nations*.

The role and causal significance of economic surplus in Smith’s system has been considered by a number of writers in recent times (Kurz 1980–1; Bharadwaj 1989a). Without doubt, the issue has been most systematically and ably examined by O’Donnell (1990: esp. 27–52, 82–117). His persuasive conclusions, based upon careful textual exegesis and unusually clear analytical standards, is well summed up in his own words:

examination of Smith’s treatment of distribution has shown that, although he adhered consistently to his particular ‘subsistence’ theory of wages, he failed to explain the determination of the rate of profit and, in particular, he did not identify a clear analytical relation between the *rates* of wages, profits and rent.... On the one hand, there

is in the *Wealth of Nations* a surplus theory of the *amount* of profits plus rent, based on the distinction between productive and unproductive labour and the ranking of industries according to their surplus producing potential. Smith consistently related the rate of *accumulation* to the magnitude of aggregate profits plus rents. However, in general, he did not use these changes in the amount of profits plus rent (brought about by changes in the extent of the market, the pattern of production, or the inputs to production) to calculate changes in the *rate* of profit. Indeed, he did not consistently relate the rate of profit to the ratio of aggregate profits to aggregate capital advanced. On the other hand, there is also in the *Wealth of Nations*, in the component parts of price, a ‘theory’ of price which relates prices to the *rates* of wages, profits and rents, but which does not provide or draw on an adequate explanation of the rate of profit.

(O’Donnell 1990:101)

This clarification has also the effect of demolishing the two versions of Smith interpretation (with respect to distribution and value) which have dominated opinion over the last two decades—Smith as primitive marginalist (Hollander 1973); and the ‘two streams’ view (Dobb 1973) which perceives Smith as a source of the two distinct traditions of economic theory, classicism and marginalism (O’Donnell 1990:121–229). Of course, it is Ricardo who first formulates a determinate theory of the rate of profit in the framework of a surplus approach, and Marx followed Ricardo’s lead. But by the time Marx was reworking Ricardo, classicism was largely in decline in the mainstream of economic opinion (*vide* Bharadwaj 1983a, 1983b, 1988; Peach 1988; O’Brien 1988; Skourtos 1991). The historical reconstruction of this period of political economy in transition is a task which is yet to be satisfactorily completed. It may be emphasized, finally, that the absence in Smith of a surplus theory of the rate of profit (and so, merely a surplus theory of non-wage shares) no more places him outside the surplus tradition than the absence of a theory of the rate of profit in Petty, Cantillon, Quesnay and Steuart places them outside the surplus tradition. In this respect Smith needs to be perceived in relation to his predecessors as well as his successors. He is indeed the most important intellectual link between Petty-Cantillon-Quesnay and Ricardo.

10.2 CLASSICAL VERSUS MARGINALIST THEORY

This is not the place to enter into a detailed consideration of how and why classicism declined and was eventually replaced by marginalism. However, it is useful to compare in some key respects the structure of classical theory—as partly outlined in the preceding chapters—and marginalist theory. The core of the marginalist approach was defined in section 1.1 and referred to a

number of times in passing in the preceding chapters and section 10.1. The core of the classical surplus approach has been discussed extensively, but especially in section 7.1. To reiterate the contrast: on the one hand, an approach in which (endowment) constrained individual optimization under conditions of substitutability provides the unifying basis for explaining value, distribution, outputs, factor employments and accumulation; on the other, an approach in which production and distribution of a social surplus is employed to explain income distribution, value and to some extent, accumulation.¹ In the former theory no social surplus in the classical sense is to be found—or at least, the social surplus can play no causal role, even if it can be defined. A striking expression of this is that in general it is impossible to guarantee that a general equilibrium along marginalist lines is consistent with the survival of individual agents (Rizvi 1991). That is to say, there is no guarantee that equilibrium prices (together with endowments) allow agents to meet subsistence consumption requirements—other than by assuming that necessary consumption is contained within each agent’s endowment. In the absence of such an assumption, replacement of necessary social consumption is not guaranteed, even if technology is assumed capable of providing it. If it is objected that classicism itself assumes wages cover subsistence requirements, it may be pointed out that the replacement of necessary consumption in the classical framework is via decentralized market exchange—not an assumed possession of subsistence *prior* to production and exchange.

Four further worthwhile lessons for modern economics drawn from the preceding chapters may be outlined.

Production prices

The production-based approach to value in classical economics provides an objective basis for analysis. This is in contradistinction to the subjectivism of the marginalist approach, based as it is upon data (‘preferences’) which could *never* be observed, even in principle; these preferences are mediated through a discredited factor substitution principle (Garegnani 1970; Harcourt 1972; Pasinetti 1977: ch VI; Garegnani 1990), once production as well as exchange is allowed. To be sure, prior to Ricardo and Marx the classical treatments of prices were essentially cost of production ‘explanations’ and subject to the severe analytical limitation that they are thereby almost inevitably circular (due to the dependence, in general, of costs upon prices)—as has been noted in passing at a number of points in the preceding chapters. But the production-based approach can be rescued from this limitation, as well as from the limitations of the Ricardian labour theory of value, as will be shown below (section 10.3). It should also be emphasized in this context that the fundamental difference of conception between the marginalist utility-maximizing allocation of endowments and the classical

reproduction and distribution of surplus should not obscure the fact that the latter as much entails an analysis of allocation as the former—and at least as much via market processes. The difference resides in the different principles for explaining allocation.

Methodological individualism

The production-based approach to value itself is symptomatic of a wider objectivism typical of classical economics, and which was noted in relation to Petty and Cantillon, in particular, in the preceding chapters. Apart from the theory of value, this is most obvious in the treatment of consumption. The historically determined social (including class) character of consumption in classical economics is essentially non-subjective and also implies a rejection of methodological individualism in the particular form it takes in marginalist theory: the notion that economic phenomena can only be explained by the constrained optimizing behaviour of autonomous individuals—an intellectually straitening doctrine worthy of rejection. In classical economics individuals appear as social characters governed by norms and conventions, not merely as individually idiosyncratic beings who share only a common logical structure of preference.

One fundamental reason why the marginalist orthodoxy of the last hundred years has been subject to persistent dissent is that the approach has an inherent tendency to deprive economic life of its social character and thereby emasculate economic science as a species of social theory. Hence follows the vision of the economic system as a set of interacting autonomous and (usually) independent agents—commonly described as ‘households’ and ‘firms’—but agents who engage each other merely as calculating machines for solving optimization problems. It may be noted that criticism of the notion of autonomous individuals is quite independent of the assumption of rational behaviour (Steedman 1989: esp. 206–15). In particular, a certain kind of economic rationality—arbitrage of prices, wages and profits—is certainly not synonymous with, nor logically dependent upon, methodological individualism in its marginalist form.

Sequential method

A further striking difference with regard to method is that the classical approach does not aim for a unified theory in the sense in which marginalism does. To be sure, any scientific endeavour in economics or any other field naturally seeks a complete understanding of the domain of relevant phenomena. That is to say, science wants a complete account of the causes of relevant phenomena. The difference between classicism and marginalism as scientific projects is that the latter proposes a unified theory in the sense that a single fundamental principle is uniformly applied

to the explanation of *all* relevant phenomena; and the former does not. Recall that in the opening paragraph of this section the surplus approach applied specifically to distribution, value and (to some extent) accumulation, whereas the marginalist approach applied constrained individual optimization *simultaneously* to the determination of these phenomena as well as outputs and factor employments (and more). As opposed to this all-embracing singular and unified approach, classical economics employs a sequential method in which different principles are employed to explain subdomains which, for theoretical purposes, are separable and therefore are not determined simultaneously (see Garegnani 1984:292–9). Treating real wages or necessary consumption as given for the analysis of distribution and value (or for Petty’s social division of labour) is a striking example of this sequential method, with the determination of real wages treated in a separable subdomain, though not thereby excluding interactions between the two subdomains. The same separability applies to determination of output and employments, again with interactions allowed. This is a method of analysis which is likely to be, at one and the same time, more modest in its claims and more robust in its achievements, compared to marginalism.

History and theory

Finally, there is a lesson for late twentieth-century economics in the failure of the theorists from Petty to Steuart adequately to grasp the ascendant capitalist form of social economy. Their failure points to the particular difficulties confronting a science whose subject matter is essentially historical and therefore changing—as is the case for all human sciences. The theorist is thereby placed in a position where s/he unknowingly may be conceptualizing a social economy which is passing away, at least in some fundamental respects. It is sobering that even a theorist of the ability of Cantillon was in part theorizing a society which was passing away as he wrote; and, as pointed out in section 7.3, the joke history played on Cantillon was that his system could not comprehend Cantillon’s own position in the social economy. This historical conditioning of theory is a warning against historical arrogance and should encourage a certain modesty with regard to the claims made for economic science. Being based upon an axiomatic view of human psychology, marginalism by its very character is not very open to history. This is less true of the classical approach and separability itself provides scope for history to enter analysis. It may or may not be that late twentieth-century economic society is the end of history and will not be superseded; but in *either* case, it would be historical arrogance of the highest order to *assume* the former.

10.3 A GENERALIZATION OF THE CLASSICAL SURPLUS APPROACH

The classical surplus approach to distribution and value remained flawed and inadequate, even in the analyses of Ricardo and Marx who were the high points of the classical tradition in this respect. A coherent reconstruction and generalization of the classical approach was provided by Sraffa (1960), long after the classical tradition was virtually extinguished. He constructed a decentralized, competitive capitalist system in which, given one distributive variable (the wage share or general rate of profit) and output levels, the technique of production in use will determine relative prices and the remaining distributive variables—and Sraffa thoroughly examined the properties of such systems. It will be useful briefly to relate Sraffa's solutions to some aspects of the formative theories considered above.

Consider a system along the lines of the model employed to examine Steuart in Chapter 8 (esp. section 8.3, equations (8.5)–(8.11)): two commodities (corn, iron) produced by means of corn, iron and labour, employing a given constant-returns-to-scale technique;² but in the first instance, without land input (or assume that land is not scarce and does not command a rent). We can then specify price equations which require that prices cover costs of production and generate a uniform rate of profit (r) on capital advanced (corn and iron input, and wages); where corn is commodity 1 and iron is commodity 2:

$$(p_1 a_{11} + p_2 a_{21} + w l_1)(1 + r) = p_1 \quad (10.1)$$

$$(p_1 a_{12} + p_2 a_{22} + w l_2)(1 + r) = p_2 \quad (10.2)$$

where l_1, l_2 are labour input per unit of corn, iron output. Further, one may assume that the money wage is equal to the value of necessary consumption (subsistence) per worker (c_1, c_2):

$$w = p_1 c_1 + p_2 c_2 \quad (10.3)$$

There are four unknowns (w, r, p_1, p_2) in three equations, and once a numeraire is specified a solution for the rate of profit and relative price may be determined:

$$\begin{aligned} p &= (p_1/p_2) = \alpha_{21}(1 + r)/[1 - \alpha_{11}(1 + r)] \\ &= [1 - \alpha_{22}(1 + r)]/\alpha_{12}(1 + r) \end{aligned} \quad (10.4)$$

$$r = \{-b + \sqrt{b^2 - 4ac}\}/2a \quad a < 0 \quad (10.5)$$

$$r = \{-b - \sqrt{b^2 - 4ac}\}/2a \quad a > 0 \quad (10.6)$$

$$a = (\alpha_{11}\alpha_{22} - \alpha_{12}\alpha_{21}) \gtrless 0 \quad (10.7)$$

$$b = [2a - (\alpha_{11} + \alpha_{22})] < 0 \quad (10.8)$$

$$c = [(1 - \alpha_{11})(1 - \alpha_{22}) - \alpha_{12}\alpha_{21}] > 0 \quad (10.9)$$

$$\alpha_{11} = a_{11} + c_1 l_1 \quad (10.10)$$

$$\alpha_{21} = a_{21} + c_2 l_1 \quad (10.11)$$

$$\alpha_{12} = a_{12} + c_1 l_2 \quad (10.12)$$

$$\alpha_{22} = a_{22} + c_2 l_2 \quad (10.13)$$

The subsistence real wage together with the (surplus-producing) technique of production determine relative price and the rate of profit—profit here being the income form in which all surplus is appropriated—and this system can be generalized to any large finite number of commodities. The dependence of costs upon prices (for example, in Cantillon and Steuart) has been resolved by reducing the determination of relative prices to technology and the real wage. The indeterminacy of profitability (for example, in Steuart and Smith) has been overcome. No recourse to a labour theory of value is required, and the solution may be regarded as a coherent representation of prices of production in the sense of Marx (*vide* Garegnani 1984:303–9).

Land can now be introduced into the production of corn, in an even more simplified model, so as to relate this issue to Petty and Cantillon in particular: land is homogeneous and corn is the only necessary produced input. The price and wage equations become:

$$(p_1 a_{11}^1 + w l_1^1)(1 + r) + (z/e^1) = p_1 \quad (10.14)$$

$$(p_1 a_{11}^2 + w l_1^2)(1 + r) + (z/e^2) = p_1 \quad (10.15)$$

$$(p_1 a_{12} + w l_2)(1 + r) = p_2 \quad (10.16)$$

$$w = p_1 c_1 \quad (10.17)$$

where z is the uniform rent per unit of homogeneous land and $(1/e^1)$, $(1/e^2)$ represent land required per unit of corn output. The superscripts (1, 2) refer to two alternative methods of producing corn. Substituting equation (10.17) into equations (10.14)–(10.16) and again specifying iron as numeraire:

$$\alpha_{11}^1 p(1 + r) + (z_2/e^1) = p \quad (10.18)$$

$$\alpha_{11}^2 p(1 + r) + (z_2/e^2) = p \quad (10.19)$$

$$\alpha_{12} p(1 + r) = 1 \quad (10.20)$$

$$\alpha_{11}^1 = a_{11}^1 + c_1 l_1^1 \quad (10.21)$$

$$\alpha_{11}^2 = a_{11}^2 + c_1 l_1^2 \quad (10.22)$$

$$\alpha_{12} = a_{12} + c_1 l_2 \quad (10.23)$$

where z_2 is rent expressed in iron (z/p_2). In the absence of two methods

simultaneously in use in the production of corn it would be impossible to determine r , z_2 and p , since there would only be two equations rather than the three given by (10.18)–(10.20). The solutions for the three variables are:

$$p = (e^1 \alpha_{11}^1 - e^2 \alpha_{11}^2) / \alpha_{12} (e^1 - e^2) \quad (10.24)$$

$$r = [e^1 (1 - \alpha_{11}^1) - e^2 (1 - \alpha_{11}^2)] / (e^1 \alpha_{11}^1 - e^2 \alpha_{11}^2) \quad (10.25)$$

$$z_1 = (z/p) = (z_2/p) = e^1 e^2 (\alpha_{11}^1 - \alpha_{11}^2) / (e^1 \alpha_{11}^1 - e^2 \alpha_{11}^2) \quad (10.26)$$

$$\alpha_{11}^1, \alpha_{11}^2 < 1 \quad (10.27)$$

$$e^1 < e^2 \quad (10.28)$$

$$\alpha_{11}^1 < \alpha_{11}^2 \quad (10.29)$$

$$e^1 (1 - \alpha_{11}^1) < e^2 (1 - \alpha_{11}^2) \quad (10.30)$$

The rate of (corn) rents and rate of profit are determined exclusively by technical conditions of production of corn, and the (corn) real wage, which captures Petty's corn model, or Cantillon's vertically integrated rural sector, in a thoroughly capitalist framework. Inequality (10.27) ensures that both methods of production are capable of producing a surplus. The remaining three inequalities, required to ensure positive solutions, may be read as follows. If it is supposed (arbitrarily) that method 1 produces a lower gross output per unit of land than method 2 (inequality (10.28)), then it must be assumed that method 1 also has a lower capital-output ratio (inequality (10.29))—and therefore also a lower capital-land ratio ($e^1 \alpha_{11}^1 < e^2 \alpha_{11}^2$) – thereby ensuring that r and z_1 have a negative denominator. This ensures z_1 is positive since its numerator is negative also (inequality (10.29)). To ensure r is positive it must further be assumed that net output from a unit of land employing method 1 is less than net output from a unit of land employing method 2 (inequality (10.30))—a form of diminishing intensive returns. In the absence of these restrictions, the simultaneous employment of two methods of production would be inconsistent with positive values of profits, rents and prices. But why are two methods of corn production simultaneously in use? The answer points to precisely the meaning of land scarcity in this framework: given total gross social demand for corn (Q_c) and society's total quantity of homogeneous land (E), it must be assumed impossible to meet social demand by use of the less capital-intensive method alone (method 1), so that recourse must also be had to the more productive (per unit of land) and more capital intensive method 2:

$$e^1 E < Q_c < e^2 E \quad (10.31)$$

The solution for prices and distribution ensures that each method of corn production is equally profitable, with the surplus appropriated as profits and rents. In their surplus theories of rents with essentially homogeneous land, neither Petty nor Cantillon could possibly have explained rents by reference

to scarcity since neither had any conception of diminishing intensive returns; and both were therefore left with explanations of rent as an essentially conventional magnitude. It should be added that the treatment of rent on homogeneous land in a competitive capitalist framework presented here—with a homogeneous capital good (a single basic commodity)—is so simple as to be potentially misleading once heterogeneous land and heterogeneous capital are taken into account (*vide* Kurz 1978).

Consider finally a three-commodity model with rent excluded from consideration as in the first model of this section:

$$(p_1 a_{11} + p_2 a_{21} + w l_1)(1 + r) = p_1 \quad (10.32)$$

$$(p_1 a_{12} + p_2 a_{22} + w l_2)(1 + r) = p_2 \quad (10.33)$$

$$(p_1 a_{13} + p_2 a_{23} + p_3 a_{33} + w l_3)(1 + r) = p_3 \quad (10.34)$$

$$w = p_1 c_1 + p_2 c_2 \quad (10.35)$$

Substituting equation (10.35) into equations (10.32)–(10.34) and again taking iron as numeraire,

$$(\alpha_{11} p + \alpha_{21})(1 + r) = p \quad (10.36)$$

$$(\alpha_{12} p + \alpha_{22})(1 + r) = 1 \quad (10.37)$$

$$(\alpha_{13} p + \alpha_{23} + a_{33} p_{32})(1 + r) = p_{32} \quad (10.38)$$

$$\alpha_{13} = a_{13} + c_1 l_3 \quad (10.39)$$

$$\alpha_{23} = a_{23} + c_2 l_3 \quad (10.40)$$

where a_{13} , a_{23} , a_{33} are commodity inputs per unit of ‘silk’ output, l_3 is labour per unit of output, p_{32} is the price of silk expressed in iron (p_3/p_2), and all other variables are as defined in equations (10.1)–(10.13). Under these conditions, the addition of a third commodity does not alter the determination of r and p as presented in the first model of this section: equations (10.32), (10.33) and (10.35) are identical to equations (10.1)–(10.3)—a self-contained system which can be solved entirely independently of equation (10.34). The solutions for r and p so determined (equations (10.4)–(10.6) above) can then be inserted into equation (10.38) to determine p_{32} (with the additional assumption that $r < (1 - a_{33}) / a_{33}$). What this partitioning points to is that, in the framework of a surplus approach with the real wage given at subsistence, the rate of profit can be determined exclusively by reference to the technical conditions of production of the commodities which enter directly and indirectly into the real wage, together with the level and composition of that real wage. With regard to commodities entering ‘indirectly’ into the real wage, suppose c_2 were zero (equation (10.35)). The price equation for iron (equation (10.37)) would remain necessary for determination of r , because iron still enters indirectly

into the real wage via its use in the production of corn ($\alpha_{21} > 0$ in equation (10.36)). If α_{21} were also zero (both a_{21} and c_2 zero: equation (10.11)), then equation (10.36) *would* become a self-contained system with

$$r = (1 - \alpha_{11})/\alpha_{11} \quad (10.41)$$

which is a return to Petty's corn model or Cantillon's vertically integrated rural sector, in a capitalist framework (and ignoring rents). And indeed, this rate of profit is inversely related to Petty's social division of labour, as outlined in section 3.1:³

$$r = [1 - (L_c/L)][(1 - a_{11})/\alpha_{11}] \quad (10.42)$$

$$L_c/L = c_1 l_1 / (1 - a_{11}) \quad (10.43)$$

What is more remarkable is that the ratio between necessary and total employment (or equivalently, the ratio between surplus labour and necessary labour), which found its first analytical expression in the history of economic thought in Petty's theory of the social division of labour, can be shown to enter into the determination of the general rate of profit in much more general models in which both necessary labour consumption and capital input are heterogeneous (*vide* Garegnani 1984:313–20). More specifically, Garegnani shows that the rate of profit can be determined by reference to (a) the ratio of surplus to necessary labour, together with (b) the structure of production in a (notional) vertically integrated wage-goods sector, the net output of which is the real wages of the total workforce, where production structure refers to 'the proportionate distribution over time of the labour necessary to produce the [composite] wage commodity, or...the quantities of the several means of production, in the price equations' (Garegnani 1984:319). Without examining Garegnani's analysis here, it may be observed in relation to the three-commodity model above, that the same central analytical conclusion will emerge in models with any large finite number of commodities: in a system of production of k distinct commodities, in which the commodities a, b, \dots, h enter directly or indirectly into the given real wage ($h < k$), it will be possible to isolate the h price equations and determine the rate of profit by exclusive reference to this vertically integrated wage-goods sector. It is of no moment if in fact most or even all of the commodities produced in a system are in the vertically integrated wage-goods sector: the point is that it is *because* they are (direct or indirect) wage goods—because they enter into real wages—that they enter into the determination of the rate of profit.

Two further observations may be added. First, the notion of the vertically integrated wage-goods sector provides an analytical clarification of the significance of Petty's corn model, Cantillon's vertically integrated rural sector, Ricardo's physical-ratio theory of the profit rate and, more generally, the special role of agriculture in classical economics generally: the particular

significance of corn or agriculture is a special case of a correct notion—that (necessary) labour consumption plays a more fundamental role in production systems than other commodities or other consumption. The enduring analytical content of those early notions is the notion of the wage-goods sector as the basis for the production of the social surplus. The very fact that scarce natural resources are not essential to the notion of a vertically integrated wage-goods sector confirms that agriculture plays no essential role: it is the wage-goods sector, self-replacing with a surplus, which is essential. Indeed, with a given real wage, the *h* commodities of the vertically integrated wage-goods sector are the *basic* commodities of the production system, in the sense of Sraffa (cf. Chapter 7, note 5). These are the commodities *necessary* to the reproduction of the economic system.

Secondly, it may be noted, though it is perhaps already quite obvious, that none of these results hinges essentially upon the real wage being equal to necessary labour consumption (and certainly does not hinge upon the real wage being constant). What is required for the above results is that the real wage be determined independently of prices and profits: all these results will continue to hold if wages are above necessary consumption, the only difference being that real wages will share in the social surplus, instead of it exclusively resolving into profits and rents. This is evident from the very beginning, in Petty's third model of production (the strict corn model)—a surplus analysis in which per capita consumption is allowed to vary above subsistence (*vide* section 3.1).

10.4 DEVELOPMENTS FROM SRAFFA AND KEYNES

The modern reconstruction of the classical surplus approach effected by Sraffa opened up the possibility of the surplus approach providing a more satisfactory analysis of modern capitalism than marginalism. There have been many extensions and developments of Sraffa's project with a view to just this objective. Here, just two particularly important lines of development may be noted in conclusion.

Keynes's critique of marginalism and his central alternative proposal, the principle of effective demand, amounted to the most significant assault upon marginalist orthodoxy during the twentieth century, apart from Sraffa's own contributions. (On the latter, see Garegnani 1970; Harcourt 1972; Pasinetti 1977: ch. VI; Garegnani 1990.) There are two aspects in particular of Keynes's *General Theory* which are pertinent to the modern reconstruction of the surplus approach. The principle of effective demand—whereby planned savings and investments are equilibrated by the level (and composition) of aggregate output—provided a theory of outputs which was (or at least could be made) separable from the theory of prices and distribution, and consistent with persistent involuntary unemployment. To be sure, Keynes's alternative theory of output and

critique of marginalism were deeply compromised by his acquiescence in certain fundamental marginalist principles—in particular, investment demand an inverse function of interest, and an inverse relation between labour employment and marginal labour product—which undermined his novel results. The compromise was almost fatal, for it allowed Keynes's unorthodox ideas to be vitiated by absorption back into essentially marginalist frameworks of one kind or another. The superior alternative is to purge Keynes of residual marginalist elements and combine his theory of output with a non-marginalist theory of distribution and prices which would give the principle of effective demand room to be a general theory of output, rather than stifling it in a marginalist framework in which it is bound to be, at best, an *ad hoc* appendage. The Sraffian reconstruction of the surplus approach provides just this complementary, rather than antagonistic, theory of distribution and prices—and thereby, the principle of effective demand provides the basis for a theory of output for the modern surplus approach.⁴

Sraffa's critique of marginalism was more cogent than that of Keynes; and, in focusing upon capital and distribution ('factor' pricing), it went to the heart of the marginalist approach and its simultaneous determination of prices and quantities in an equilibrium with full factor employment (*vide* Garegnani 1983). In its positive dimension Sraffa's project provided the foundations for a theory of distribution and prices superior to marginalism and a more 'hospitable' theoretical framework for the theory of effective demand. Furthermore, at one point in particular their two critiques came to almost precisely the same critical conclusion: rejection of the notion that the rate of profit can be conceived of as being determined via the equilibration of savings and investment, or supply of and demand for capital. In Keynes this was a corollary of the principle of effective demand itself.⁵ In Sraffa it is entailed by his repudiation of the orthodox approach to the rate of profit (or interest), demand for capital, and choice of technique. They also reached a related, common positive conclusion: that the rate of interest determined in the monetary and financial sphere may be treated as an independent variable which determines the profitability of capital in the production system (Keynes 1936:135–41, 202–4; Sraffa 1960:33). Apart from the principle of effective demand itself, this is the most unorthodox theoretical idea in *The General Theory*, and, as indicated in note 5, it bears a direct analytical connection with the principle of effective demand.

The most obvious significance of this notion of interest regulating the general rate of profit on capital is that the classical idea of the real wage as determined independently of prices and other distributive variables must be given up since otherwise the system of prices and distribution in general would be over-determined: the real wage and the rate of profit cannot both be determined independently of prices. With regard to real wage determination there are two distinct steps here, away from classical

economics. It has already been indicated in the preceding section that real wages exogenously determined may take values above subsistence without essentially altering the determination of distribution and prices in the framework of the surplus approach—and indeed, above-subsistence wages is the appropriate assumption for modern capitalist economies. This is consistent with the real wage remaining exogenously determined, for example, by money wage bargaining of some kind. (Indexation of money wages to the price of a composite consumption good is the most obvious form of exogenous real wages in a modern context; but the failure of modern wage indexation systems to endure is noteworthy.)

The notion of exogenous interest requires that the real wage be above subsistence *and* that it be endogenously determined simultaneous with prices. This innovation does not make the resulting determination of distribution and prices any less a surplus approach. What is required for the surplus approach in a capitalist framework is production of a surplus with capitalist pricing principles, and a principle or principles for distributing the surplus. The typical principle for distributing the surplus in the classical era was real wages equal to necessary labour consumption, so that the surplus resolved itself entirely into non-wage income—the remaining problem being to resolve this into rates of profits and rents. As already indicated, the subsistence wage may be given up, so that workers share in the surplus. Equally, rather than the (surplus) real wage being the independent distributive variable the rate of profit may be independently determined via interest. All that has changed is that a *different* principle for distributing the surplus has been introduced.

It is then the rate of interest in the monetary and financial system, rather than the real wage, which is separably determined (cf. section 10.2 on sequential method). Such an approach, in integrating the monetary system with distribution and value also entails a repudiation of the dichotomy between real and monetary forces, thereby opening the way to non-neutrality of money (*vide* Garegnani 1984:320–3; Pivetti 1991; Panico 1988). Together with Sraffa's system of distribution and value, these two developments—the Sraffa-Keynes synthesis and exogenous interest as the regulator of profitability—along with other developments which cannot be discussed here, provide a plausible modernized version of the classical approach; a modern surplus approach which is more objectively based, more open to history, more flexible, and altogether more satisfying than marginalism: an approach begun by William Petty and which endures as a powerful instrument for understanding social life.

APPENDIX A: PETTY'S WRITINGS

The purpose of this appendix is to outline what is known of the history of Petty's economic writings. Apart from providing a quite comprehensive account of the corpus of his economic and other intellectual work, this is a worthwhile exercise because it brings to light his overwhelming commitment to economic subjects and that he was writing quite continuously on economics from the beginning of the 1660s. This discussion draws heavily upon Hull (1899) and Keynes (1971).

Petty's first published work was his *Advice of W.P. to Mr. Samuel Hartlib. For the Advancement of some particular Parts of Learning* (1648). The occasion for the *Advice* was Milton's *Tractate on Education* (1644) which had been published at the instigation of Hartlib, as no doubt were Petty's thoughts on 'some *particular parts*' of education (emphasis added). The subtitle bespeaks the enthusiasm of the young Petty for Bacon's philosophy, in so far as it characterizes the short work as a 'footnote to Bacon', so to speak. Apart from two short pamphlets of little significance and no economic interest, between 1648 and 1662 Petty published only his *Reflections Upon Some Persons and Things in Ireland* (1660), an elaborate polemical essay of 185 pages defending his conduct in the surveying of Ireland and his subsequent actions. It also is of little economic interest. In May 1662, at about the time of his thirty-ninth birthday, Petty published *A Treatise of Taxes and Contributions*, the greatest intellectual achievement of his life. It was published anonymously, as were all the subsequent seventeenth-century editions, though the authorship was hardly a secret. It was declared publicly by Josiah Child six years after the first edition (Child 1668:17; Hull 1899: vol. I, 4).

Following the *Treatise* Petty did not publish another work on economic subjects for more than twenty years. Only in the last five years of his life did he return to print on economic subjects, publishing in succession a number of short essays devoted to his beloved political arithmetic: *Another Essay in Political Arithmetick* (1683a), *Observations Upon the Dublin Bills of Mortality* (1683b), *Two Essays in Political Arithmetick* (1687b) and *Five Essays in Political Arithmetick* (1687a). All of these late works can be supposed to have been written at about the time they were published, though

most of the empirical data used in them would have been collected earlier. The *Observations* and *Another Essay* were probably written in Dublin in 1681. The *Two Essays* were written in 1686, first appearing in a French translation that year (1686a). The only other significant work published between 1662 and 1687 was the *Discourse...Concerning the Use of Duplicate Proportion* (1674), an attempt to apply certain mathematical formulas to a variety of practical problems. Apart from a couple of instances, this essay has no economic interest. Aside from the *Discourse*, only a few rather ephemeral pamphlets and short technical pieces surfaced during the twenty years following publication of the *Treatise of Taxes* (1662); in particular, papers on woollen textile techniques and dyeing presented to the Royal Society (27 November 1661; 1667) and a Latin version of the 104th Psalm (1679) composed while Petty was briefly imprisoned in 1677 for defamation of the Lord Chancellor, Heneage Finch (first Earl of Nottingham).

This account of works published during Petty's lifetime indicates what anyone who examined the public record upon his death would have recognized as the fruits of his intellectual labours. But within eight years of his death a further four major works were published, works more substantial than the late essays in political arithmetic: *Political Arithmetick* (1690), *The Political Anatomy of Ireland* (1691a), *Verbum Sapienti* (1691b) and the *Quantulumcunque concerning Money* (1695). The reason for Petty's failure to publish these works is suggested by his resistance to republication of the *Treatise*. It is probable that all the editions after 1662 were published without his authority. On 29 May 1678 he wrote to John Aubrey from Dublin: As for the Reprinting of the booke of Taxes I will not meddle with it. I never had thanks for any publick good I ever did, nor doe I owne any such booke' (Fitzmaurice 1895:258). It is noteworthy that Petty's resentment at not receiving what he regarded as due public reward tinges his attitude to the book. This same attitude is expressed in broader terms in a letter to Robert Southwell on 5 October 1678, also from Dublin:

[Sir Peter Pett] talks of reprinting the *Books of Taxes*, and of printing *Political Arithmetick* and that the Paraphrase upon the 104th Psalm is already printed. But Cousin,... I hope you will...take a care of these matters. You know I have no Luck with my politicks. Slight Court tricks have advanced many men, but the solid study of other men's peace and plenty ruines mee. Wherefore lett the Stationer doe what hee pleases with the *Taxes*. I am against printing the Arithmetick and wish the *Paraphrase* Undone.

(Lansdowne 1928:61; cf. Matsukawa 1977:37–8)

Geoffrey Keynes's statement (1971:9) that Petty 'disowned' the *Treatise* is potentially misleading. He disowned its republication but certainly not its doctrines.

Southwell appears to have been instrumental in the posthumous

publications from 1690 to 1695, in response to requests like that from Pett which Petty mentions. Southwell had always ensured that he received good manuscript copies of Petty's writings. Some at least of the unpublished works—in particular, the *Political Arithmetick*—had wide circulation in manuscript during Petty's life. He also presented a copy to Charles II, with a dedication probably written in 1683. After Petty's death there was considerable demand for it and, with the support of Southwell, Lady Petty allowed its publication. In early 1688, she wrote to Southwell of the pressure to have the *Political Arithmetick* published (Slatter 1980:111–12). The *Political Anatomy*, with *Verbum Sapienti* appended, was published with a dedication by the poet and dramatist Nahum Tate, who apparently acquired the manuscript from Southwell. It may be noted that publication of Petty's short treatise on money and interest, the *Quantulutncunque*, coincided with the height of the recoinage controversy of the late seventeenth century. Two final works—Petty's *History of...the Down Survey* (Larcom 1851) and his *Treatise of Ireland*—were published much later. The latter was written in 1687 and presented to James II as an elaboration of Petty's comprehensive proposals for Ireland. It was first published in Hull (1899), from Southwell's manuscript.

One reason has already been adduced for Petty's unwillingness to publish his work. A contributory reason may have been his general aversion to the proliferation of books and book-reading, an attitude derived from Hobbes. Evidence for this can be found in a number of places. In a letter to Robert Boyle (15 April 1653), Petty berates him for wasting twelve hours or more per day reading (Fitzmaurice 1895:45–6). In a postscript addressed to his publisher and appended to the *Observations* of 1683 Petty (1683b:490) comments: 'Whereas you complain, that these observations make no sufficient Bulk, I could answer you, That I wish the Bulk of all Books were less.' Aubrey relates that Petty 'hath told me that he hath read but little, that is to say, not since 25 aetat., and is of Mr. Hobbes his mind, that had he read much, as some men have, he had not known so much as he does, nor should have made such Discoveries and improvements' (Dick 1972:403; cf. 314). In any case, the aversion to publishing does not reflect an aversion to writing. Nor does the two-decade break in publication reflect a similar disjuncture in Petty's research on economic subjects.

The dates at which Petty wrote his works can be determined with reasonable accuracy. Following the *Advice to Hartlib*, probably written in 1647, Petty appears to have been engaged in no substantial writing until 1659–60. During his time at Oxford from 1648 to 1652 he was engaged of course in intellectual activities and some materials are extant, for example, lectures on anatomy and medicine. In the years from September 1652 to June 1659 the activities of Petty's first Irish sojourn left him little time for other intellectual endeavours. These activities no doubt explain the absence of writings from this period. On the other hand, the years following his loss of

all public offices, 1659–62 (his late thirties), were intellectually fruitful for him, in terms of writing. In 1659–60 he assembled the substantial *History of the Down Survey*, though it was not published for almost two centuries. In 1659 he wrote and published a brief defence of his actions in Ireland (Petty 1659) and this was followed by the much longer *Reflections* (1660). In 1661 he presented the account of textile techniques already mentioned. It is not certain when he wrote the *Treatise* but it must have been composed between 1660 and early 1662, probably 1661–2, if we allow for the other writings in 1659–60. The catalyst for the *Treatise* was probably the changes to the English fiscal system inaugurated after the Restoration, marked by the abolition of the feudal duties on land and the transition to forms of indirect taxation, though Petty addressed his preface specifically to Irish problems. Even during his busiest times Petty was in the habit of dictating to an amanuensis before going to bed.¹ Notwithstanding its brilliance, the *Treatise* may have been written very quickly.

Although *Verbum Sapienti* was published as an appendix to the *Political Anatomy*, it bears no particular relation to that work or to Ireland. Petty himself lists it as having been written in 1665 and internal evidence indicates that it could not in any circumstance have been written later than mid-1667. *Political Arithmetick* was at least begun in 1671 and the *Political Anatomy* in 1672, with a draft of the former probably in existence by 1672 (Lansdowne 1927: vol. II, 260–2; Lansdowne 1928:60; Fitzmaurice 1895:157–8; Hull 1899: vol. I, 235–6). The purportedly chronological order in which Hull placed them (the *Political Anatomy* first) is justifiable only on the basis that the *Political Arithmetick* was completed after the *Political Anatomy*. Internal evidence indicates the date of final completion of the *Political Arithmetick* as 1676–7. The existence and wide circulation of this work explains why the first published essay in political arithmetic carried the title *Another Essay....* A corrupt text of the *Political Arithmetick* was appended to Chamberlayne (1683) under the title *England's Guide to Industry*. The *Quantulumcunque* was written in 1682 and was probably inspired by the debates on recoinage then already under way.

Mention may also be made here of the controversy surrounding the authorship of John Graunt's *Natural and Political Observations...upon the Bills of Mortality* (1662). As has been noted in section 2.1, Graunt was a friend of Petty and played a part in his early academic preferment and probably his first Irish appointment. They later fell out with each other to some extent, partly for financial reasons after Graunt was bankrupted, partly due to Graunt's conversion to Roman Catholicism (Fitzmaurice 1895:232–5; Strauss 1954:159–60). The basis for doubts about the authorship, at least in the first instance, is that a number of generally reliable authorities imputed the book to Petty: Aubrey, Evelyn, Edmund Halley and others. There have been many contributions to the debate, for example, Hull (1896), Hull (1899: vol. I, xxxix—liv), Lansdowne 1927: vol. II, 271–84), Greenwood (1928), Willcox

(1939: Intro.), Greenwood (1948:36–9), Glass (1963), and Groenewegen (1967). Petty certainly made some contribution to Graunt's *Observations*—the only issue at stake is the extent of that contribution.

In the first instance it may be noted that Graunt's *Observations* encompass only a very limited part of the inquiries embraced by political arithmetic. Graunt's work is almost entirely concerned with birth rates and mortality, with a view to examining population growth, and does not even consider the economic significance of this single phenomenon, until 'The Conclusion'. To that extent the authorship of the *Observations* is actually of almost no significance for the interpretation of Petty as economist. The *Observations* have more kinship with Petty's late essays than anything else he wrote; though the former are distinctly superior on the subject of population, in analytical terms. Hull (1899: vol. I, lxxv) sums up the matter aptly: '[Graunt] is...a more careful statistician than Petty, but he is not an economist at all.'

There are three issues in the body of the *Observations* with regard to which there is a certain similarity to Petty's thought: proposals for public provision for the unemployed; a prediction of the westward spread of London; and advocacy of parish reform (Graunt 1662:353–4, 378–83). On the first, the argument is expressed in language distinctly different from that used by Petty in his *Treatise* published the same year. More importantly, the suggestion made in this context, that there may not be suitable work for the unemployed, is utterly at odds with the argument of the *Treatise* and Petty's lifelong convictions. In the same context Graunt argues that private charity is motivated by psychological gains to the giver, a view of which there is likewise no trace in Petty's writings. Their similar views on the spread of London is of little significance, the idea having been put forward by John Evelyn the previous year (Petty 1662:41–2, with Hull 1899: vol. I, xlvi). The proposals for parish reform are more 'pious' than those of Petty. They lack Petty's anti-clerical overtones in the *Treatise* and the public cost of religion is not mentioned (*vide* section 3.2). None of this provides strong evidence of a role for Petty in the *Observations*. Graunt's 'Conclusion', on the other hand, bears unmistakable evidence of Petty's hand, both as to content and language (Graunt 1662:394–7). Arguments and turns of phrase such as the following—and these are just the most succinct examples—seem unmistakably from his pen:

there is pleasure in doing something new [that is, the *Observations*], though never so little, without pestering the World with voluminous Transcriptions...

the Art of Governing...is how to preserve the Subject in Peace and Plenty...

the Foundation...of... Policy is to understand the Land, and the hands of the Territory...

if all these things were clearly and truly known...it would appear, how small a part of the People work upon necessary Labours and Callings,...how few are employed in raising and working necessary Food and Covering...

A clear knowledge of all these particulars...is necessary, in order to good, certain and easie Government.²

The content of the ‘Conclusion’ goes far beyond the actual scope of the *Observations*. A comparison of the argument with that of the body of the *Observations*, and with Petty’s writings, provides compelling evidence for the view that Petty was the author of these three pages (cf. Hull 1899: vol. I, xlix-l; Strauss 1954:189–91). In any case, on the basis of his own thorough knowledge of Petty’s writings—their ideas, language and style—the present writer is quite convinced that Petty wrote ‘The Conclusion’, did not write the body of Graunt’s book, and probably had little part in it. Nevertheless, in order to avoid controversy on the grounds of disputed authorship, the interpretation of Petty in the above chapters in no way relies upon any part of the *Observations*.

Returning to Petty’s writings, the point to be emphasized concerning the writing and publication of his works is that the published record obscures the fact that he was writing quite continuously on economic subjects from the beginning of the 1660s until his death. This is indicated in Table A1. Full citations are given in the list of References. Unless otherwise indicated, place of publication is London. Apart from these editions of individual works, a number of collected editions have appeared. *Several Essays in Political Arithmetick* ... (1699, 1711, 1755) contains items 7, 9, 10 (the version of 1686), 12 and 13, the latter in French and English, and some other material. (The French version of *Five Essays* is omitted from the edition of 1755.) *Tracts; chiefly relating to Ireland...by the late Sir William Petty* (1769, Dublin) contains 4, 5, 6 and apparently the contents of *Several Essays* (1699). Finally there is the definitive Hull edition of 1899, which contains items 4 to 14 and some other short writings and extracts (reprinted 1963, New York).³ A French collected works with virtually the same content as Hull (1899) appeared in 1905.⁴

Apart from those manuscripts which were intended as more or less complete, self-contained works, Petty left a huge body of papers, much of which amounts to fragments and hastily written private notes—many of them the seventeenth-century equivalent of ‘back-of-the-envelope’ calculations and comments. These papers constitute a further testament to his sustained investigation of economic and political subjects. When he left Ireland for the last time in 1685 Petty took with him to London fifty-three

APPENDIX A

Table A1. Writing and publication of Petty's works

<i>Date of composition</i>	<i>Published during Petty's life</i>	<i>Published after Petty's death</i>	<i>Subsequent editions</i>
1647	1 <i>Advice to Hartlib</i> (1648)		1745, 1810
1659–60		2 <i>The Down Survey</i> (Larcom 1851)	1967 (New York)
1660	3 <i>Reflections upon Ireland</i> (1660)		1790 (Dublin)
c.1661–2	4 <i>Treatise of Taxes</i> (1662)		1667, 1679 (2 Issues), 1685, 1689
c.1665		5 <i>Verbum Sapienti</i> (1691b) ^a	1719, 1861 (Dublin)
c.1672		6 <i>Political Anatomy of Ireland</i> (1691a)	1719, 1861 (Dublin)
c.1671–6		7 <i>Political Arithmetick</i> (1690)	1691, 1751 (Glasgow), 1778, 1883 (Birmingham), 1903
1674	8 <i>Discourse Concerning Duplicate Proportion</i> (1674)		
1681	9 <i>Another Essay</i> (1683a) 10 <i>Observations upon the Dublin Bills</i> (1683b)		1686, 1759 1686 ^b
1682		11 <i>Quantulumcumque</i> (1695, 3 issues)	1748, 1760, 1812, 1856
1686	12 <i>Two Essays</i> (1687b) ^c		
1687	13 <i>Five Essays</i> (1687a) ^d	14 <i>Treatise of Ireland</i> (1899)	

Notes

^a In all its editions *Verbum Sapienti* was published as an appendix to the *Political Anatomy*.

^b This is a slightly amended version of the 1683 edition (Petty 1686b).

^c The French edition of the previous year (Petty 1686a) bears on its title page as place of publication London; but this is almost certainly false and perhaps a subterfuge to evade French censorship.

^d A German abstract of the *Five Essays* was published in 1693 and reprinted in 1724.

chests of papers. These remained in the possession of his descendants until very recently. The other substantial collection of Petty manuscripts was that kept by Robert Southwell. These were purchased by the third Marquis of Lansdowne from the papers of Edward Southwell Clifford (the 18th Baron de Clifford) in 1834. Consequently these two collections of papers were brought together and the great bulk of Petty's private papers were under one roof at Bowood House for 160 years. Lansdowne's *Petty Papers* (1927) constitute a cross-section of the Bowood manuscripts, and his *Petty-Southwell Correspondence, 1676–1687* (1928) was made possible by the amalgamation of the Southwell collection with the original Petty collection.

APPENDIX A

Apart from Lansdowne (1927, 1928), to the best of our knowledge only one other manuscript from the Bowood Collection has been published (Matsukawa 1977); though a Latin manuscript published in Lansdowne (1927) has been translated into English (Amati and Aspromourgos 1985). The entire collection of Bowood manuscripts, catalogued by M.D.Slatter (1980), was purchased by the British Library in December 1993. Selections from them have been utilized in this study. Unfortunately, most of them are undated and undateable.

APPENDIX B: CONTENTS OF THE ‘SUPPLEMENT’ TO CANTILLON’S *ESSAI*

In the text of Cantillon’s *Essai* there are a number of references to various empirical calculations contained in a ‘Supplement’ to the *Essai*. The Supplement appears to have perished in the fire which was associated with Cantillon’s apparent death (Higgs 1931b:373–4, 383, 385; Murphy 1986: ch. 14); though Murphy (1986:323) holds out hope that a copy will yet be discovered. Knowledge of its contents, therefore, is currently confined to Cantillon’s references to it in the body of the *Essai*.

The list below provides a comprehensive summary of the calculations which Cantillon refers to as being in the Supplement. Sometimes the actual result of the calculations is given in the text. These are placed in parentheses. The Supplement is indexed in the Higgs edition of the *Essai* and an independent search of the text confirms the accuracy of Higgs’s entries under this heading, except for the omission of p. 27. The most obvious feature of the resulting reconstruction is that these contents of the Supplement refer exclusively to Part I of the *Essai*, that is, exclusively to the analysis of production and allocation, distribution and value. However, there are many other empirical measures scattered throughout the *Essai*—and as much in Parts II and III as in Part I. If the contents of the Supplement were exhaustively covered by Cantillon’s references to it in the text, then what follows would be a reliable summary of its contents. But against this supposition, the contents so derived appear quite piecemeal in scope. Citations below are to part, chapter and page number of the Higgs edition.

- 1 Calculation of the numbers of merchants and artisans of all kinds employed [in cities] as a result of the expenditures of landowners—I, V: 15.
- 2 Calculation of the labour time required to transform a pound of flax into fine Brussels lace (14 labour years)—I, X:27.
- 3 Verification that the price of the lace covers the maintenance of 14 labour years plus the profits of all the undertakers and merchants involved in its production and sale.

APPENDIX B

- 4 Calculation of the ratio between material cost and labour cost in the production of the steel spring in an English watch (1:1,000,000)—I, X: 29.
- 5a Calculation of the quantity of land required to produce the consumption of one labourer, in accordance with the normal mode of living in various parts of Europe. (This apparently refers to a set of figures for various different consumption patterns and in different parts of Europe. The text itself provides some figures for different parts of Europe (southern France, 1 acres; Middlesex, 5–8 acres), China (1/10 of an acre) and the Iroquois people of North America (50 acres).)—I, xi:37–9.
- 5b This is evidently a second reference to the calculations under item 5a, and it confirms the parenthetical inference there. [This reference also indicates that the quantity of land required is calculated in terms of agricultural output net of seed corn input and taking into account fallow land.]—I, XV:71–3.
- 6 Calculation of the quantity of French land required to produce the Champagne wine which equals in exchange value the quantity of Brussels lace produced by one acre of foreign land (16,000 acres). [Cf. item 2.]—I, XV:77.
- 7 A ‘long’ calculation of the number of labourers required to produce the necessary consumption (‘according to the European standard’) of 100 people (25 labourers)—I, xvi:87.
- 8 Calculation of the number of English workers employed in the production of textiles for exportation [apparently with a view to showing that not all surplus labour can be employed in production of exports]—I, xvi: 91.

NOTES

1 INTRODUCTION

- 1 By 'neo-Walrasian' theory is meant theoretical approaches derivative from the work of, in particular, K.J.Arrow, G.Debreu and L.W.McKenzie in the 1950s.
- 2 It is apparent from the context of these quotations, as well as other statements (for example, Marx 1967: vol. in, 830), that Marx identifies classical political economy with 'scientific' political economy (from the bourgeois standpoint) as opposed to vulgar economy—or just political economy proper, from its beginnings to Ricardo.
- 3 In other areas of economic theory the dis juncture between classical and marginalist theories with regard to distribution and value need not be paralleled. In particular, this is so with regard to monetary analysis, where a certain formal similarity in relation to the theory of interest results in a certain continuity between classical and twentieth-century monetary theory. It is not possible to enter into a discussion of those matters here. It may also be noted that there is no logical necessity for a commitment to marginalist theory to inevitably lead one to the misconception of classicism as primitive marginalism—for example, Blaug (1987) on Ricardo, as opposed to Hollander (1979).
- 4 For general accounts of economic surplus and its relation to classical economics and Marx, see Dobb (1973: esp. ch. 9), Bharadwaj (1978a), Garegnani (1984) or (1987), and Pivetti (1987).

2 THE LIFE OF PETTY IN RELATION TO HIS ECONOMICS

- 1 The facts of Petty's life provided here and below are drawn from Bevan (1894: ch. 2), Dick (1972), Fitzmaurice (1895), and Strauss (1954).
- 2 This is documented in sections 2.4, 2.5 and Appendix A. See also Chapter 4.
- 3 See the specimen sheets for the survey in Larcom (1851:393–7). It may be added that Holland and Ireland came to represent the polar extremes of material progress and stagnation in Petty's thought.
- 4 Compare Petty with John Locke. Petty was writing quite continuously on economic subjects from the beginning of the 1660s until his death. See Appendix A, which outlines the history of Petty's research and writings.
- 5 Petty's bitterness at not gaining public offices intertwines with a similar bitterness regarding the reception of his ideas. See Appendix A.

3 ECONOMIC SURPLUS AND THE SOCIAL DIVISION OF LABOUR

- 1 The second common strand is Petty as a Baconian who took an inductive approach and pioneered serious empirical, especially quantitative, analysis of economic phenomena. This is examined in section 3.5 and Chapter 4. Some other aspects of interpretations of Petty will also receive comment below.
- 2 At the same time, Letwin's judgement that as a theoretician Petty is the best or equal to the best prior to 1750 is actually an overstatement—if intended to include Cantillon, who died (apparently—*vide* Chapter 5, intro.) in 1734 but whose *Essai* was not published until 1755.
- 3 In relation to the interpretation presented here, Roncaglia (1985: esp. 61–71, 89–93) is more concerned with the historical significance of Petty for the formation of a scientific political economy as such—rather than, as here, specifically the formation of surplus theories. Nevertheless, in Roncaglia's account the formation of scientific political economy is closely connected with classical economics and he recognizes that Petty employed a surplus approach. There is also no disagreement here with Hutchison's judgement of Petty quoted above; however, Hutchison's account of Petty lacks recognition of his systematic use of a surplus approach (but see Hutchison 1988:10, 34).
- 4 Although this order of magnitude seems empirically unrealistic, Petty (1691b:118) subsequently affirms its feasibility:

There are in England above four Acres of Arable, Meadow and Pasture-Land, for every Soul in it; and those so fertile, as that the labour of one man in tilling them, is sufficient to get a bare Livelihood for above 10: So as 'tis for want of Discipline that any Poverty appears in England, and that any are hanged or starved upon that account.

- 5 Cf. Petty (1662:23, 37) where the possibilities of excessive taxation or maldistributed revenues threatening subsistence and political disorder are attributed to inept or mischievous policy, rather than the absence of adequate necessary consumption output. Elsewhere Petty also more explicitly allows for a customary and variable character of subsistence, quoted in Chapter 7, note 6. Note also that Petty's analysis presupposes that imports are not required for necessary consumption.
- 6 Petty (1662:50–1). Cf. Matsukawa (1977:47). The seventeenth-century English five-shilling Crown contained approximately one ounce of silver.
- 7 It will be evident that Petty's treatment of labour and value at pp. 43 and 50–1 of the *Treatise*, discussed above, together with the argument of pp. 89–90 discussed above, are companion arguments. The issue of labour and value is further discussed in section 3.6 and Chapter 6 (esp. section 6.1).
- 8 This formulation and the associated definition of the social division of labour was suggested by Dixon (1981).
- 9 That is to say, the proportion of population capable of labour, not the proportion which *actually* works. The latter is emphatically a variable in Petty's thought.
- 10 Petty generally takes for granted that A is high enough relative to c , for surplus labour to exist; because he can plainly see surplus labour all around him (unemployment and non-necessary employment). In effect, he takes for granted that $c/A < n$.
- 11 Petty (1662:89). Sraffa drew attention to this particular Pettian abstraction in the Italian version of his well-known article on Marshall (Sraffa 1926; 1925:324n., also 279), noting also Marshall's own reference to it. It bears an

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- obvious analytical connection to Sraffa's interpretation of Ricardo (1815) on agriculture and the rate of profit.
- 12 Petty (1662:32, 36–7). Petty gives as an example a tax on rents with the revenues expended on naval trades. The implication is that landlords are more likely to engage in luxury consumption.
 - 13 See Evelyn's description of Petty's satirizing religion, quoted in section 2.4; the references to Petty's bitterness at the reception of his ideas, in section 2.5 and Appendix A; Petty's comment on universities quoted at the end of section 2.5; his comments on book reading reported in Appendix A; and for further discussion of Petty's views on religion and education, section 4.3 below.
 - 14 Petty (1662:31, also 60); and Petty (1691b:114, 118). Cf. Keynes (1936:128–9):

Pyramid-building, earthquakes, even wars may serve to increase wealth, if the education of our statesmen...stands in the way of anything better... If the Treasury were to fill old bottles with bank-notes, bury them... and leave it to private enterprise...to dig the notes up again...there need be no more unemployment... It would, indeed, be more sensible to build houses and the like; but if there are political and practical difficulties in the way of this, the above would be better than nothing.
 - 15 Monroe (1923:136–8); Holtrop (1929:503–4); also Schumpeter, as cited in the introduction to this chapter. Marget (1938:96n.55), citing Viner (1937:38n.75), suggests one instance of a conception of velocity prior to Petty; but Viner does not really propose this.
 - 16 See also Petty (1691a:183–7; 1690:310–11).
 - 17 The intellectually methodical manner in which Petty organized the survey is some additional evidence against the perception of him as an erratic genius. See the introductory comments to this chapter.
 - 18 Letwin (1963:142) suggests that 'Smith, when he came to write Book V of *The Wealth of Nations*, followed [the structure of Petty's *Treatise of Taxes* (1662)] extremely closely; though there is no evidence aside from the presence of Petty's works in his library that he took it over directly.' The claim concerning Book V is fanciful; the (undocumented) assertion about Smith's library, with the one exception noted here, is unfounded.
 - 19 Petty (1690:306; and, on superlucration, 254, 292, 294–5, 308–9; 1691b:108). The concept of wealth means that even exclusively devoting surplus labour to wealth accumulation is consistent with using surplus labour for forms of luxury consumption (for example, Petty 1690:270–1; 1691a:147, 217–18). It follows that superlucration cannot be identified with saving in the usual sense of that term.
 - 20 On the subject of material progress, attention may also be drawn here to a short piece by Petty on history and economic development which includes some further comments on technical division of labour and superlucration (Lansdowne 1927: vol. I, 211–14). Also noteworthy is the connection Petty draws between religious toleration and material progress, Holland again providing the example: 'Trade is most vigorously carried on, in every State and Government, by the [religious] Heterodox part of the same, and such as profess Opinions different from what are publicly established.' Petty does not connect this particularly to Protestantism; rather, to heterodoxy as such (Petty 1690:262–4). For further discussion of his views on religion, see section 4.3.
 - 21 The Down Survey (Larcom 1851) may be regarded as an important event in the prehistory of political arithmetic in so far as it was Petty's first systematic

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- empirical work, providing him with a detailed knowledge of the Irish social economy.
- 22 On the significance of political anatomy, see Roncaglia (1985:25–8) and Webster (1975:421, 423–4, 430, 434).
 - 23 Petty (1691a:144–7). See also (1691a:189) and (1691b:108) for further estimates of the proportion of the population available for labour; that is, L/P ($=n$) in terms of the model employed in section 3.1. These estimates, at least in the case of the *Political Anatomy*, evidently exclude sections of the population from the available workforce by virtue of their social status.
 - 24 Lansdowne (1927: vol. I, 196); *Papers* (iv.33:11). King (1696:19–21, 24–5) also examines the limit to population growth in terms of declining land per capita but it is an entirely hypothetical problem, not predicted to become a binding constraint until between the years 3500 and 3600. Cf. Davenant (1698: vol. II, 110–16).
 - 25 Matsukawa (1977:45–7). Two obvious numerical errors have been corrected. It is interesting to contrast Petty's empirical estimates of the social division of labour (L/L , or L/P , in the formal model of section 3.1 above) with the apparently hypothetical figure used in the first and third models in the *Treatise*. There the figure for L/L was 1/10, though no clear distinction was drawn between workforce and population, so that L/L and L/P are blurred. Here the empirical estimates for L/P are 12/19 and 1/4 (cf. note 4 above).
 - 26 On the apparent biblical origin of the phrase 'number, weight, measure' see Webster (1975:351).
 - 27 At a deeper level, this is underpinned by philosophical convictions about methodology and politics, examined in Chapter 4.
 - 28 Hueckel (1986: esp. 38–9, 43–9, 52–3, 55–6) also rejects the labour theory interpretation, but links this to a wider purpose of repudiating the interpretation of Petty as surplus theorist. It therefore should be pointed out explicitly here (though it should not be necessary) that a labour theory of value is not logically necessary to the construction of a theory of surplus in general, or to Petty's theory of the social division of labour in particular.
 - 29 There are two notable exceptions to the latter: interest and land prices, discussed in section 6.1; and corn prices and rents. With regard to the latter, Petty (1662:48–9; also 51–2) suggests a locational theory of differential rents, arising from the corn price being determined by the costs of that part of the corn supply which is transported the greatest distance to market (forty miles in his example): 'the Corn growing within a mile of London,...shall have added unto its natural price, so much as the charge of bringing it thirty nine miles doth amount unto'; thereby generating higher rents on the closer land. The stated general principle is that 'Lands intrinsically alike near populous places, such as where the perimeter of Area that feeds them is great, will...yield more Rent'. Recall also in this context Petty's concern with transport costs discussed in section 3.2.

4 METHODOLOGICAL AND POLITICAL BASES OF PETTY'S ECONOMICS

- 1 Temple's *Observations upon...the Netherlands* (1673) actually contains very little economics. There is a chapter on trade (1673:108–26; cf. xv-xvi).
- 2 Hull (1899: vol. I, IX). Recall Petty's antipathy towards book-reading (*vide* Appendix A). It may also be noted that there is a letter in the *Papers* (vi. 16, second series) from Josiah Child to Petty, dated 15 October 1673 and sent with

a copy of Child's *New Discourse of Trade* (1693). It was written *c.* 1668–70 (Letwin 1963:231–3).

- 3 Dick (1972:308–9). Hobbes and Petty were particularly close friends of Aubrey (*vide* Dick 1972:118, 125). The Hobbes biography is easily the lengthiest in Aubrey's manuscripts.
- 4 Petty (1674: Ep. Dedi.); Fitzmaurice (1895:5–7). This may be compared with Hobbes's celebrated 'conversion' to geometry (Dick 1972:309):

[Hobbes] was 40 years old before he looked on Geometry; which happened accidentally. Being in a Gentleman's Library, Euclid's Elements lay open, and 'twas the 47 *El. libri I*. He read the Proposition. By G—, said he, (he would now and then swear an emphaticall Oath by way of emphasis) *this is impossible!* So he reads the Demonstration of it, which referred him back to such a Proposition; which proposition he read. That referred him back to another, which he also read. *Et sic deinceps* [and so on] that at last he was demonstratively convinced of that truth. This made him in love with Geometry.

- 5 Petty (1662:43); Lansdowne (1927: vol. I, 197). It may be emphasized that the appeal for empirical concepts is not a demand that rational inquiry have always an immediate practical purpose. Witness the abstractness, both in formulation and purpose, of Petty's treatment of natural rent, natural price, and so on, in the models of production in the *Treatise of Taxes*. The methodological norm involved is deeper and, in a sense, more elementary: to ensure that concepts employed in both theoretical and applied analysis *possess* a genuine and well-defined empirical meaning. The preoccupation with such an apparently primitive requirement is no doubt partly a symptom of the state of seventeenth-century science.
- 6 This entails literally the solution of a set of simultaneous equations (Lansdowne 1928:319–21). A worker thrashes out forty quarters of wheat (*W*) plus barley (*B*), the respective quantities being unknown. He receives a piece-rate of one shilling per quarter of wheat and sixpence per quarter of barley. His total wages are twenty-eight shillings. Petty solves

$$W + B = 40$$

$$W + (1/2)B = 28$$

to arrive at (*W, B*) equals (16, 24).

- 7 The two basic principles which constitute Petty's methodological intentions are summarized in his definition of 'Ratiocination': 'nothing but Addition and Subtraction of Sensata' (Lansdowne 1928:295). *Vide* Lansdowne (1927: vol. I, 165, vol. II, 40); Lansdowne (1928:241–4, 294–6, 304–5); and references in section 4.1, to Petty's criticisms of Pascal.
- 8 Matsukawa (1977:37). Apart from being symptomatic of economism in his view of politics, these sentiments also point to Petty's objectivist approach to theoretical inquiry, repudiating any role for subjective and otherwise uncertain elements. This attitude finds pervasive expression in Petty's thought (*vide* sections 3.1 and 3.5). It is as if he regards analysis based upon subjective opinions, desires, and so on as necessarily lacking any firm foundation. Petty's methodological norms imply an analysis at the same time more robust and more modest. It may be added that the peace-and-plenty formula is also employed in passing by Houghton (1677:271) and Child (1693: ch. 1, 35), the latter

asserting: 'Peace begets Plenty, and Plenty may be a means to preserve Peace.' See also Barbon (1690:22–3).

- 9 Petty's *answers* to the second set of questions partly arise out of his attitudes toward various social classes, as well as his theoretical conception of wealth, and so on. These partly extra-economic views were not, in the seventeenth century, unique to Petty.
- 10 Hobbes (1651a:25–6). Hobbes here (and elsewhere) uses the term 'ratiocination' to describe reasoning so understood, as does Petty; though the term itself is not uncommon in the seventeenth century as a general term for reasoning. The latter's assertion in the *Advice* (1648:5) that mathematics is the most reliable part of theoretical knowledge may be compared with Hobbes (1651b:91–2):

Now look, how many sorts of things there are, which properly fall within the cognizance of human reason; into so many branches does the tree of philosophy divide itself... And truly the geometricians have very admirably performed their part. For...whatsoever things they are in which this present age doth differ from the rude simpleness of antiquity, we must acknowledge to be a debt which we owe merely to geometry... [W]ere the nature of human actions as distinctly known as the nature of *quantity* in geometrical figures,...mankind should enjoy...an immortal peace ... But...what hath hitherto been written by moral philosophers, hath not made any progress in the knowledge of the truth...

- 11 The purpose of this discussion has been only to isolate the central elements of Petty's methodological debts to Hobbes. Other more incidental evidence for Hobbes's influence could be brought forward. For example, Petty's characterization of humanity in terms of a concern for the remote consequences of events is typically Hobbesian (Lansdowne 1927: vol. I, 155–6; Hobbes 1651a: 68, 70). The paper in which this discussion occurs is full of unambiguously Hobbesian ideas, as the editor indicates. Further, Petty's commendation of Aristotle's *Rhetoric* (Lansdowne 1927: vol. II, 5; Fitzmaurice 1895:303) may be compared with Aubrey's comment: 'I have heard [Hobbes] say that Aristotle was...the worst Politician and Ethick...but his *Rhetorique* and *Discourse of Animals* was rare' (Dick 1972:318). (Hobbes translated an abridged version of the *Rhetoric*: Hobbes 1681). See also the citations given in the opening paragraph of section 4.1.
- 12 Amati and Aspromourgos (1985:129–30). It may also be noted here that Petty knew Harrington and attended his Rota Club. Aubrey reports that Petty 'was a Rota man, and troubled Mr. James Harrington with his Arithmetically proportions, reducing Politic to Numbers' (Dick 1972:402; cf. Braybrooke 1848–9: vol. I, 7–8). For an example of Petty's 'reductions' see Amati and Aspromourgos (1985:130–2).
- 13 Hull (1899: vol. I, lxi—lxiv) perceives Hobbes's influence upon Petty to relate merely to an alleged political *content* of Petty's thought (involving dubious ascriptions to Petty, in any case) as does Fitzmaurice (1895:186–8). Hull then looks to the Bacon-inspired experimental method as the impetus for Petty's (empirical) method. Bevan (1894:85–94) is much closer to the truth.
- 14 Unlike the *Philosophical Rudiments*, *Leviathan* was designed for a wide public audience. Consequently Hobbes is much more deferential to conventional religion in the latter. There is nothing in Hobbes's philosophy which would persuade one to take the qualifications concerning God very seriously.
- 15 Hull (1899: lxxiii) argues that Petty's labour theory of value was probably

suggested by Hobbes, specifically citing *De Cive*, ch. 24, *Latin Works*, vol. III, 185. This turns out actually to be a reference to the first page of Chapter 24 of the Latin version of *Leviathan* (that is, Hobbes 1651a: ch. XXIV, 160–1). *De Cive* has only eighteen chapters. There is, in any case, no warrant for this claim. MacPherson (1983:218) also repudiates the view that Hobbes had anything resembling a labour theory of exchange value. In this context it may be observed that a labour-embodied explanation of use value should not be confused with a labour theory of exchange value.

5 THE THEORY OF PRODUCTION AND DISTRIBUTION IN CANTILLON'S *ESSAI*

- 1 Jevons (1881). A German edition was edited by another prominent economist, F.A.von Hayek, with an introduction and annotations (von Hayek 1931). The English edition appeared the same year (Higgs 1931a).
- 2 In what follows, 'production and distribution' is employed as a shorthand for production and the allocation of labour, land and commodities; and prices and the distribution of the product among classes.
- 3 Cantillon (1755:3–7). On inequality and the origins of landed property, see also pp. 31, 45. All references are to the Higgs (1931a) translation though in some cases key phrases from the French text (Higgs ed.) are also quoted.
- 4 It is tempting but somewhat misleading to identify 'city' with 'manufacture' and 'country' with 'agriculture'. That the exchange between city and country is exchange of manufactures for agricultural produce does not mean that manufactures are produced *exclusively* in cities. This is further discussed below in this section.
- 5 It is evident from the context that by '100 others' Cantillon means 100 altogether. He refers the reader to 'a long calculation' in a 'Supplement' to the *Essai* for a verification of the empirical basis of his analysis. It is evident from the Supplement that Cantillon identifies necessary or subsistence consumption with the normal consumption of labourers, associated with the various modes of living of particular societies. See Appendix B, especially items 5, 7; also, for example, Cantillon (1755:35–9, 67–73).
- 6 Condition (5.6) ensures that with regard to labour and commodity input the economic system is viable; that is, it can at least reproduce its necessary consumption. Cantillon in fact takes it for granted that the system is productive (surplus labour exists), as did Petty: $(c/A) \leq n$ is satisfied as a strong inequality. In Cantillon's empirical analysis $n (= L/P)$ is a half and $c/A (= L_c/P)$ is a quarter; so that by simple deduction $(L - L_c)/P$ is a quarter. See Chapter 3, notes 23, 25 for Petty's empirical estimates. For both Cantillon and Petty, n as much as c is a *social* datum. It may be added that the relation between Petty and Cantillon will only be systematically dealt with in Chapters 6 and 7 below.
- 7 Cantillon concludes by emphasizing the dominant role of the Prince and landowners in determining the composition of output and employment, also by a kind of demonstration effect that their consumption patterns have upon the rest of the population, and makes some vehemently anti-clerical comments on the economic consequences of Roman Catholicism (Cantillon 1755:93–5; cf. 63, 103, 209–11).
- 8 It is noteworthy that virtually no role is allowed throughout the *Essai* for technical change which would operate upon A and T . The parameter n is treated more or less as an irreducible datum (but consider the discussion of Roman

- Catholicism cited in note 7 above). There are passing references to something resembling technical innovation at pp. 65–7, 241.
- 9 It is fanciful and over-generous to suppose that Cantillon's appeals to mode of living of landlords, and so on, amounts to any determinate theory of output as a whole (*vide* Brems 1986:40–9).
 - 10 The interpretation at this point is indebted to the distinction between town/country and manufacture/agriculture, as discussed by Roncaglia (1988:158–61, 170).
 - 11 A number of passages in the *Essai* could be examined in this context. Consider in particular the following: some role is suggested for manufactures from 'market towns' as inputs to the country (11–13); production of 'Tools and Instruments' is made an activity of surplus labour (89); the rural sector is treated as self-sufficient with regard to necessary consumption (121–5); also 43–5, 121–59 on manufacture and 'circulation' of commodities between city and country.
 - 12 Another complication which Cantillon does take into account is of no similar moment: direct agricultural input into agricultural production (seed input). He calculates the equivalent of what would now be called 'own-rates of reproduction' in agriculture: output net of seed input as a proportion of seed input (Cantillon 1755:71, 201). This is formally incorporated in the treatment of Cantillon's value theory in Chapter 6 below.
 - 13 This issue is further examined in Chapter 7.
 - 14 It will be recalled from section 5.1 that landowners' consumption also plays a fundamental role in the determination of population. Consider also Cantillon (1755:73, 93).
 - 15 Cantillon's comparison of identical allocations by 'command' and by markets might have been shaped by his own observation of the development of markets. His contrast between pervasive barter exchange in the country and monetary exchange in town might also be relevant (Cantillon 1755:123–5, 131–3, 143, 177). Certainly barter gives some transparency to the notion of exchange bringing about a given distributive and allocative outcome. It may be added that the prices which bring about such an outcome must for the sake of coherence be equivalent to intrinsic values; but Cantillon does not actually say so. It may be that he did not think through the relation between the two formulations concerning the structure of prices.
 - 16 One subject not discussed here is Cantillon's formulation of a 'par' between the value of labour and of land. Its essential purpose is to determine the quantity of land directly and indirectly required to 'reproduce' a worker. This is discussed, together with Petty's conceptions of value parity, in Chapter 6.
 - 17 Meek omits to indicate that the analysis of monetary circulation actually continues in Chapters IV–V of Part II as well. Furthermore, Part I, Chapter XII is a rather minor aspect of the theoretical argument of Part I. The other principal piece of evidence Meek brings forward consists of some similarities between Cantillon's economics and Quesnay's *Grains* (1757a). In particular, Meek alleges that Quesnay there employs the notion that the farmers share in the agricultural surplus—a notion absent from the mature Quesnay, and in Meek's view present in Cantillon. But, as has been indicated in section 5.2, there is no firm basis for the judgement that Cantillon treats the farmers' share of the agricultural product as part of the agricultural surplus and what evidence there is points to the contrary. The relation between Cantillon and Quesnay is further discussed in Chapter 7.
 - 18 That is, the 'circulation' of commodities. Cantillon occasionally uses this term in

- Part I—for example, in the title of Chapter XIII—and extensively in Part II, Chapters III–V.
- 19 One sometimes gains the impression from these chapters that interest may be *entirely* explained by risk; that is, interest does not merely include a risk premium, it is a risk premium. This is certainly consistent with the treatment of undertakers' income as a compensation for risk, discussed in section 5.2. Borrowing by the undertaker would then simply mean that those profits for risk are transferred to the lender as interest, in proportion to the transferring of the risk.
- 20 In one particular instance direction of causation regarding interest is unambiguous. Cantillon restates what was by then an old doctrine, that the price of land tends to adjust to rents per unit of land and the rate of interest so as to establish a uniform rate of return on land and money, subject to the differential advantages of holding land versus money (Cantillon 1755:221–3).

6 THE SIGNIFICANCE OF VALUE PARITY IN PETTY AND CANTILLON

- 1 Notable recent discussions are Brems (1978; 1986:40–9), Brewer (1988; 1992a: 720–2; 1922b:132–3), Hicks (1983:17–21), Roncaglia (1985:82–5), Vaggi (1983:15–16; 1987:79–80).
- 2 Petty (1662:50–1). Petty here elaborates the distinction in terms of 'intrinsic' versus 'extrinsic or accidental' value in a manner evocative of Cantillon's distinction between intrinsic value and market price. (Cf. Hull 1899: vol. III, 625–6). John Locke (for example, 1691:66–7) also uses the terminology of intrinsic value but the substance of Cantillon's usage has much more kinship with Petty. Petty also suggests a method for determining real changes in the stock of money, by deflating the quantity of bullion by population times the average wage; that is to say, by comparing through time the rate of growth of the money stock measured in labour commanded with the rate of population growth.
- 3 Petty (1662:45–7); also Petty (1690:286–90; 1899:563–4, 570–1); Lansdowne (1927: vol. III, 55–6; 1928:93); *Papers* (E.63, 8–10). In these additional references Petty, with absurd and unjustified precision, argues that both rents and years-purchase rise in strict proportion to population (but see 1690:286, cited above). This is in the context of Petty's advocacy of population density and 'transplantation' (*vide* section 3.4 and note 7 below). The variation of rents of course is no problem for the theory of natural value since it does not affect the valuation principle. Hence this also applies to Petty's location theory of differential rents (Petty 1662:48–52); though he also mentions in this context that years-purchase may vary with location, due to population density giving to land 'pleasure and honour extraordinary' (p. 49; cf. p. 46). Note also that the strict proportionality of both rents and years-purchase to population gives rise to a striking result of which Petty is fully conscious (pp. 8–10, 56, 563–4, 570–1 cited above): If population changes from P to aP ($a > 0$), and both national aggregate rents (R) and years-purchase (y) change in the same proportion, to aR , ay ; then the value of land will rise from yR to $(a^2)yR$ (cf. Sheridan 1677:201–2, who enunciates the same 'duplicate proportion' doctrine). Petty uses the same mathematical relation in other applications, economic and non-economic (Petty 1674; Hull 1899: vol. III, 627).
- 4 'But in other Countreys Lands are worth nearer thirty years purchase, by reason

- of the better Titles, more people, and perhaps truer opinion of the value and duration of three lives' (Petty 1662:46).
- 5 Petty (1691a:181). Elsewhere Petty (1683b:481) speaks of population as 'the A, B, C of Publick Oeconomy' (*sic*). (See also Petty 1662:60.) These may be the first English usages of something close to the term political economy but that is not as probable as may first appear. King (1948) traces French usage of the term to Louis de Mayerne-Turquet (*La Monarchie aristodémocratique*, 1611) and Antoine de Monchrétien (*Traicté de l'oeconomie politique*, 1615). King thinks it 'quite probable' that the term was then in current French usage. The earliest English citation of the term in the *Oxford English Dictionary* (2nd edition) is to Steuart (1767); though it is indicated that Hobbes (1651a:157) had spoken of 'the economy of a commonwealth'. Hobbes's influence upon Petty is examined in Chapter 4.
 - 6 Petty also suggests a reduction of heterogeneous labour ('Art and Simple Labour') to a common measure—in effect, by reference to the quantity of simple labour required to produce a particular skill and the associated instruments of production (Petty 1691a:182; cf. Lansdowne 1927: vol. I, 196).
 - 7 Petty (1691b:108–10; 1691a:152–3; 1690:267–8, 285–90; 1683a:475–6; 1687b: 512; 1899:563–4); Lansdowne (1927: vol. I, 64–5, 264–7, vol. II, 55–7); *Papers* (I. 22:2–3, E. 63). The actual valuation varies from sixty, to 'above 80' and ninety pounds per capita; though in one place the Irish are valued at about fifteen pounds, 'as Slaves and Negroes are usually rated' (p. 152 cited above; but cf. pp. 265, 512, 563–4 cited above for different valuations of both Irish and slaves). If he had thought about it, perhaps Petty would have realized that slaves were more like land than Irishmen, in so far as slaves' value would tend towards the capitalized value of their net returns to owners (not their consumption as quasi-wages); but presumably an Irishman, by coincidence, is also worth approximately one-fifth of an Englishman because of proportionally lower wages (consumption) per capita, on Petty's own logic. As to whether Irish or slave would be least pleased with these comparative valuations is perhaps best left unexplored! Note also that in one instance (p. 563 cited above) Petty makes explicit the equivalence of years-purchase (twenty years are usually employed in these valuations) and interest (5 per cent is employed at p. 563) in this people valuation context.
 - 8 Note that the ratio of aggregate rents to aggregate wages is not the same as the ratio of *rates* of rents and wages, discussed in the preceding paragraph—and in general the two ratios will not produce the same result.
 - 9 The unmarried save for marriage and/or enjoy higher consumption. Wives' wages barely meet their own consumption; which is why husbands' wages must suffice for children's consumption as well as their own (Cantillon 1755:35–7).
 - 10 A sense of the thinking behind Cantillon's notion of replacement consumption occurring at levels of consumption which differ for different labour categories is provided in another part of the *Essai*:

most men desire nothing better than to marry if they are set in a position to keep their Families in the same style as they are content to live themselves. That is, if a Man is satisfied with the produce of an Acre and a half of Land he will marry if he is sure of having enough to keep his Family in the same way. But if he is only satisfied with the produce of 5 to 10 Acres he will be in no hurry to marry unless he thinks he can bring up his Family in the same manner.

...[With regard to the Nobility,] as the largest share of the Property is usually given to the Eldest sons, the younger Sons are in no hurry to marry...

... In the lower classes...most...would consider themselves to do an injustice to their Children if they brought them up to fall into a lower class than themselves... All the lower orders wish to live and bring up Children who can live like themselves.

(Cantillon 1755:77–9)

- 11 The common method of calculation is the use of a multiplier of two—that is, a married male labourer needs twice his own consumption to meet the consumption of his children as well as himself—and then the same determination of land quantity. However, there is a notable ambivalence concerning entrepreneurs. On the one hand, Cantillon wishes to apply an average multiplier of three; on the other, he recognizes that at least some entrepreneurs cannot really be valued according to the consumption/wages rule applied to other labourers (Cantillon 1755:39–41):

As the Farmers and Masters of Crafts in Europe are all Undertakers [*Entrepreneurs*] working at a risk, some get rich and gain more than a double subsistence, others are ruined and become bankrupt...; but the majority support themselves and their Families from day to day, and their Labour or Superintendence may be valued at about thrice the produce of the Land which serves for their maintenance.

Evidently these Farmers and Master Craftsmen, if they superintend the Labour of 10 Labourers or Journeymen, would be equally capable of superintending the Labour of 20, according to the size of their Farms or the number of their customers, and this renders uncertain the value of their Labour or Superintendence.

This is just another expression of the difficulties inherent in Cantillon's entrepreneur category (*vide* sections 5.2 and 7.3).

- 12 Any temptation to see in this a 'marginal productivity' theory of distribution (for example, Brewer 1992a:718, 721; 1992b:133, 137) should be firmly resisted. The notion that distribution reflects 'contributions' of inputs to production of outputs is an ideological notion which has had some persistence in economic thought. It happens also to have been associated with the marginal productivity theory; but it is not *entailed* by that theory, and is certainly not identical with it. See also Roncaglia (1985:83–4).
- 13 It may also be noted here that whereas Petty spoke of a *natural* par, Cantillon never does. Not too much should be made of this but it is more than merely semantic. Cantillon's par is intended to be conventional in a sense in which that of Petty is not. For Cantillon there is a plurality of pars as there is a plurality of customary consumption patterns and kinds of labour. For Petty the notion of subsistence relevant to the par is intended to be stricter ('the easiest-gotten food of...respective Countries')—notwithstanding that elsewhere Petty recognizes the historical as well as geographical character of subsistence (*vide* Chapter 7, note 6)—and there is even an effort to give capitalization (interest and years-purchase) a 'natural' significance; and to reduce heterogeneous labour to homogeneity. If Petty had ever arrived at a parity, it would have been singular, at least by location.
- 14 As mentioned in the previous chapter, Cantillon, like others before him including Petty, treats the price of land as primarily determined by the value of rents capitalized at the ruling rate of interest, subject to certain qualifications including differential risk and non-pecuniary advantages (Cantillon 1755:221–3). With regard to Petty's analysis along these lines, see section 6.1.
- 15 The difficulty is compounded by Petty's speaking almost in the same breath of

‘the Wealth, Stock, or Provision of the Nation...[as] the effect of the former or past labour’ (Petty 1691b:108–10 with 114).

- 16 It is this notion which spurred Rousseau’s indignation and fury. Cantillon makes it explicit with respect to slaves by comparing them with cattle (Cantillon 1755:35). But analytically the value of non-slave labour is formulated in exactly the same way as for slave labour. Cf. also Sraffa’s comment on his modern formulation of the classical approach to value and the general rate of profit, initially on the classical assumption of ‘subsistence’ labour consumption: ‘We have up to this point regarded wages as consisting of the necessary subsistence of the workers and thus entering the system on the same footing as the fuel for the engines or the feed for the cattle’ (Sraffa 1960:9).

Rousseau’s implied attack on value parity happens to be in the context of one of his more famous comments on Enlightenment (the first sentence of the following quotation), in his *Discourse on the Sciences and Arts (First Discourse)*:

Ancient politicians incessantly talked about morals and virtue, those of our time talk only of business and money. One will tell you that in a given country a man is worth the price he would fetch in Algiers; another, following this calculation, will discover some countries where a man is worth nothing and others where he is worth less than nothing. They evaluate men like herds of cattle. According to them a man is worth no more to the State than the value of his domestic consumption.

(Masters 1964:51)

The Algiers reference is to Petty’s quotation of slave values (Petty 1687b:512, briefly discussed in note 7 above), though evidently from the French edition of the previous year (Petty 1686a). The reference to men worth nothing or less is apparently to Montesquieu (Masters 1964:51 n. 37). The reference to cattle and the value of consumption is suggestive of Cantillon, even though the *First Discourse* was published in 1750: Rousseau knew Mirabeau, the man who had possession of Cantillon’s manuscript and vigorously espoused its ideas (*vide* Chapter Five, intro; Fox-Genovese 1976:145–6). Indeed, the contemporaneous account of the Mirabeau/Quesnay encounter mentioned in the introduction to Chapter 5, as well as Quesnay’s comments on Cantillon (*vide* section 7.1), is a letter from Mirabeau to Rousseau (Meek 1962:16). Note also that the context of Petty’s quotation of the Algiers slave price is the valuation of French lives.

- 17 Two points may be added. Since c has been interpreted in this chapter (section 6.2) to include necessary consumption by children, equation (6.19) is better interpreted as determining adult population. Second, if surplus use of land is interpreted as production of the commodity j of section 6.2, then q equals (T/A) .

7 PETTY—CANTILLON—QUESNAY

- 1 Compare the entries in Eatwell *et al.* (1987) by J.Eatwell (vol. I, 537), P. Garegnani (vol. IV, 560, 573), M.Milgate (vol. II, 180) and G. Vaggi (vol. IV, 29).
- 2 Almost nothing will be said concerning the influence of Petty and Cantillon upon others; nor concerning other intellectual influences upon Cantillon and Quesnay. Aspects of this will be examined in Chapter 9.
- 3 The commodity specification has greater generality than the labour specification because the former is capable of treatment in a framework of joint production, which the latter in general is not.
- 4 See Chapter 3, note 1 1 above. Attention may also be drawn here to a later letter

of Sraffa to G.Einaudi (30 October 1948), which tends to suggest Sraffa's support for the view that Petty rather than Quesnay originated the classical surplus approach (Potier 1991:68–70; cf. 57–8):

About the series of economic classics: obviously such a series, if it is to be successful and of permanent value, should follow a consistent idea... Up to now, no series of classical economists considered as sources of Marxism has ever been put together in any country, and such a series is long overdue... I agree with the first names you mentioned. Nevertheless, neither Petty nor Quesnay (unlike A. Smith and Ricardo) is the author of a fundamental work as such—the *Tableau économique*, for example, is an opusculé of twenty to thirty pages. To the volumes you have indicated, I would unhesitatingly add Cantillon's *Essai*...

- 5 Basics are commodities which enter directly or indirectly into the production of all commodities, all other commodities being non-basic. With necessary consumption by labour, and labour input required in the production of all commodities, at least the necessary consumption goods are basics.
- 6 Cantillon (1755:86, also 34, 37–9, 67–71). Petty also recognizes subsistence to be customary; and in particular, historically, climatically and geographically variable—‘Sugar, Tobacco, and Pepper, which custom hath now made necessary to all sorts of people’; ‘Climate disposes men to a necessity of spending more or less’; subsistence understood as ‘the easiest-gotten food of the respective Countries of the World’ (Petty 1690:275; 1662:90; 1691a:181).
- 7 Petty does provide some empirical analysis of the quantity of land required for necessary consumption. See section 3.5.
- 8 Cantillon (1755:43, 83, 131). The first and third of these are evidently references to Petty (1691a). See also note 20 below.
- 9 The economic writers Cantillon refers to—with number of references in parentheses—are Charles Davenant (2), Edmund Halley (2), Gregory King (1), John Locke (4), Isaac Newton (1—though relatively long), Petty (3) and Maréchal de Vauban (1). (All these references can be found in the index to the Higgs edition.) Pierre de Boisguilbert's *Le Détail de la France* (1695) is also referred to in the *Essai*, though his name is not used; and there is a reference to Jean Boizard's *Traité des Monoyes* (on the minting of coins). All these references are neutral or critical, though Halley is once referred to as ‘celebrated’—as is Newton, but in a critical context. Thus the character of Cantillon's references to Petty are actually typical of the tone of his rather small number of references to other economic writers mentioned in the *Essai*. A sense of Cantillon's rather disdainful tone in this regard, can be gained from the following (Cantillon 1755:43, 83, 187, 283):

[Petty's inquiry into value parity] is fanciful and remote from natural laws, because he has attached himself not to causes and principles but only to effects, as Mr. Locke, Mr. Davenant and all the other English authors who have written on this subject have done after him.

Petty, and... Davenant... seem to depart from nature when they try to estimate [population growth]... Their calculations seem to be purely imaginary and drawn up at hazard.

[Boisguilbert] has mistaken the effect for the cause.

[Newton's currency proposals] sacrificed the substance to appearances.

It may be added that Cantillon's references to Locke also do not do justice to Cantillon's debt to Locke's monetary theory; though on Locke's

- treatment of market prices, which Cantillon also makes some use of, his criticism is accurate and acute (*vide* section 9.3).
- 10 Ironically, this is to some extent a treatment similar to that which Cantillon would subsequently receive himself from Quesnay.
 - 11 Petty (1690:269, 270–1); Cantillon (1755:89, 91–3). On the basis of this it can reasonably be assumed that Cantillon had access to the *Political Arithmetick*. Note also that each pair of quotes follows quite closely, in their respective texts.
 - 12 Attention may also be drawn to a strong similarity between the views of Petty (1662:48–9, 51–2) and Cantillon (1755:151–5) on agricultural prices and location. Cantillon argues that ‘the price of raw Produce of equal quality will always be higher in the Country places which are nearest the Capital than in those more distant in proportion to the costs and risks of transport’ (though he qualifies this). Cf. the Petty quotation in Chapter 3, note 29. Petty’s strong interest in transport costs is discussed in section 3.2. Economic aspects of location are a major theme of Cantillon’s *Essai*. If this element of Cantillon’s economics were inspired by Petty, this would point to Cantillon’s exposure to Petty’s *Treatise* (1662).
It may also be noted here that one striking and curious substantive difference between Petty and Cantillon is that the former put so much emphasis upon technical progress while the latter virtually ignored it completely (*vide* section 3.4 and Chapter 5, note 8 above).
 - 13 Cantillon (1755:45, 65, 265). Consider also the character of Cantillon’s critical remarks on other writers cited and some of those quoted in note 9 above, especially with regard to cause/effect and substance/appearance.
 - 14 It may also be noted that the lost quantitative ‘Supplement’ to Cantillon’s *Essai*, with its empirical estimates of various theoretically significant economic variables, is evocative of Petty’s political arithmetic; but in the absence of detailed knowledge of its contents not much should be made of this (*vide* Appendix B). Nevertheless, the account by Mirabeau of Cantillon’s intensely empirical intellectual temper, quoted in Higgs (1931b:382), is intriguing.
 - 15 Brewer (1992a: esp. 725–7) questions the extent of Cantillon’s debt to Petty, while at the same time acknowledging the four substantive points outlined above (and the substantive point in note 12 above—Brewer 1992b: 193–4) but not the two methodological elements noted above. Brewer argues that the surplus approach in Petty is, in effect, piecemeal—a claim which may be compared with the interpretation and documentation provided in Chapter 3. Brewer (1992a:726 n. 13) also argues that the analysis of the social division of labour in Cantillon is ‘peripheral...and...of secondary importance’. But Cantillon’s surplus labour analysis is integral to his surplus theory of rents and the circulation of commodities (*vide* Chapter 5)—which is evidently central to Cantillon’s economics. (Consider in particular equation (5.5) with (6.10), in Chapters 5 and 6, noting that the former does not incorporate seed input.) Most of the difference of judgement therefore hinges upon the *significance* of the surplus approach in the economics of Petty and Cantillon; in particular, whether it captures the genuine character of their thought on production and distribution (cf. Chapter 5, note 2), and the relation between them.
 - 16 Meek (1962:266–9); Marx (1967: vol. I, 555 n. 2); Jevons (1881:347, 353–5); Ingram (1888:60–1); Roll (1942:133); Schumpeter (1954:218); Fox-Genovese (1976:95–6, 98, 122–3); Walsh and Gram (1980:19, 21); Groenewegen (1983: xviii); Murphy (1986:260–1, 279); Hutchison (1988:10, 164–5, 274). Meek (1962:267) quotes Quesnay’s reference to Cantillon in *Grains*: (1757a) ‘Cantillon’s recognition of certain “fundamental truths”, notably that “the

- revenue of the king, the clergy, and the proprietors, and the gains of the farmer and of those whom he employs, turn into expenditure, which is distributed to all the other estates and to all the other occupations”.⁷ Commenting upon Quesnay’s intellectual pedigree, Groenewegen (1983:xvii–xviii) concludes that his early economic writings ‘were not inspired to any marked extent by the work of others’, save for Cantillon, who ‘must have inspired essential features of Quesnay’s *Tableau*’.
- 17 To be more precise, in various accounts of the Mirabeau/Quesnay encounter Quesnay’s imputation is not disputed. Meek (1962:16–17), for example, simply accepts Mirabeau’s view (‘the “populationist” thesis...which Mirabeau had borrowed from Cantillon’), going on to quote Mirabeau: ‘I had, like him [Cantillon] and so many others, concluded, according to the superficial appearance of things, that... The way to achieve prosperity [wealth] is... To increase men.’
 - 18 Cantillon (1755:3, 65–95 (Part I, chs XV–XVI), esp. 87–9); and section 5.1. It may be added that the wealth-as-consumption doctrine is also consistent with the hierarchical notion of wealth-as-durables; since these latter (especially gold and silver as liquid reserves) are conceived as means to subsistence or above-subsistence consumption (Cantillon 1755:89–91; also 185).
 - 19 See also Quesnay (1756:25; 1757a:73, 74, 81, 83; 1759:8n., 15, 16n., 19); Eltis (1984:10–11, 64–5, 132–3); Vaggi (1987:38–9, 47, 104–5).
 - 20 *Vide* sections 3.3 and 5.3. See Cantillon (1755:131) for a comment on an aspect of Petty’s treatment of velocity (cf. Petty 1691a:192). For a wider account of Cantillon’s monetary thought, see Murphy (1986:261–79).
 - 21 On basics and non-basics see note 5 above. In terms of Cantillon’s country/city production system intra-sectoral circulation of commodities is therefore unproblematic. City-manufactured input to city manufacture does not alter the essentially surplus character of this activity. Rural input to agriculture includes rural manufacture, without much analysis. Vaggi (1987:89–90) is wrong to suppose that Cantillon employs a linear conception of production with only primary inputs, land and labour—and in any case, labour is not a primary input in Cantillon’s system (*vide* section 6.2). Of course, for both Petty and Cantillon seed input is a produced means of production.
 - 22 The phrase emphasized (by us) quite clearly implies that taxes, even if levied upon farmers, fall upon landowners’ income.
 - 23 Cantillon (1755:59–85, 93–103). With regard to demand variations Cantillon comments that labourers ‘live from day to day’ and only change their consumption ‘from necessity’, while any entrepreneurs ‘in easy circumstances’ always alter consumption only in imitation of the landowners (p. 63)—hence the essential passivity of all consumption except that of the landowners (and the Prince).
 - 24 Cantillon (1755:55–7, also 219–21). Note that in this account these agents were originally high-wage hired labourers or large-scale entrepreneurs but seem to have become something qualitatively different, though Cantillon unconvincingly goes on to attempt to minimize its significance. Obviously these agents share at least one characteristic with entrepreneurs: uncertain incomes. These citations also indicate a notion of money wealth (credit) effecting a redistribution of surplus from indebted landowners—and indirectly from landowners, via the state’s public debt and interest payments. Prendergast (1991:423) makes a very similar point.
 - 25 Quesnay (1757a:73–4, 76, 81–2; 1757b:95–9; 1757c: 103–7; 1759: i–ix, xi, In., 5n., 6, 6n., 7–8, 8n., 11n., 13n., 14n., 17n., 20n.); Meek (1962:41, 274);

- Groenewegen (1983:xv-xvi); Vaggi (1987:28–9, 46–8, 99–101); Eltis (1984, ch. 2).
- 26 There are also linguistic difficulties pertaining to the precise eighteenth-century significance of *profit* and other French terms. See Meek (1962:41); Groenewegen (1983:xxiii). A similar difficulty also pertains to Prendergast (1991:421 n. 3) on profits in Cantillon. With regard to Marx's comment on Physiocracy, this could be explained by Marx's limited access to Physiocratic writings (see Vaggi 1987:193 n. 2). For Quesnay on profits see (1756:7–8, 12–13, 15–18, 23; 1757a:73, 81–2, 86–7; 1757b:89, 96, 98; 1757c:103, 105–6; 1759:2n., 5n., 6n., 8n., 11n., 14n.).
- 27 The logical problem of the relation between farmers' incomes, net accumulation and surplus does not arise in Cantillon because he has no conception of net accumulation.
- 28 Chapters 2 and 4 provide some reasons why Petty was particularly well placed to make a breakthrough in the scientific analysis of economic life in general and production in particular. See also Roncaglia (1985:19–28, 89–93).

8 WAGES, PRICES AND ECONOMIC SURPLUS IN STEUART'S *PRINCIPLES*

- 1 All references are to the Skinner edition. His edition actually follows the text of Stuart (1805); but substantive differences between the two editions (and other texts) are noted by Skinner. They are not considerable.
- 2 Notwithstanding an infelicity of language which might suggest the contrary: compare 152 and 172–3. In the latter Stuart says that they are synonyms and then immediately argues that they are actually different because compound demand comprehends both excess demand and excess supply. But the earlier discussion makes it evident that the latter distinction is at best superfluous. In spite of (or because of?) Stuart's self-conscious preoccupation with economic language and definition (for example, at 172), linguistic confusions or superfluities like this occur at a number of points. The use of the term *simple* competition, associated with *compound* demand as opposed to *simple* demand, is also unhelpful.
- 3 The metaphor of 'vibration' around a balance recurs continually in the *Principles*, and is connected with Stuart's use of the nomenclature of 'equilibrium' (for example, 189). It almost goes without saying that Stuart's discussion of demand and supply should not be regarded as an anticipation of the marginalist theory of equilibrium prices in terms of demand and supply functions (or excess demand functions) determined by 'endowments', preferences and technology—except that Stuart's editor at one point does actually suggest that Stuart's discussion is intelligible in terms of such demand schedules (Stuart 1767:152–3); also Hutchison (1988:345, 347); Karayiannis (1991:172, 174, 176, 178–80, 185). This is all the more surprising because in the very next editorial footnote (153) Skinner quotes Stuart (1805: vol. in, 15–16) in terms which could hardly be more explicit:

It is impossible to lay down a distinct theory for the rise and fall of the prices of all sorts of commodities in a nation such as Great Britain. All that can be said with certainty, is, that competition on the part of the consumers will make them rise, and that competition on the part of the furnishers will make them fall. Now the competition among the furnishers may be reduced to theory; because it is fixed within determinate limits....

But the competition among consumers is fixed within no determinate limits: some demand to satisfy physical wants; others those of vanity and caprice.

What is meant by determinateness on the supply side will be explained below (section 8.3): there is no theory of demand price; but there is a theory of normal supply price, though it has no kinship with the rising supply price of marginalist theory. On the (later) origins of the actual phrase ‘supply and demand’, see Groenewegen (1973).

- 4 Note that the meaningfulness of the upper bound of the real wage here, given by the international prices of subsistence, simply presumes that international prices exceed domestic prices associated with strict (‘shortest’) subsistence. Nor is it explained how domestic and foreign prices can diverge. *Shortest* subsistence echoes the notion of a band of physical subsistence levels.
- 5 Stuart (1767:17, 28, 86, 231) defines the principal object of political economy as securing subsistence for all the inhabitants of a society, as well as full employment.
- 6 Mercantilism is used here in the narrow sense implied in section 3.3: the doctrine that changes in the quantity of circulating currency, due to the balance of foreign payments, significantly influence the level of domestic activity; and that government regulation can systematically and successfully influence that balance.
- 7 With regard to taxation falling only on surplus consumption, see Steuart (1767:305–6, 334–5, 641, 677–84, 686, 687–8, 729–35). On the relations between taxes, prices and wages, see *ibid.* (672, 673, 679–84, 689–97 (export prices), 702, 705, 706–7, 723, 729–35). On wages and import prices, see *ibid.* (115n., 119–20, 200–1, 402–4); Steuart (1777). Other discussions in which a causation from consumption prices to wages is conceded occur at Steuart (1767:188, 196–200, 252–5, 271, 340).
- 8 Steuart (1767:192–3, 194, 246; also 192–5, 204, 240, 248–52, 259, 684). On a couple of occasions Steuart suggests that consolidated profits can be unconsolidated, so to speak (250, 695). Steuart’s editor indicates that ‘consolidated’ was substituted for ‘incorporated’ in Steuart’s MS (193 n. 1).
- 9 If Steuart had conceived of profits as received at a general rate in proportion to capital advanced, profits per unit of output in the various industries would be systematically connected and one degree of freedom would be eliminated from the above price equations. With a uniform rate of profit (π) across the two industries $\pi = (\pi_{ca}/k_c) = (\pi_{ja}/k_j)$, where k_c, k_j are the capital—output ratios in the two industries, measured in corn.
- 10 Karayiannis (1991, 183–4) also draws attention to the problem of functionally distinguishing wages and profits in Steuart but makes an unfortunate choice of language in referring to a *rate* (per what?) of profit in Steuart. Meek (1958:293–6) makes a similar point, examining its significance in some detail and drawing attention to the problem of indeterminacy.
- 11 If real values are exclusive of surplus wages, only the former difficulty applies; but recall also the references to ‘unconsolidating’ consolidated profits in note 8 above, which tells against this interpretation.
- 12 Steuart (1767:189–90, 355). See also, for use of the term equilibrium, 194, 204, 412; on the concept of ‘balance’, 189–205, 245–52; on output adjustment, 153, 192, 195, 375–6; and on the role of merchants in markets, 156–9, 161, 171–8.
- 13 This points to the one aspect of the above interpretation of Steuart’s price theory which is open to question: the treatment of rents per unit of homogeneous land

- as a price-determining cost of production—the Cantillon interpretation, so to speak (*vide* section 6.2). If this interpretation were given up, the price theory would be restricted to prices of manufactures, with agricultural prices (including prices of agricultural inputs to manufacture) undetermined. On rents in Steuart, see also Karayiannis (1988:39).
- 14 Connections have been drawn between Steuart and Keynes with respect to monetary theory, employment theory and, most obviously, interventionist policy stance (*vide* Eltis 1987; Sen 1947). In relation to policy, Steuart's continental European experience is evidently relevant; so that cameralist, rather than Keynesian, seems a more historically germane characterization of him (Hutchison 1988:348–9, 351; Eltis 1987:495).
 - 15 In fact an identical relation to our equations (3.3) and (5.5) is used by Akhtar (1978:60 eq. (2); 1979:286 eq. (2)) in his models of Steuart's macroeconomic ideas and views on growth—on the supposition that subsistence is purely agricultural; labour is homogeneous; and with population (identified with a fully employed labour force) endogenously determined.

9 DEVELOPMENTS IN THE THEORY OF DISTRIBUTION AND VALUE

- 1 On a personal note, when the present writer began to examine a large body of this literature, following intensive studies of Locke and Petty, he fully expected to discover other seventeenth-century instances of surplus analysis and was quite surprised to find virtually nothing resembling this. It may also be noted here that all quotations in this chapter from seventeenth-century sources are verbatim, except for the omission of original italicization.
- 2 McCulloch (1856:xi–xiii) makes the extraordinary claim that North (1691) is 'the most remarkable [tract] in many respects of any that appeared in the course of the century... North is an uncompromising advocate of commercial freedom ... An Achilles without a heel, he has no vulnerable points, no bounties, no duties, no prohibitions.' Letwin (1963:201–4) sees North's *Discourses* as the highest expression of scientific method in seventeenth-century English economic literature. Winch (1971:11), following Letwin, lumps Petty, Locke and North together, commenting that they 'were frequently able to go beyond the common-sense observations and isolated insights of their contemporaries'. A recent effusive study of Locke makes the empty claim that he is a 'social scientist' and the bizarre claim that he is a precursor of Austrian capital theory (Vaughn 1980:52–7, 108, 132–7). Hutchison (1988: ch. 5) presents a more balanced assessment of the English economic writers of the 1690s, relative to Petty.
- 3 There is some dispute as to whether Steuart refers to Cantillon's *Essai* in the *Principles*. Compare p. 564 of the Skinner edition with vol. in, 391, 408 of the edition by Steuart's son (Steuart 1805). Johnson (1937:364 n. 37, 409) evidently believes these to be references to the *Essai* and also points out Steuart's exposure to the corrupted version of the *Essai*—*The Analysis of Trade...*(1759) assembled by Philip Cantillon (cf. Jevons 1881:333–9; Higgs 1931b:376–8). See also Sen (1957:198).
- 4 It almost goes without saying that none of the foregoing implies a denial that other influences acted upon the main figures considered here; for example, Boisguilbert with respect to Cantillon and Quesnay.
- 5 As with Cantillon's *Essai* (see note 3 above), there is some difference of opinion between Skinner (Steuart 1767:111 n. 1) and Johnson (1937:409) concerning a

- possible citation of Quesnay by Steuart. Johnson is evidently correct to regard this as a reference to Quesnay (1757a; also Sen 1957:198). The most striking parallel between Quesnay and Steuart is with regard to tax incidence and the unique disposability of the social surplus (for example, Steuart 1767:677–8)—a doctrine merely implied in Cantillon (*vide* Chapter 7, note 22). See also note 6 below.
- 6 There is one piece of evidence for an influence of Quesnay upon Steuart which may be noted here that is not noted by any of the secondary sources cited above, nor by Steuart's editor. At one point in the *Principles* Steuart (1767:340; cf. 159–61) actually uses the term 'fundamental price' though the context leaves uncertain the precise relation to Steuart's notion of 'real value' (*vide* section 8.3). Fundamental price is just the term Quesnay uses for a cost-based notion of value equivalent to Steuart's real value. Steuart's real value and Quesnay's fundamental price have virtually identical meaning; and there is also some parallel between Quesnay's *bon prix* and Steuart's equilibrium price, the additional component making up the difference between fundamental price (real value) and *bon prix* (equilibrium price) being an element of adequate (reasonable) profit (cf. Vaggi 1987:127–9).
 - 7 For an overview of debates about possible influence of Quesnay and Turgot upon Smith—though one which exaggerates Smith's originality—see Walsh and Gram (1980:40–4, 50–61). (For a clear example of exaggeration, p. 71 grossly underrates Turgot's treatment of profits, relative to Smith.) For other accounts see Meek (1973:iii–vii, 56–7); Eltis (1984:vii–viii, 67, 315–18); and especially Groenewegen (1968:501, 503–6, and 1969:274–82, 285–7).
 - 8 Values are determined independently of market prices, actual prices and competition, and act as regulators of market behaviour. In the centre-of-gravity metaphor, actual and market prices orbit values, so to speak. Difference between values and actual/market prices is attributed to more or less continuous random influences or imbalances which obstruct realization of the conditions for values to prevail (essentially, clearing of commodity markets under competitive conditions, with no profitable arbitraging opportunities available). On the other hand, values can be conceived of as accounting for the dominant sources of variation in actual/market prices: change in prices is attributed primarily to change in the determinants of values. The former notion strongly implies (if not entails) the latter; but the latter does not entail the former. The former, stronger notion is required for a conceptually adequate theory of exchange value.
 - 9 See also Mun (1664:128); Fortrey; (1673:239); Sheridan (1677:159, 198). It should be evident that reference to 'scarcity' in these contexts does not imply scarcity in the modern marginalist sense (finite resources with inexhaustible desirable uses). Rather, it refers merely to excess of demand over quantity supplied, for particular commodities. This is apparent from the accompanying use of 'plenty' (excess supply) as an antonym. Nor are these kinds of statements primitive anticipations of marginalist theories of equilibrium prices determined by reference to demand and supply functions (see, for example, Bowley 1963; cf. Garegnani 1983).
 - 10 It is worth noting that Cantillon's accurate criticism, that Locke has no theory of intrinsic commodity value, applies with equal force to Cantillon's own treatment of interest, which determines interest by reference to nothing more than the proportion between lenders and borrowers (*vide* section 5.3).
 - 11 Davenant (cited above) also uses the term prime cost (pp. 430–1); but neither of them define it. In Barbon the context suggests that it refers to the cost of

- commodities to the merchant (artificer's price); and Davenant's other uses of the term suggest the same meaning (Davenant 1698: vol. II, 15, 95, 119–20).
- 12 Heterogenous land almost by definition entails different methods of production for each quality of land—and opens the way for a no-rent species of land; so that agricultural (and all other) commodity prices can be determined independently of rents, by reference to production methods on no-rent land (as well as other conditions). For a critique of scarcity interpretations of Quesnay, see Vaggi (1987:182–7). Brewer (1992b:11–12, 14, 15, 29, 34, 39n., 66, 113, 118, 119, 172, 175, 179, 184, 189–90) applies a scarcity interpretation to Cantillon—a view for which it is impossible to provide a single piece of textual evidence. It is, rather, an alien imposition upon Cantillon's text (*vide* Aspromourgos 1993).
 - 13 King (1696:30–2), followed by Davenant (1696:87–8), also employs Petty's value-of-the-people notion (*vide* section 6.1) in estimating national wealth, though it is noteworthy that King (1697) silently drops it. The notion is also employed by Sheridan (1677:184–5).
 - 14 See also the use made of King's data on income distribution and class by Macpherson (1962:279–92).
 - 15 The other major reason for which King and Davenant retain a place in the history of economic thought, besides political arithmetic in general, is the so-called 'King-Davenant Law of Demand', wherein Davenant—apparently following King, but to an extent which is difficult to ascertain—is supposed to have specified an empirical demand curve for corn linking price and quantity. See Evans (1967); Greedy (1986); and Endres (1987). Without entering into a debate over this issue, the warning given in note 9 above, about misreading premarginalist economics as primitive marginalism, is also relevant here.
 - 16 In the preceding chapters (esp. section 3.5) political arithmetic has been more narrowly construed, so as not to be synonymous with Petty's economic thought as a whole. On Smith's apparent indebtedness to Petty on the subject of technical division of labour, see section 3.4. For another view of the Smith and Marx comments on political arithmetic, see Roncaglia (1985:19, 25).

10 ADAM SMITH AND AFTER

- 1 Section 10.3 examines how this can be formally treated from a modern standpoint.
- 2 This differs from Sraffa's procedure, where gross outputs and the methods for producing just those outputs are assumed given, so that no assumption concerning returns to scale is necessary.
- 3 The expression for L_c/L in equation (10.43) is equivalent to the expression used in equation (3.3) of section 3.1 (and equation (5.5) of section 5.1), since c there is identical to c_i here, and A there is identical to $(1/l_i)$ here. The only differences are that the distinction between working and non-working population is here ignored ($n=1$); and seed input is here formally taken into account ($a_{11}>0$).
- 4 *Vide* Garegnani (1978–9); Eatwell and Milgate (1983); Kurz (1985). By way of simple illustration, if equations (10.1)–(10.13) are combined with given proportions in which net profits are divided between capitalist consumption of each commodity and saving, and given planned net investment demand for each commodity, then outputs can be determined by equating gross demand and output for each commodity, with r and p separately determined and aggregate savings brought into equality with investment.
- 5 Hence Keynes (1937:212–13) comments:

NOTES

the initial novelty lies in my maintaining that it is not the rate of interest, but the level of incomes which ensures equality between saving and investment. The arguments which lead up to this initial conclusion are independent of my subsequent theory of the rate of interest, and in fact I reached it before I had reached the latter theory. But the result of it was to leave the rate of interest in the air. If the rate of interest is not determined by saving and investment in the same way in which price is determined by supply and demand, how is it determined? One naturally began by supposing that the rate of interest must be determined in some sense by productivity—that it was, perhaps, simply the monetary equivalent of the marginal efficiency of capital, the latter being independently fixed by physical and technical considerations in conjunction with the expected demand. It was only when this line of approach led repeatedly to what seemed to be circular reasoning, that I hit on what I now think to be the true explanation. The resulting theory, whether right or wrong, is exceedingly simple—namely, that the rate of interest on a loan of given quality and maturity has to be established at the level which, in the opinion of those who have the opportunity of choice—that is, of wealth-holders—equalises the attractions of holding idle cash and of holding the loan. It would be true to say that this by itself does not carry us very far. But it gives us firm and intelligible ground from which to proceed.

APPENDIX A

- 1 Consider the following account of Petty's writing habits, quoted by Larcom (1851:V) from a contemporaneous source: 'His way was to retire early to his lodgings, where his supper was only a handfull of raisins and a piece of bread. He would bid one of his clarks, who wrote a fair hand, go to sleep; and while he eat his raisins and walked about, he would dictate to the other dark, who was a ready man at short-hand. When this was fitted to his mind, the other was roused, and set to work, and he [Petty] went to bed, so that next morning all was ready.'
- 2 Consider also the argument concerning intrinsic and extrinsic value of land (Graunt 1662:395–6). This is very similar in intention and expression to Petty (1662:49–50).
- 3 Only some extracts from item 8 are published in Hull. If item 1 had also been included it might have received the attention it deserves in the study of Petty's thought.
- 4 In the version of this paragraph published in Aspromourgos (1988:352) some numbers were incorrect by one; for example, '4 to 13' instead of '4 to 14'. This was due to a typesetting alteration of the enumeration in the table, unaccompanied by the associated required alterations to the enumeration in the text.

REFERENCES

- Akhtar, M.A. (1978) 'Sir James Steuart on Economic Growth', *Scottish Journal of Political Economy* 25, 1:57–74.
- (1979) 'An Analytical Outline of Sir James Steuart's Macroeconomic Model', *Oxford Economic Papers* 31, 2:283–302.
- Amati, F. and Aspromourgos, T. (1985) 'Petty *contra* Hobbes: a previously untranslated manuscript', *Journal of the History of Ideas* 46:127–32.
- Aspromourgos, T. (1986a) 'On the origins of the term "neoclassical"', *Cambridge Journal of Economics* 10, 3:265–70.
- (1986b) 'Political Economy and the Social Division of Labour: the economics of Sir William Petty', *Scottish Journal of Political Economy* 33, 1:28–45.
- (1988) 'The Life of William Petty in Relation to his Economics: a tercentenary interpretation', *History of Political Economy* 20, 3:337–56.
- (1993) Review of Brewer (1992b), *European Journal of the History of Economic Thought* 1, 1:169–72.
- Bacon, F. (1605) *The Advancement of Learning*, ed. with an intro. by T.Case (1906), London: Oxford University Press, reset 1951.
- (1620) *Novum Organum*, transl. and ed. by Spedding, Ellis and Heath (1870), vol. IV:37–248.
- Barbon, N. (1690) *A Discourse of Trade*, ed. by J.H.Hollander (1934) Baltimore: Johns Hopkins University Press.
- Barnett, G.E. (ed.) (1936) *Two Tracts by Gregory King*, Baltimore: Johns Hopkins University Press.
- Bauer, S. (1894) 'Arithmetic, Political', in Palgrave (1894–9), vol. I:55–7.
- Beer, M. (1938) *Early British Economics: from the XIIIth to the Middle of the XVIIIth Century*, London: George Allen & Unwin.
- Bevan, W.L. (1894) 'Sir William Petty: a study in English economic literature', *Publications of the American Economic Association* 9:371–472.
- Bharadwaj, K. (1978a) *Classical Political Economy and Rise to Dominance of Supply and Demand Theories*, New Delhi: Orient Longman.
- (1978b) 'The Subversion of Classical Analysis: Alfred Marshall's early writing on value', *Cambridge Journal of Economics* 2, 3:253–71.
- (1983a) 'On a Controversy over Ricardo's Theory of Distribution', *Cambridge Journal of Economics* 7; repr. in Bharadwaj (1989b):77–110.
- (1983b) 'Ricardian Theory and Ricardianism', *Contributions to Political Economy* 2; repr. with minor modifications in Bharadwaj (1989b):41–76.
- (1988) 'Sraffa's Ricardo', *Cambridge Journal of Economics* 12; repr. in Bharadwaj (1989b):111–33.
- (1989a) 'Adam Smith's Political Economy', in Bharadwaj (1989b):13–40.

REFERENCES

- (1989b) *Themes in Value and Distribution: classical theory reappraised*, London: Unwin Hyman.
- Birch, T. (1756–7) *History of the Royal Society*, 4 vols, London.
- Blaug, M. (1987) ‘Classical Economics’, in Eatwell *et al.* (eds), vol. 1:434–45.
- Boisguilbert, P.de (1695) *Le Détail de la France*, repr. in Institut National d’Études Démographiques (1966), vol. II:581–662.
- Bonar, J. (1932) *A Catalogue of the Library of Adam Smith*, 2nd edn, New York: Augustus Kelley (1966).
- Bowley, M. (1963) ‘Some Seventeenth Century Contributions to the Theory of Value’, *Economical*, 118:122–39.
- Bray, W. (ed.) (1907) *The Diary of John Evelyn*, 2 vols, London: J.M.Dent.
- Braybrooke, R. (1848–9) *Diary and Correspondence of Samuel Pepys, F.R.S.*, 4 vols, London: Swan Sonnenschein (1906).
- Brems, H. (1978) ‘Cantillon versus Marx: the land theory and the labour theory of value’, *History of Political Economy* 10, 4:669–78.
- (1986) *Pioneering Economic Theory, 1630–1980: a mathematical restatement*, Baltimore: Johns Hopkins University Press.
- Brewer, A. (1988) ‘Cantillon and the Land Theory of Value’, *History of Political Economy* 20, 1:1–14.
- (1992a) ‘Petty and Cantillon’, *History of Political Economy* 24, 3:711–28.
- (1992b) *Richard Cantillon: pioneer of economic theory*, London: Routledge.
- Cannan, E. (1893) *A History of the Theories of Production and Distribution in English Political Economy from 1776 to 1848*, 3rd edn, 1917; London: P.S.King (1924 reprint).
- Cantillon, R. (1755) *Essai sur la Nature du Commerce en Général*, as repr. in Higgs (1931a).
- Chamberlayne, E. (1669) *Angliae Notitia, or the Present State of England...*, London.
- (1683) *The Present State of England. Part III and Part IV...*[with] *England’s Guide to Industry...*, London.
- Child, J. (1668) *Brief Observations Concerning Trade, and Interest of Money*, repr. in Child (1968).
- (1693) *A New Discourse of Trade...*, repr. in Child (1968).
- (1968) *Selected Works 1668–1697*, n.p.: Gregg Press.
- Clark, A. (ed.) (1898) ‘*Brief Lives*’, chiefly of contemporaries, set down by John Aubrey, between the years 1669 and 1695, 2 vols, Oxford: Clarendon Press.
- Coke, R. (1670) *A Discourse of Trade...*, London.
- Cossa, L. (1880) *Guide to the Study of Political Economy*, transl. by W.S.Jevons, London: Macmillan.
- Creedy, J. (1986) ‘On the King-Davenant “Law” of Demand’, *Scottish Journal of Political Economy* 33, 3:193–212.
- Davenant, C. (1695) *A Memorial Concerning the Coyn of England...*, in Usher (1942): 1–63.
- (1696) *A memoriall concerning Credit...*, in Usher (1942):65–108.
- (1698) *Discourses on the Public Revenues, and on the Trade of England...*, London, repr. in Whitworth (1771), vol. I:125–459; vol. II:1–162.
- Deane, P. (1955) ‘The Implications of Early National Income Estimates for the Measurement of Long-term Economic Growth in the United Kingdom’, *Economic Development and Cultural Change* 4:3–38.
- (1968) ‘William Petty’, *International Encyclopedia of the Social Sciences*, 12:66–8.
- Deane, P. and Cole, W.A. (1962) *British Economic Growth, 1688–1959: trends and structure*, Cambridge: Cambridge University Press.
- Dick, O.L. (ed.) (1972) *Aubrey’s Brief Lives*, Harmondsworth: Penguin.

REFERENCES

- Dixon, R. (1981) 'A Model of Distribution', *Journal of Post Keynesian Economics* 3:383–402.
- Dobb, M. (1973) *Theories of Value and Distribution since Adam Smith: ideology and economic theory*, Cambridge: Cambridge University Press.
- Eatwell, J. (1987) 'Competition: classical conceptions', in Eatwell *et al.* (eds), vol. 1: 537–40.
- Eatwell, J. and M. Milgate (1983) *Keynes's Economics and the Theory of Value and Distribution*, London: Duckworth.
- Eatwell, J., Milgate, M. and Newman, P. (eds) (1987) *The New Palgrave: a dictionary of economics*, 4 vols, London: Macmillan.
- Eltis, W. (1984) *The Classical Theory of Economic Growth*, London: Macmillan.
- (1987) 'Steuart, Sir James (1713–1780)', in Eatwell *et al.* (eds), vol. 4:494–7.
- Endres, A.M. (1987) 'The King-Davenant "Law" in Classical Economics', *History of Political Economy* 19, 4:621–38.
- Evans, G.H., Jr., (1967) 'The Law of Demand—the Roles of Gregory King and Charles Davenant', *Quarterly Journal of Economics* 81:483–92.
- Fay, C.R. (1933) 'Locke versus Lowndes', *Cambridge Historical Journal* 4:143–55.
- Fitzmaurice, E. (1895) *The Life of Sir William Petty, 1623–1687*, London: John-Murray.
- Fortrey, S. (1673) *Englands Interest and Improvement...*, repr. in McCulloch (1856).
- Fox-Genovese, E. (1976) *The Origins of Physiocracy: economic revolution and social order in eighteenth-century France*, Ithaca and London: Cornell University Press.
- Garegnani, P. (1970) 'Heterogeneous Capital, the Production Function and the Theory of Distribution', *Review of Economic Studies* 37, 3:407–36.
- (1978–9) 'Notes on Consumption, Investment and Effective Demand', *Cambridge Journal of Economics* 2:335–53; 3:63–82.
- (1983) 'The Classical Theory of Wages and the Role of Demand Schedules in the Determination of Relative Prices', *American Economic Review (Papers and Proceedings)* 73:309–13.
- (1984) 'Value and Distribution in the Classical Economists and Marx', *Oxford Economic Papers* 36:291–325.
- (1987) 'Surplus Approach to Value and Distribution', in Eatwell *et al.* (eds), vol. 4:560–74.
- (1990) 'Sraffa: classical versus marginalist analysis', in K. Bharadwaj and B. Schefold (eds), *Essays on Piero Sraffa: critical perspectives on the revival of classical theory*, London: Unwin Hyman: 112–41.
- Gilibert, G. (1989) Review of Vaggi (1987), *Contributions to Political Economy* 8:91–6.
- Glass, D.V. (1963) 'John Graunt and his *Natural and Political Observations*', *Proceedings of the Royal Society of London (Series B)* 159:1–32.
- Graunt, J. (1662) *Natural and Political Observations... upon the Bills of Mortality*, repr. in Hull (1899), vol. II:314–435.
- Greenwood, M. (1928) 'Graunt and Petty', *Journal of the Royal Statistical Society* 91: 79–85.
- (1948) *Medical Statistics from Graunt to Farr*, Cambridge: Cambridge University Press.
- Groenewegen, P.D. (1967) 'Authorship of the *Natural and Political Observations Upon the Bills of Mortality*', *Journal of the History of Ideas* 28:601–2.
- (1968) 'A New Catalogue of Adam Smith's Library', *Economic Record* 44, 108: 498–506.
- (1969) 'Turgot and Adam Smith', *Scottish Journal of Political Economy* 16, 3:271–87.

REFERENCES

- (1973) ‘A Note on the Origin of the Phrase, “Supply and Demand”’, *Economic Journal* 83:505–9.
- (ed.) (1977) *The Economics of A.R.J.Turgot*, The Hague: Martinus Nijhoff.
- (1982) ‘Turgot: forerunner of neo-classical economics?’, *Kenzei Kinkyu* 33, 2: 119–33.
- (1983) *Quesnay. Farmers 1756 and Turgot. Sur la grande and la petite Culture 1766*, ed. and transl, with an intro., Reprints of Economic Classics, Series 2, no. 2, Sydney: University of Sydney.
- (1993a) ‘Marshall on Ricardo’, in G.C.Harcourt and M.Baranzini (eds), *The Dynamics of the Wealth of Nations: growth, distribution and structural change, essays in honour of Luigi Pasinetti*, London: Macmillan: 45–70.
- (1993b) Review of Brewer (1992b), *Economic Journal* 103, 418:762–4.
- Habakkuk, H.J. (1952) ‘The Long-term Rate of Interest and the Price of Land in the Seventeenth Century’, *Economic History Review* 5 (2nd series), 1:26–45.
- Hale, M. (1677) *The Primitive Origination of Mankind, considered and examined according to the light of nature*, London.
- Harcourt, G.C. (1972) *Some Cambridge Controversies in the Theory of Capital*, Cambridge: Cambridge University Press.
- Harris, J. (1757–8) *An Essay upon Money and Coins*, 2 vols, London.
- Harrison, J. and Laslett, P. (1971) *The Library of John Locke*, 2nd edn, Oxford: Clarendon Press.
- Harrod, R.F (1952) *Economic Essays*, London: Macmillan.
- Hayek, F.A.von (ed.) (1931) *R.Cantillon, Abhandlung über die Natur des Handels im Allgemeinen*, transl, by H.von Hayek, Jena: Gustav Fischer.
- Hicks, J. (1983) ‘The Social Accounting of Classical Models’, in J.Hicks, *Classics and Moderns: Collected Essays on Economic Theory*, vol. 3, Oxford: Basil Blackwell: 17–31.
- Higgs, H. (ed.) (1931a) *Essai sur la Nature du Commerce en General by Richard Cantillon*, with an English translation and other material, London: Macmillan, for the Royal Economic Society.
- Higgs, H. (1931b) ‘Life and Work of Richard Cantillon’, in Higgs (1931a):363–89.
- Hobbes, T. (1651a) *Leviathan...*, ed. with an intro. by M.Oakeshott, Oxford: Basil Blackwell, n.d.
- (1651b) *Philosophical Rudiments Concerning Government and Society*, in B.Gert (ed.) *Man and Citizen. Thomas Hobbes*, Peterborough: Anchor Books, 1972.
- (1681) *The Whole Art of Rhetoric*, in Molesworth (1839–45), vol. VI:419–510.
- Hollander, S. (1973) *The Economics of Adam Smith*, Toronto: University of Toronto Press.
- (1979) *The Economics of David Ricardo*, London: Heinemann.
- Holtrop, M.W (1929) ‘Theories of the Velocity of Circulation of Money in Earlier Economic Literature’, *Economic History* (Supplement to the *Economic Journal*) 1:503–24.
- Houghton, J. (1677) *England’s Great Happiness; Or, A Dialogue Between Content and Complaint...*, repr. in McCulloch (1856).
- Hueckel, G. (1986) ‘Sir William Petty on Value: a reconsideration’, *Research in the History of Economic Thought and Methodology* (ed. W.J.Samuels), vol. 4:37–66.
- Hull, C.H. (1896) ‘Graunt or Petty?’, *Political Science Quarterly* 11:105–32.
- Hull, C.H. (ed.) (1899) *The Economic Writings of Sir William Petty*, 2 vols, Cambridge: at the University Press.
- Hutchison, T.W. (1988) *Before Adam Smith: the emergence of political economy 1662–1776*, Oxford: Basil Blackwell.
- Ingram, J.K. (1888) *A History of Political Economy*, Edinburgh: Adam & Charles Black.

REFERENCES

- Institut National D'Études Démographiques (1966) *Pierre de Boisguilbert ou la Naissance de L'Économie Politique*, 2 vols, Paris.
- Jevons, W.S. (1871) *The Theory of Political Economy*, London: Macmillan.
- (1881) 'Richard Cantillon and the Nationality of Political Economy', *Contemporary Review* (January), as repr. in Higgs (1931a) 333–60.
- Johnson, E.A.J. (1937) *Predecessors of Adam Smith: the growth of British economic thought*, New York: Augustus Kelley, 1965.
- Karayiannis, A.D. (1988) 'James Steuart on Distribution', *Quaderni di Storia dell'Economia Politica* 6, 2:25–50.
- (1991) 'Sir James Steuart on Value and Prices', *Spoudai* (The University of Piraeus Journal of Economics, Business, Statistics and Operations Research) 41, 2:167–90.
- Keynes, G. (1971) *A Bibliography of Sir William Petty*, Oxford: Clarendon Press.
- Keynes, J.M. (1926) *The End of Laissez-Faire*, as repr. in *The Collected Writings of John Maynard Keynes* (London: Macmillan, for the Royal Economic Society; 1972) IX: 272–94.
- (1936) *The General Theory of Employment, Interest and Money*, London: Macmillan.
- (1937) 'Alternative Theories of the Rate of Interest', *Economic Journal* (June), as repr. in *The Collected Writings of John Maynard Keynes* (London: Macmillan, for the Royal Economic Society; 1973) XIV:201–15.
- King, G. (c.1696) *Natural and Politicall Observations and Conclusions upon the State and Condition of England... A.D. 1696* (British Museum: Harl. MSS. 1898), repr. in Barnett (1936).
- (1697) *Of the Naval Trade of England a° 1688 and the National Profit then arising thereby* (Bodleian Library: Rawlinson MSS D919), 1st pr. in Barnett (1936).
- King, J.E. (1948) 'The Origin of the Term "Political Economy"', *Journal of Modern History*, 20:230–1.
- Kurz, H.D. (1978) 'Rent Theory in a Multisectoral Model', *Oxford Economic Papers* 30, 1:16–37; repr. in Kurz, *Capital, Distribution and Effective Demand*, Cambridge: Polity Press, 1990:110–34.
- (1980–1) 'Smithian Themes in Piero Sraffa's Theory', *Journal of Post Keynesian Economics* 3, 2; repr. in Kurz, *Capital, Distribution and Effective Demand*, Cambridge: Polity Press, 1990:36–45.
- (1985) 'Effective Demand in a "Classical" Model of Value and Distribution: the multiplier in a Sraffian framework', *The Manchester School* 53, 2:121–37.
- Lansdowne, Marquis of [H.W.E.Petty Fitzmaurice] (ed.) (1927) *The Petty Papers*, 2 vols, London: Constable.
- (ed.) (1928) *The Petty-Southwell Correspondence, 1676–1687*, London: Constable.
- Larcom, T.A. (ed.) (1851) *The History of the Survey of Ireland, commonly called the Down Survey, by Doctor William Petty, A.D. 1655–6*, Dublin: Irish Archaeological Society.
- Laski, H. (1936) *The Rise of European Liberalism: an essay in interpretation*, London: George Allen & Unwin.
- Letwin, W. (1963) *The Origins of Scientific Economics: English economic thought 1660–1776*, London: Methuen.
- Locke, J. (1691) *Some Considerations of the Consequences of the Lowering of Interest, and Raising the Value of Money*, as repr. in Locke (1696).
- (1696) *Several Papers Relating to Money, Interest, and Trade, etc....*, New York: Augustus Kelley, 1968.

REFERENCES

- MacPherson, C.B. (1962) *The Political Theory of Possessive Individualism: Hobbes to Locke*, Oxford: Clarendon Press.
- (1983) ‘Hobbes’s Political Economy’, *Philosophical Forum* 14, 3–4:211–24.
- Margot, A.W. (1938) *The Theory of Prices: a re-examination of the central problems of monetary theory*, vol. 1, London: P.S.King.
- Marshall, A. (1920) *Principles of Economics*, 8th edn, London: Macmillan, 1972 (1st edn, 1890).
- Marx, K. (1967) *Capital: a critique of political economy*, 3 vols (1st edns: 1867, 1885, 1894), ed. by F.Engels, New York: International Publishers.
- (1968) *Theories of Surplus-Value, Part II*, transl. and ed. by S.W.Ryazanskaya, Moscow: Progress Publishers.
- (1970) *A Contribution to the Critique of Political Economy*, transl. by S.W.Ryazanskaya and ed. by M.Dobb, Moscow: Progress Publishers; 1st edn, 1859.
- Masters, R.D. (ed.) (1964) *Jean-Jacques Rousseau, The First and Second Discourses*, transl. by R.D. and J.R.Masters, New York: St Martin’s Press.
- Matsukawa, S. (1977) ‘Sir William Petty: an unpublished manuscript’, *Hitotsubashi Journal of Economics* 17:33–50.
- McCulloch, J.R. (ed.) (1856) *A Select Collection of Early English Tracts on Commerce*, London: Political Economy Club.
- Meek, R.L. (1954) ‘Adam Smith and the Classical Concept of Profit’, *Scottish Journal of Political Economy* 1, 2; as amended in Meek, *Economics and Ideology and Other Essays: studies in the development of economic thought*, London: Chapman & Hall, 1967:18–33.
- (1958) ‘The Economics of Control Prefigured by Sir James Steuart’, *Science and Society* 22:289–305.
- (1962) *The Economics of Physiocracy: essays and translations*, London: George Allen & Unwin.
- (1973) *Studies in the Labour Theory of Value*, 2nd edn, London: Lawrence & Wishart.
- Menger, C. (1871) *Grundsätze der Volkswirtschaftslehre*, Vienna: W.Braumüller.
- Mintz, S.I. (1962) *The Hunting of Leviathan*, Cambridge: Cambridge University Press.
- Misselden, E. (1623) *The Circle of Commerce. Or the Ballance of Trade, in defence of Free Trade...*, London.
- Molesworth, W. (ed.) (1839–45) *The English Works of Thomas Hobbes*, 11 vols, London: John Bohn.
- Monroe, A.E. (1923) *Monetary Theory Before Adam Smith*, Cambridge, Mass.: Harvard University Press.
- Mun, T. (1664) *England’s Treasure by Forraign Trade...*, repr. in McCulloch (1856).
- Murphy, A.E. (1986) *Richard Cantillon: entrepreneur and economist*, Oxford: Clarendon Press.
- North, D. (1691) *Discourses Upon Trade...*, repr. in McCulloch (1856).
- O’Brien, D.P. (1988) ‘Classical Reassessments’, in W.O.Thweatt (ed.), *Classical Political Economy: a survey of recent literature*, Boston: Kluwer: 179–220.
- O’Donnell, R. (1990) *Adam Smith’s Theory of Value and Distribution: a reappraisal*, New York: St Martin’s Press.
- Palgrave, R.H.I. (ed.) (1894–9) *Dictionary of Political Economy*, 3 vols, London: Macmillan.
- Panico, C. (1988) *Interest and Profit in the Theories of Value and Distribution*, London: Macmillan.

REFERENCES

- Pasinetti, L.L. (1977) *Lectures on the Theory of Production*, New York: Columbia University Press.
- Peach, T. (1988) 'David Ricardo: a review of some interpretive issues'; in W.O. Thweatt (ed.), *Classical Political Economy: a survey of recent literature*, Boston: Kluwer: 103–31.
- Petty, W (1648) *The Advice of W.P. to Mr. Samuel Hartlib. For the Advancement of some particular Parts of Learning*, as repr. in *The Harleian Miscellany*, 1810, vol. 6:1–14.
- (1659) *A Brief of Proceedings between Sr. Hierom Sankey and Dr. William Petty...*, London.
- (1660) *Reflections Upon Some Persons and Things in Ireland...*, London.
- (1662) *A Treatise of Taxes and Contributions...*, repr. in Hull (1899), vol. I:1–97.
- (1674) *The Discourse Made Before the Royal Society The 26 of November 1674. Concerning the Use of Duplicate Proportion...*, British Museum 434. a. 31(2).
- (1683a) *Another Essay in Political Arithmetick...*, repr. in Hull (1899), vol. II:451–78.
- (1683b) *Observations Upon the Dublin Bills of Mortality, MDCLXXXI...*, repr. in Hull (1899), vol. II:479–91.
- (1686a) *Deux Essays d'Arithmetique Politique...*
- (1686b) *Further Observations Upon the Dublin Bills...*, repr. in Hull (1899), vol. II: 493–8.
- (1687a) *Five Essays in Political Arithmetick...*, repr. in Hull (1899), vol. II:520–44.
- (1687b) *Two Essays in Political Arithmetick...[with] Observations upon the Cities of London and Rome*, repr. in Hull (1899), vol. II:500–18.
- (1690) *Political Arithmetick...*, repr. in Hull (1899), vol. I:232–313.
- (1691a) *The Political Anatomy of Ireland...*, repr. in Hull (1899), vol. I:121–231.
- (1691b) *Verbum Sapienti*, originally published as an appendix to Petty (1691a) and repr. in Hull (1899), vol. I:99–120.
- (1695) *Quantulumcunqne concerning Money*, repr. in Hull (1899), vol. II:437–48.
- (1899) *A Treatise of Ireland...*, in Hull (1899), vol. II:545–621.
- Pivetti, M. (1987) 'Distribution Theories: classical', in Eatwell *et al.* (eds), vol. 1:872–6.
- (1991) *An Essay on Money and Distribution*, New York: St Martin's Press.
- Postlethwayt, M. (1749), *A Dissertation on the Plan, Use and Importance of the Universal Dictionary of Trade and Commerce*, London.
- (1751, 1755) *The Universal Dictionary of Trade and Commerce*, 2 vols, London.
- (1757) *Great Britain's True System...*, London.
- Potier, J.-P. (1991) *Piero Sraffa—Unorthodox Economist (1898–1983): a biographical essay*, London: Routledge; French edn, 1987.
- Prendergast, R. (1991) 'Cantillon and the Emergence of the Theory of Profit', *History of Political Economy* 23, 3:419–29.
- Quesnay, F. (1756) *Fermiers*, as transl, in Groenewegen (1983):1–25.
- (1757a) *Grains*, as partially transl, in Meek (1962):72–87.
- (1757b) *Hommes*, as partially transl, in Meek (1962):88–101.
- (1757c) *Impôts*, as partially transl, in Meek (1962):102–7.
- (1759) *Tableau Economique* ('Third Edition'), as transl, in M.Kuczynski and R.L.Meek, *Quesnay's Tableau Economique*, ed. with new material, translations and notes, New York: Augustus Kelley, for the American Economic Association, 1972.
- Ricardo, D. (1815) *An Essay on the Influence of a Low Price of Corn on the Profits of Stock ...*, ed. by Sraffa (1951–5), vol. IV.
- Rizvi, S.A.T. (1991) 'Specialisation and the Existence Problem in General Equilibrium Theory', *Contributions to Political Economy* 10:1–20.

REFERENCES

- Roll, E. (1942) *A History of Economic Thought*, rev. edn, New York: Prentice-Hall.
- Roncaglia, A. (1985) *Petty: the origins of political economy*, New York: M.E. Sharpe; Italian edn, 1977.
- (1988) ‘William Petty and the Conceptual Framework for the Analysis of Economic Development’, in K.J.Arrow (ed.), *The Balance between Industry and Agriculture in Economic Development*, vol. 1: *Basic Issues*, London: Macmillan: 157–74.
- Schumpeter, J.A. (1933) ‘The Common Sense of Econometrics’, *Econometrica* I, 1:5–12.
- (1954) *History of Economic Analysis*, ed. by E.B.Schumpeter, London: George Allen & Unwin.
- Sen, S.R. (1947) ‘Sir James Steuart’s General Theory of Employment, Interest and Money’, *Economica* 14, 53:19–36.
- (1957) *The Economics of Sir James Steuart*, London: G.Bell.
- Sheridan, T. (1677) *A Discourse On the Rise and Power of Parliaments...*, ed. by S. Bannister, London: Longmans, Green, Reader & Dyer, 1870.
- Skinner, A.S. (1966) ‘Introduction’, in Steuart (1767):xxi–lxxxiv.
- Skourtos, M. (1991) ‘Corn Models in the Classical Tradition: P.Sraffa considered historically’, *Cambridge Journal of Economics* 15, 2:215–28.
- Slatter, M.D. (1980) *Calendar of Literary and Personal Papers of Sir William Petty (1623– 1687), at Bowood House, Calne, Wiltshire* (property of the Earl of Shelburne, Bowood House, Calne, Wiltshire), reproduced by the Royal Commission on Historical Manuscripts, London.
- Smith, A. (1776) *An Inquiry into the Nature and Causes of the Wealth of Nations*, 2 vols, ed. by R.H.Campbell, A.S.Skinner and W.B.Todd [*The Glasgow Edition of the Works and Correspondence of A.dam Smith*, vols 1–2 (Oxford: Clarendon Press, 1976)].
- Spedding, J., Ellis, R.L. and Heath, D.D. (eds) (1870) *The Works of Francis Bacon* vols IV, V (Translations of the Philosophical Works), London.
- Spengler, J.J. (1954) ‘Richard Cantillon: first of the moderns’, *Journal of Political Economy* 62, 4:281–95; 5:406–24.
- Sraffa, P. (1925) ‘Sulle relazioni fra costo e quantità prodotta’, *Annali di Economia* 2: 277–328.
- (1926) ‘The Laws of Returns under Competitive Conditions’, *Economic Journal* 36: 535–50.
- (1951–5) *The Works and Correspondence of David Ricardo*, 10 vols, with the collaboration of M.Dobb, Cambridge: Cambridge University Press, for the Royal Economic Society.
- (1960) *Production of Commodities by Means of Commodities: prelude to a critique of economic theory*, Cambridge: Cambridge University Press.
- Steedman, I. (1989) ‘Economic Theory and Intrinsically Non-autonomous Preferences and Beliefs’, in Steedman, *From Exploitation to Altruism*, Cambridge: Polity Press: 205–21.
- Stephen, L. and Lee, S. (eds) (1949–50) *The Dictionary of National Biography: from the earliest times to 1900*, 22 vols, London: Oxford University Press.
- Steuart, J. (1767) *An Inquiry into the Principles of Political Oeconomy...*, ed. with an intro. by A.S.Skinner, 2 vols, Edinburgh and London: Oliver & Boyd, for the Scottish Economic Society, 1966.
- (1777) *Memorial on the Corn Laws, 14 Oct. 1777*, Chalmers Papers, published as an appendix in Steuart (1767):737–8.
- Steuart, Gen. J. (ed.) (1805) *The Works, Political, Metaphysical, and Chronological, of the Late Sir James Steuart...*, 6 vols, London: Cadell & Davies.
- Strauss, E. (1954) *Sir William Petty: portrait of a genius*, London: Bodley Head.

REFERENCES

- Temple, W. (1673) *Observations upon the United Provinces of the Netherlands*, ed. by G.N. Clark, Oxford: Clarendon Press, 1972.
- Tucker, G.S.L. (1960) *Progress and Profits in British Economic Thought 1650–1850*, Cambridge: Cambridge University Press.
- Turgot, A.R.J. (1766) *Reflections on the Formation and Distribution of Wealth*, as transl, in Groenewegen (ed.) (1977).
- (1767) ‘Observations on a Paper by Saint-Péray on the Subject of Indirect Taxation’, as transl, in Groenewegen (ed.) (1977).
- Usher, A.P. (ed.) (1942) *Two Manuscripts by Charles Davenant*, Baltimore: Johns Hopkins University Press.
- Vaggi, G. (1983) ‘The Physiocratic Theory of Prices’, *Contributions to Political Economy* 2:1–22.
- (1987) *The Economics of François Quesnay*, London: Macmillan.
- Vaughn, K.I. (1980) *John Locke: economist and social scientist*, Chicago: University of Chicago Press.
- Viner J. (1937) *Studies in the Theory of International Trade*, London: George Allen & Unwin (repr. 1964).
- Waddell, D. (1958) ‘Charles Davenant (1656–1714)—a biographical sketch’, *Economic History Review* 11:279–88.
- Walras, L. (1874, 1877) *Eléments d’économie politique pure*, Lausanne: L. Corbaz.
- Walsh, V. (1987) ‘Cantillon, Richard’, in J. Eatwell *et al.* (eds), vol. 1:317–20.
- Walsh, V. and H. Gram (1980) *Classical and Neoclassical Theories of General Equilibrium: historical origins and mathematical structure*, New York and Oxford: Oxford University Press.
- Webster, C. (ed.) (1970) *Samuel Hartlib and the Advancement of Learning*, Cambridge: Cambridge University Press.
- Webster, C. (1975) *The Great Instauration: science, medicine and reform 1626–1660*, London: Duckworth.
- West, E.G. (1980) ‘Richard Cantillon and Adam Smith: a reappraisal’, *Carleton University Economic Papers*, no. 80–12.
- Whitworth, C. (ed.) (1771) *The Political and Commercial Works of ... Charles D’Avenant, LL.D....*, 5 vols, London, facsimile edition, Gregg Press, 1967.
- Willcox, W.E. (ed.) (1939) *Natural and Political Observations made upon the Bills of Mortality by John Graunt*, Baltimore: Johns Hopkins University Press.
- Winch, D. (1971) *The Emergence of Economics as a Science, 1750–1870*, London: Collins.

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