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REVIEW ARTICLE

Six titans of the Cambridge School: a review article

Harvey Gram*

(Reviewing: *Great Thinker in Economics*, Series Editor, A. P. Thirlwall, selection consisting of P. Groenewegen, *Alfred Marshall*, 2007; P. Davidson, *John Maynard Keynes*, 2007, 2009; G. Fletcher, *Dennis Robertson*, 2008; A. Roncaglia, *Piero Sraffa*, 2009; G. C. Harcourt and P. Kerr, *Joan Robinson*, 2009; J. E. King, *Nicholas Kaldor*, 2009, Palgrave Macmillan)

Six volumes in the *Great Thinker in Economics* Series were chosen by the Editors for this review, which focuses on The Cambridge School of Economics, so very different from the mainstream theory of general economic equilibrium which gives formal expression to Lionel Robbins' famous definition of the subject as the allocation of scarce means among alternative uses. In recognition of a distinct Cambridge School, the authors of these volumes present a variety of arguments within which three overlapping themes can be discerned: the relationship between ethics and economics; the role of stocks and flows in economic analysis; and the epistemic problem surrounding the role of creativity, which has eluded the skills of formalists. The once pervasive influence of Alfred Marshall, John Maynard Keynes, Dennis Robertson, Piero Sraffa, Joan Robinson and Nicholas Kaldor can only be recovered with some such set of general themes in mind.

Key words: Role of economists, History of thought: individuals
JEL classifications: A11, B31

1. Introduction

Great Thinkers in Economics, under the general editorship of Professor A. P. Thirlwall is a welcome series of short intellectual biographies 'written in a style that makes them of interest not only to professional economists but also to students of economics and the

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interested lay person'. The interested lay person would surely be surprised to learn, just as some students are disappointed to find out, that the formal apparatus of modern economic theory bears no clearly articulated relationship to either morality or ethics—notwithstanding the sharp distinction some professional economists draw between 'positive' and 'normative' analysis. Each of the books under review allows the reader to rediscover the ethical and moral underpinnings of economics. A common analytical thread can also be discerned in the attention that our six Cambridge economists gave to the relationship between stocks and flows—conceptual categories central to all economic theories and inextricably bound up with the passage of time. A final theme for this overview deals tentatively with certain epistemic questions surrounding the role of creativity, which has eluded the skills of formalists but which helps the modern reader better to appreciate the lasting contribution of six of the great thinkers in economics.¹

2. Economics as a moral and ethical science

2.1 Marshall

Economics was once a moral science, developing out of Hume's *Principles of Morals* and Smith's *Theory of Moral Sentiments*. Marshall's hard won campaign, beginning in earnest with his inaugural lecture in 1885, to establish, two decades later in Cambridge, an Economics and Politics Tripos, separate from Moral Sciences and History was by no means an effort to *remove* moral and ethical concerns from the orbit of economics. The strong line from Mill to Marshall prompts Groenewegen to cite Mill on The Futurity of the Labouring Class in his discussion of Marshall's similarly titled 1873 address to the Cambridge Reform Club: Marshall 'defined the nature of the working classes in terms of character, analysed the effect of work on character and then looked at the remedial influence of education . . . Marshall's economic studies with respect to the improvement of the labour force . . . stayed with him for the rest of his life' (*AM*, p. 46). Yet, Marshall's "youthful tendency to socialism" to which he confessed in the preface of *Industry and Trade* (1919) (*AM*, p. 116) never overcame his wariness of 'the potential for suppressing individual energy and freedom to experiment when an industry was dominated by large trade unions and employers' organisations' (*AM*, p. 91).

It is not surprising that Marshall's economics was rooted in ethics and an abiding concern for what he called the 'standard of life'. He appears easily, if gradually, to have sloughed off the religious theology of his youth, while endorsing 'the value of religion more strongly as he grew older' (*AM*, p. 34). Partly, it was a reflection of the times. During the 1860s, 'reform of church, universities and parliamentary government were high on the agenda and the conflict between science and religion sharpened considerably' (*AM*, p. 30). Partly, it was a personal rebellion against a tyrannical father (Keynes, 1924[1972], pp. 163–4). Then, too, at about the age that an undergraduate would nowadays be delving into the mysteries of Marshall's consumers' surplus, he himself was witness to the publication of that great shock to a religious upbringing, *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. In the year of his birth, women and children under the age of 10 were, for the first time, prohibited from working

¹ In what follows, references to Alfred Marshall are indicated by *AM*, and likewise for the other volumes, in the order listed here by date of birth of their subjects: John Maynard Keynes, *JMK*; Dennis Robertson, *DR*; Piero Sraffa, *PS*; Joan Robinson, *JR*; Nicholas Kaldor, *NK*. Other volumes in the series, in particular those on Pigou, Kalecki and Harrod, have a general bearing on the development of a distinctive Cambridge economics, but were not included in the selection made by the Editors.

in the mines; and by the time Marshall's *Principles of Economics* first appeared, 48 years later, the minimum age for work in factories was still nine. With the erosion of the religious foundation for ethics, economic questions motivated by policy concerns would naturally be bound up in ethical values.

G. J. Goschen's presidential address to the British Economic Association in 1893 was entirely concerned with defending economics against the charge that it had lost touch with ethics as it embraced a scientific outlook. Marshall, in seconding the vote of thanks reinforced the message in his folksy style: 'In early times Ethics did all her own work. But as she got on in the world, she delegated much of the drudgery to various servants; of whom Economics was one of the most busy. Ethics now gave herself mainly to the higher problems of the ultimate basis of duty . . . setting ever higher and higher ideals, as tasks up to which her servants had to work' (Marshall, 1893, p. 389). The duty of economists was to serve ethics.

Marshall's struggle to separate economics from moral science *without* losing its ethical foundation was an integral part of his neoclassical embrace of the classical distinction between 'the theory of distribution, where laws varied according to time and place and the universally applicable general laws of Political Economy' (*AM*, p. 39), a separation so clearly maintained by Mill.

2.2 Keynes

Davidson also comments on this shift in the foundation for values: 'In Cambridge, at the end of the nineteenth century, the belief in religion as the predetermination of one's life and one's society was being replaced by the notion that by studying the principles of the "moral sciences" one could recognise the source of social order and wisdom' (*JMK*, p. 4). Keynes, too, had written that 'Marshall's Cambridge career came just at the . . . critical moment at which Christian dogma fell away from the serious philosophical world of England, or an any rate of Cambridge' (Keynes, 1924[1972], p. 168). Shove's review of Marshall's *Industry and Trade* had already moved on, critical of 'the excessive "moral tone" of the work, not appropriate to reporting the "non-moral science" of economics' (*AM*, p. 159). By the time of Keynes's essay, the seriousness of Marshall's struggle was on the verge of being reduced to a psychological tic: 'Marshall was too anxious to do good . . . to undervalue those intellectual parts of the subject which were not *directly* connected with human well-being . . . and to feel that when he was pursuing them he was not occupying himself with the Highest' (Keynes, 1924[1972], p. 200). And yet, 'To Keynes, the existence of human distress resulting from the inability of the economic system to persistently generate a fully employed economy, and the gross inequality of income and wealth under the existing economic system, should not go unheeded. If at all possible, institutions and policies should be developed to abolish these faults . . .' (*JMK*, pp. 1–2). Citing Harrod (1951, pp. 191–2), Davidson recalls that a year before his death, Keynes appealed to his own notion of the Highest in offering 'a toast to "economics and economists who are the trustees, not of civilisation, but the possibilities of civilisation"' (*JMK*, p. 3).

Skidelsky (2009) contains a chapter on 'Keynes and the Ethics of Capitalism' where it is remarked that Keynes, the atheist, 'was close enough to the "believing" generation to feel the need for "true" beliefs' (Skidelsky, 2009, p. 136) concerning what is good. In his search, Keynes was guided by G. E. Moore's *Principia Ethica*, published during his first year as an undergraduate. Skidelsky's sympathetic and engrossing account of how Keynes

‘forces us to consider the question of what economic activity is for’ (Skidelsky, 2009, p. 153) ends by suggesting that Keynes ‘might have been deluding himself’ (Skidelsky, 2009). Davidson takes a more robust line, never wavering from his insistence that the philosophical key to understanding the Keynesian revolution is the relationship between ethics and uncertainty.² It is an arresting juxtaposition. What modern student, having swallowed the assumptions necessary to reduce the unknowable future to a matter of calculable risk, would ever think that the problem of the Ethics of Capitalism had thereby been shunted to one side?

Davidson tells the story of how Keynes *created* ‘a new economic theory to provide an understanding of an economic system that was able to perpetuate widespread unemployment. . . [and] so set mankind on the road to a more civilized society’ (*JMK*, pp. 11–12). He notes at the outset the 15 year period during which Keynes’s fellowship dissertation evolved into his *Treatise on Probability*, a key to his view of probability as a branch of logic rather than of mathematics and so the further key to understanding the importance of irreducible uncertainty in Keynes’s economics.³ In *A Tract on Monetary Reform*, ‘Keynes argued that price stability was necessary for contractual predictability, which in turn promoted economic stability . . . an essential condition for the operation of a progressive civilizing economic system’ (*JMK*, p. 15). More than a decade then passed during which ‘Keynes would struggle to throw off the vestments of the classical theory and to create his own new taxonomy and revolutionary economic theory’ (*JMK*, p. 16). Along the way, he parts company with his long-time colleague, Dennis Robertson, whose thinking was ‘in many ways, a trailblazer for Keynes’s new ideas [set forth in his *Treatise on Money*, but for whom] fluctuations in economic activity . . . were “real” phenomena independent of the quantity of money and credit [and explained by] “over-investment in real plant and equipment”’ (*JMK*, p. 17).⁴ Finally, in *The General Theory of Employment, Interest and Money*, now regarded by New Keynesian, Greg Mankiw as ‘an obscure . . . outdated book’ (*JMK*, p. 38), Davidson finds the influence of Moore’s *Principia Ethica* in Keynes’s realisation ‘that to understand the unemployment problem it was necessary to develop a precise taxonomy regarding classes of expenditure and saving’ (*JMK*, p. 42). In developing this new taxonomy, Keynes comes to recognise one over-riding, *insatiable* need: ‘In a world of uncertainty, one can never have too much liquidity . . .’ (*JMK*, p. 54). Fear of illiquidity is the root cause of the business cycle and all its attendant costs, a fear inherent in, what Davidson calls, the ‘non-ergodic’ nature of a money-using, market-oriented, entrepreneurial economy.⁵ This fear must be addressed by concerted, intelligent, cooperative action designed to mitigate the avoidable costs.

² *Ethics and Uncertainty* (Greer, 2000) contrasts Frank Knight’s pessimistic conclusions concerning the unavoidable costs inflicted on the macro-economy by uncertainty with Keynes’s more optimistic prognostications.

³ Keynes’s unhappy acceptance of Ramsey’s criticisms of his *Treatise on Probability* has recently been addressed by D. Gillies (2006); see also A. Roncaglia (2009).

⁴ For a discussion of how *The General Theory* emerged out of critical analysis of the quantity theory during the 1920s and 1930s, see Laidler (1991). As for the reception of *The General Theory*, Davidson focuses much of his attention on the way in which Samuelson embraced a limited interpretation of its main ideas (*JMK*, pp. 176–85).

⁵ The professional economist, familiar with dynamic programming will be helped in understanding the depth of Davidson’s critique of mainstream economics by his reference to Liouville’s Theorem, closely connected to Hamiltonian mechanics: ‘The intrinsic stability of . . . conservative systems is linked with the theory of ergodic processes by Liouville’s Theorem’ (*JMK*, p. 206). Davidson cites a letter from Hicks who wrote to him: ‘. . . I missed a chance of labeling my own point of view as *nonergodic*. One needs a name like that. . .’ (*JMK*, p. 203, n. 6).

2.3 Robertson

In Robertson's 'work on the relationship between the trade, or business, cycle and economic growth in a money-using economy . . . cyclical fluctuations were a necessary by-product of the growth process' (*DR*, p. 5). Economic progress presented Robertson with an ethical problem, recalled by Fletcher (*DR*, p. 81) in a memorable quotation from *A Study of Industrial Fluctuation* (1915, p. 254):

Is the assumption valid upon which western civilisation seems to proceed—that it is desirable so to manipulate one's income-stream that it shall flow in with an ever-rising tide? From some points of view the whole cycle of industrial change presents the appearance of a perpetual immolation of the present upon the altar of the future. During the boom sacrifices are made out of all proportion to the enjoyment over which they will ultimately give command: during the depression enjoyment is denied lest it debar the possibility of making fresh sacrifices. Out of the welter of industrial dislocation the great permanent riches of the future are generated. How far are we bound to honour the undrawn bills of posterity, and to acquiesce in this never-closing hyperbola of intersecular exchange? . . . The question is one of ethics, rather than of economics: but let us at least remember that we belong to an age which is apt to forget the ['final cause'] among the ['material cause'] and to immolate ourselves, if we must, with our eyes open and not as in a trance.

These are not the concerns of the modern student of intertemporal optimisation, oblivious even of those ethical concerns about discounting the future so simply expressed by that other Cambridge economist whose name is routinely invoked by modern theorists: ' . . . it is assumed that we do not discount later enjoyments in comparison with earlier ones, a practice which is ethically indefensible and arises merely from the weakness of the imagination . . .' (Ramsey, 1928, p. 543).

Fletcher develops in a subtle and engaging way, over the course of his entire book, a remarkable thesis concerning the connection between Robertson's analysis of the business cycle as a problem with clear ethical overtones and his enduring fascination with the poetry of Walt Whitman. 'Consciousness of the reality of death and the means of coming to terms with it permeates the whole' (*DR*, p. 83). Whitman's lines, 'Urge and urge and urge/Always the procreant urge of the world', were included in the above quotation and appeared again at the end of the New Introduction to the 1948 edition of *A Study of Industrial Fluctuation*, sounding once more the ethical problem that haunted Robertson: "to abolish the trade cycle" would be to abolish growth' (*DR*, p. 122).

2.4 Sraffa

The ethical content of *Production of Commodities by Means of Commodities* (Sraffa, 1960), Roncaglia's main focus, is not explicitly addressed by him; nor did the author of that famously slim volume help to shed light on the matter. Perhaps it is obvious that in establishing new foundations for the classical tradition that follows an arc from Petty to Marx, Sraffa was developing a framework of analysis in which ethical considerations are inherent insofar as exchange is *required* for the reproduction of an economy's social and technical relations of production. This is in opposition to exchange viewed simply as a way to increase the standard of living of an economy's individual consumers who, among them, own directly or indirectly all its various 'factors of production', but for whom there is no analytically recognised *necessity* for social interaction. Indeed, what is most striking about Sraffa's analysis is that, unlike the general equilibrium of supply and demand, it does *not* associate with each particular list of final outputs a unique distribution of income reflecting

the relative scarcity of the given inputs with which the outputs are produced at a point of constrained optimisation. On the contrary, in Sraffa's analysis, the distribution of income—and, indeed, the composition of output itself—is left open and in need of a complementary analysis. This analytical separation, still found in Mill, finds expression in a 'core' of propositions (cf. Garegnani, 1984) outside of which income distribution and output are to be analysed, a separation that Roncaglia questions only insofar as the 'core' is seen as having priority over, rather than coexistence with 'the investigation of different aspects of the functioning of economic systems . . . when distinguishing between different economic "visions"' (PS, p. 160).

Despite some discussion of the role that Sraffa played in the intellectual development of Wittgenstein, the place of ethics in such visions is left unexamined. One might therefore briefly note that Arrow and Hahn (1971) did recognise, within the mainstream vision, an awkward problem: zero equilibrium income arises for consumers who own only those factors of production that have zero scarcity value at the margin. Their reason for proposing an axiom of 'resource-relatedness' was to solve a formal difficulty having to do with discontinuity of demand correspondences, rather than to face up to the ethical problem of survival within an economy of interacting 'agents'. By contrast, Sen (1981) introduced the concept of *trade-independent security*, stressing 'the entanglement of Sraffa's economics and philosophy. Specifically, he describes the role Sraffa played in persuading Wittgenstein to turn away from his early formalism and toward a respect for natural languages, and the possibility that Sraffa was influenced in this matter by his friend Antonio Gramsci' (Walsh, 2008, p. 226).

2.5 Robinson

One might expect *Joan Robinson*, whose subject declared herself a left-wing Keynesian, to be filled with discussions of the relationship between ethics and economics. For the most part, Harcourt and Prue have other fish to fry, typified by critical remarks written in connection with 'Joan Robinson's reductionist and deductive approach to Marx and a theory of capitalist activity' (JR, p. 40): 'Because she proceeds to "translate" Marx's historical materialism and dialectical reasoning into deductive logic, much is distorted or lost, the conceptualisation of causality is inverted and its pattern is changed; its relationship to history is lost' (JR, p. 41). Further on, they conclude: 'Her reading of Marx [later became] far more open-minded and sympathetic . . . [but even then, her appeal to history] is too glib and reflects her limited interpretation of the nature of abstraction in Marx's history' (JR, p. 53).

In their chapter, 'Joan Robinson and Socialist Planning', Harcourt and Prue do make clear that ethics and reason are inextricably united in her approach to policy. A year after her 1942 *Essay on Marxian Economics*, Robinson wrote: 'a rational society would certainly not contain the enormous inequalities which exist in capitalist or feudal states, and would not recognise mere ownership of property as a source of income, but it would have to make use of differences in income as an incentive to work and to acquire knowledge and skill, so that complete equality could not be attained' (JR, p. 71). Nevertheless, it is concluded (in this period, at least) that Robinson's 'theory was separable from politics . . . She chose political or moral objectives and then developed her theory "scientifically" to produce policies which would achieve these' (JR, p. 74). Only later did 'her dualist approach ultimately [give] way to a view that theory and ideology were essentially mixed in the economist's method' (JR, p. 75).

The reader is reminded, with intended approbation, that ‘Joan Robinson always thought it most important to make explicit what sort of society/economy was implied in theoretical models: who were the decision-makers, what were the rules of the game, what institutions were implied, if any?’ (*JR*, p. 115). And, in a chapter on her views on development economics, Robinson’s intriguing comment on the ethical problem of ensuring fairness *and* providing incentive is singled out: ‘These two purposes are of course not separated because feelings of fair dealing also provide incentive’ (*JR*, p. 148). But only in their penultimate chapter is the relationship between ethics and economics in Robinson’s work taken up in detail. Arguably the most important of the three books considered, her 1962 *Economic Philosophy*, appeared three decades after she announced in a 1932 pamphlet that economics was nothing more than its own technique. Still, that later work does not fully satisfy Harcourt and Prue who conclude that ‘she did not have the philosophical instruments to guide her thinking, or to give validity to her arguments. Her lingering positivism interfered with and limited her theoretical developments, denying her passionately held views on social justice a status equivalent to what she saw as the “scientific” element of political economy’ (*JR*, p. 202; cf. Walsh, 1996, pp. 258–62).

2.6 Kaldor

King recalls that, ‘For conservative economists, utilitarianism had always seemed to carry a dangerously egalitarian message. . . . One way in which a utilitarian could escape from egalitarianism was by means of a dogmatic denial of the very possibility that the utility levels of different individuals could be compared in the first place. This defence of privilege required an unconvincingly solipsistic approach to the problem of comparing the states of mind of different individuals. . . .’ (*NK*, p. 23). Kaldor entered the fray with a defence of the compensation principle in the context of the classical debate over the Corn Laws, but he concluded his argument on a general note: “‘All that economics can, and should, do in this field, is to show, given the pattern of income-distribution desired, which is the most convenient way of bringing it about’” (Kaldor, 1939A, p. 552)’ (*NK*, p. 26). Positing a desired income distribution independently of the level and composition of output is part and parcel of an enduring classical tradition within the Cambridge School and thus a basis for its concern with ethics.

By 1980, Kaldor’s ethical stance towards capitalism had crystallised: “‘The concentration on material welfare . . . creates a socially restless and basically frustrated competitive society which fosters a scale of values that moralists and religions throughout human history have regarded as reprehensible. . . . it leads . . . to a concentration of power . . . no less distasteful than state power . . . since it is power without responsibility . . . conferred by the possession of wealth . . . which makes modern capitalism so unsatisfactory as a method of organisation of human societies . . .” (Kaldor, 1980, p. 10)’ (*NK*, p. 91). King is critical of Kaldor for failing to make use of his early work on the economics of welfare, of contributing ‘nothing to the extensive literature on . . . market socialism, [seeming] to have been entirely unimpressed by the arguments for economic planning, and . . . [taking] no interest in the analysis of worker cooperatives, self-managed enterprises and other forms of social ownership. . . .’ (*NK*, pp. 91–2). Still, he reserves some of his best Kaldorian prose for his chapter on ‘The Scourge of Monetarism’, the title of Kaldor’s 1982 book, which was followed a year later by *The Economic Consequences of Mrs. Thatcher*, echoing the title of Keynes’s famous and unrestrained polemic. Kaldor’s clear understanding of the political consequences of a successful assault on the evils of unemployment underlay his conclusion that ‘Thatcher

was serious, and that . . . monetarism itself was increasingly being used as a cover for her class war' (*NK*, p. 152). It was his theoretical position and his understanding of the facts that provided the foundation for his moral indignation (cf. Putnam and Walsh, 2009).

3. Stocks and flows

The conceptual difference between stocks and flows is bound up with the passage of time. In mainstream theory, the scarce means in Robbins's famous definition of economics are all *stocks*; whereas, the arguments in utility functions and production functions are all *flows*. Static equilibrium is about matching up the flows, but without a clear discussion of their relationships to stocks, nothing very coherent can be said about how balance is to be achieved. This lacuna in elementary textbooks is later addressed with the aid of dynamic programming, a decidedly advanced subject. The theory of optimal control, a modern descendant of the calculus of variations used by Ramsey (1928), provides the basis for analysing a general equilibrium stock–flow analysis of supply and demand, linking quantities and prices through time. This is the main tool of analysis in graduate level textbooks on macroeconomic theory. Its relationship to Arrow–Debreu general equilibrium theory is carefully investigated by Burgstaller (1994[2010]) who shows, in a broad class of models, that solution paths are generically unstable. Doubts are occasionally expressed concerning the relevance of this theory for an understanding of how a capitalist market economy actually works.⁶ The less formal but more nuanced discussions of stock/flow relationships in the work of our six Cambridge economists provide a more robust antidote.

3.1 Marshall

In *The Economics of Industry*, written with his wife Mary Paley, and more particularly in his *Principles*, Marshall 'examined production by way of its [four] agents, that is, land, labour, capital and organisation . . . [defining] these agents by indicating that labour and nature, the more basic classification, gave rise to the other two agents, capital and organisation, as produced agents' (*AM*, p. 108). In the earlier work also, 'Agents of production . . . are defined first in terms of man and his environment (man and nature or, more narrowly, labour and land)' (*AM*, p. 57). There is no suggestion that capital is an *original* factor of production. And, neither is organisation. What is emphasised is that the flow of work depends on the characteristics of the stock of labour and the natural environment (*AM*, p. 57). To the extent that some elements of nature constitute a *fixed* stock, all progress depends on 'the growth of that knowledge and those ideas which are incomparably the most important form of collective wealth' (Marshall, 1907, p. 22). This together with the economic virtues—the moral character of the labouring classes and the 'chivalrous and noble' (Marshall, 1907, p. 25) nature of many, but by no means all business dealings—are always in the back of Marshall's mind as he theorises about the ordinary business of life. Accumulation and development of new instruments of capital and new forms of organisation are the means by which the growth of technical knowledge and the enhancement of virtue are sustained.

Some assets, essential in the just right amounts to ensure ongoing efficiency, are perhaps too easily created and too easily destroyed. In a passage from *The Economics of Industry*,⁷

⁶ For an especially clear and candid statement, see the concluding section of Samuelson (1967).

⁷ Groenewegen refers to the 'rarity of the actual text' of *The Economics of Industry*, now available in its 1881 edition as a downloadable Google Book.

Groenewegen includes Marshall's yet modern sounding comments on the destabilising swings of trust and confidence over the course of the business cycle: 'As credit by growing makes itself grow, so when distrust has taken the place of confidence, failure and panic breed panic and failure' (Marshall and Marshall, 1879[1881], p. 63). Other assets become embedded in the bureaucracies of business organisations, which Marshall always feared becoming sclerotic and inhibitive of enterprise.

3.2 Keynes

Although Keynesian economics is routinely introduced by focusing the student's attention entirely on flows—production, income, expenditure—and their relationship as seen through the multiplier, a broad conception of the role of stocks in the economy provides a better starting point. Keynes took the physical stock of capital goods as a given in the short period. But, as Davidson has long emphasised, positions in assets must be financed by liabilities and so in the foreground of his understanding of Keynes are all the associated cash commitments. It was the beneficial *predictability* of cash commitments that underlay Keynes's focus on the need for price stability in *A Tract on Monetary Reform* and so the need for central bank action to 'offset unanticipated changes in the public's desire to hold money as a store of value' (*JMK*, p. 15).

Appeals to 'sticky prices', in the modern vernacular, take for granted that the unemployment problem can be solved by bringing the flow demand for work into line with the flow supply of work by altering wages. 'Keynes argued that the persistent unemployment was not the fault of the unemployed or intransigence of workers to accept lower wages or the result of market imperfections such as monopolies or trade unions' (*JMK*, p. 21), all getting in the way of the balancing of flows. 'Rather, the cause was nested in the public's desire for liquidity and the peculiar but essential properties possessed by money and other liquid assets' (*JMK*, p. 21). Weak market demand for the flow of output could not easily be corrected by 'getting the prices right' because of the existing structure of balance sheets, reflecting past financing of positions in stocks of real assets, accompanied by binding cash flow commitments or, more generally, 'high carrying costs' (*JMK*, p. 50). In the face of weak demand, all then seek protection 'by spending a portion of . . . income on the purchase of money and other liquid assets. These liquid assets, though *not* the products of industry, provide the utility of security in that with sufficient liquidity they can meet any unforeseen substantial contractual obligations in the uncertain future' (*JMK*, p. 46).

Throughout *Keynes*, Davidson focuses on the asset price effects of a waxing and waning fear of illiquidity and the role, not just of the central bank, but of all the main financial market makers in bringing it to heel. In his postscript on the recent financial crisis, this theme is reiterated.

3.3 Robertson

Robertson would also struggle to understand the workings of the business cycle through an analysis of interacting stocks and flows. 'In considering fluctuations in general trade, Robertson describes himself as "breaking at some point arbitrarily into the magic circle of industrial change" (Robertson, 1915, p. 121) . . . at the point of revival . . . [from which] the rest of the process will follow' (*DR*, p. 73). A rise in demand in some particular market increases profits for existing firms. But, how many new firms will enter and on what scale? Robertson argued that the longer it takes to build up a stock of new capacity, the greater the

chance for error.⁸ In what might be called Robertson's version of 'real business cycle' theory, there is a waste of consumption because of over-investment during the upswing and a denial of compensating consumption during the slump as fresh sacrifices are made in preparation for the coming boom. His whole approach to thinking about the costs of the business cycle turns thus on an inefficient pattern of the flow of consumption induced by the innate urge to accumulate stocks.

Robertson's recommendations for taming the cycle were set forth in his 1926 *Banking Policy and the Price Level*, 'concise and forbidding, devoid of charm and whimsy and employing in its important chapters a terminology replete with neologisms amounting almost to a private language' (*DR*, p. 125). That private language remains a barrier to understanding. Fletcher is determined to make it all clear and, in the process, to reveal the sense in which Robertson intends to *ensure* that money remains neutral:

In Robertson's scheme, banks play their part . . . as facilitators, enabling savers to realise their intentions by transforming spontaneous new hoarding into applied lacking by *restoring* the price level. In this way, price *stability* is maintained and individuals retain the *initiative of choice* between present enjoyment and provision for the future. [The banks also play the role of] plunderers, raising the price level and forcing a reduction in consumption to meet what the authorities deem the long-term social interest. (*DR*, p. 135, emphasis added)

In the event of an increase in hoarding, proper banking policy "imposes Automatic Stinting: considered in conjunction with the New Hoarding, it nips in the bud the Automatic Splashing which would otherwise occur as a by-product of the New Hoarding. The bank, therefore, while imposing Automatic Stinting is not imposing Automatic Lacking, but is in effect transforming Spontaneous New Hoarding into Applied Lacking . . ." (Robertson, 1926, pp. 53–4)' (*DR*, p. 137). Fletcher concludes:

[Robertson's] elaborate apparatus, based on a sleight of hand [fails, in the end, to maintain the] orthodox sequence at all. When Robinson Crusoe decides to build a boat or a jetty to increase his chances of catching fish, he perforce chooses to reduce consumption as a means of accumulating a sufficient stock of food to carry him through the investment period . . . By contrast, Robertson's hapless public *choose* to reduce consumption in order to accumulate money hoards—not to engage in investment . . . Individual choice and the saving-drives-investment sequence . . . are lost. (*DR*, p. 137–38)

3.4 Sraffa

Roncaglia devotes considerable space to Sraffa's robust defense of Keynes in 'a markedly critical review of *Prices and Production* [in which Hayek had argued that] a policy in support of demand for consumption goods . . . proves counterproductive' (*PS*, pp. 30–33). Sraffa's argument turned on recognising the importance of financial stocks in the short run. He 'points out that Hayek's argument fails to take into account certain features typical of a monetary economy, where money is not only a means of payment but also a unit of measurement in contracts and a store of value. . .' (*PS*, p. 33). Most intriguing is Hayek's reaction to Sraffa's observation that when relative prices are changing, each commodity 'has its "own rate of interest", defined as the interest paid on the money necessary to buy spot a unit of the commodity added to the (positive or negative) difference between spot and forward prices of the commodity, in per cent' (*PS*, p. 33). Hayek argues 'that "there

⁸ Such difficulties were the subject of G. B. Richardson's *Information and Investment* (1961[1997]), recently the subject of renewed interest (see Foss and Loasby, 1998).

might, at any moment, be as many ‘natural’ interest rates as there are commodities, *all of which would be equilibrium rates*” (Hayek, 1932, p. 245)’ (PS, p. 34). Roncaglia cites Milgate (1979) in support of the claim that Hayek’s anticipation of intertemporal equilibrium theory, ‘amounts to renouncing the idea of automatic mechanisms ensuring a tendency to a macroeconomic equilibrium of the economy’ (PS, p. 34). Here, one comes into direct contact with modern macroeconomic theory, in which stocks of real assets and their prices follow an unstable but convergent saddle-path, a path that can only be reached if initial asset prices are pre-set to ensure that all capital values subsequently follow an equilibrium path. Roncaglia concludes: ‘Today it appears quite clear that what to Hayek seemed like nihilism on the part of Sraffa was simply rejection of the marginalist approach . . . in favour of a reconstruction of political economy based on the alternative approach of the classical school’ (PS, p. 34).

It is striking that the alternative approach Roncaglia speaks of virtually denies a role for stocks, apart from non-reproducible land. Indeed, he draws a line from Ricardo to Sraffa, without even mentioning land: ‘Sraffa stresses the importance of the notion of surplus, and of the conception of the economic system as a circular flow of production and consumption, which Ricardo inherited from an already robust school of thought: suffice it here to recall William Petty (1623–87) for the concept of surplus and François Quesnay (1694–1774) for the idea of a circular flow’ (PS, p. 37). This emphasis on flows explains why the prototypical Sraffian model is one of circulating capital, in which stocks all turn over within the period of production, but even when fixed capital is considered by Sraffa, partially used-up capital goods are treated as output *flows* rather than depreciated *stocks*.⁹ Thus, in addition to land, the only stocks in the analysis are out-dated, no-longer-produced inputs whose rents are determined by prices of production, at the assumed uniform rate of profit, using ‘a “reference technology” [relative to which the] “dominated” techniques still in use correspond to investment carried out in the past, which would not be chosen today’ (PS, p. 53).

In concluding that ‘Sraffa provides the tools for a radical, and indeed destructive, critique’ (PS, p. 57) of marginalist theory, Roncaglia sounds a recurring theme: ‘It has been argued that this criticism does not apply to the modern theory of general economic equilibrium . . . However, as early as 1926 Sraffa points out that the general equilibrium approach is in its generality *utterly sterile*’ (PS, p. 57, emphasis added). At other points, too, Roncaglia merely ridicules general equilibrium theory: ‘Thus, in Debreu’s (1959) general equilibrium analysis there is no reason not to speak of angels (or demons, or avatars) instead of economic agents, and of souls to be saved or damned (to lower or higher circles of hell or paradise depending on the evaluations of the angels themselves) instead of commodities’ (PS, p. 98). It is natural to question the meaning of an analytical framework in which goods and services are defined by their natural properties, date and location of delivery, and the state of nature in which such delivery is made at the same time that a *continuum* of traders is assumed to exist for all such minutely defined inputs and outputs at a single point in time when all equilibrium transactions, stretching out over an indefinite future, are consummated! The stock/flow problem suggests a more transparent line of attack.

As earlier noted, Burgstaller (1994[2010]) analysed the connection between an Arrow–Debreu general equilibrium of supply and demand and the Hamiltonian dynamics typical

⁹ Kurz and Salvadori (2003) defend the ‘flow–flow’ approach to the analysis of choice of technique in the presence of fixed capital, arguing that by reducing fixed capital to circulating capital, errors that might otherwise occur in solving for a cost-minimising technique are avoided.

of stock/flow equilibrium. His work made clear that the mainstream analysis of a ‘mechanism to ensure a uniform rate of return on all the various capital goods’ (*PS*, p. 57) is haunted by an inherent instability.¹⁰ Roncaglia argues that Sraffa’s ‘extreme theoretical nihilism’ (*PS*, p. 34, n. 19) towards such theories, the beginnings of which may be traced to the work of Hicks (cf. Garegnani, 1976), Hayek and Lindahl in the 1930s, was part and parcel of his reconstruction of political economy based on the alternative approach of the classical school, but the precise connection between that nihilism and rejection of what he frequently characterises as a hopelessly complex and sterile general equilibrium theory is left unexamined. What is at stake is enormous: the existence of an inverse relationship between the real wage and the overall labour intensity of production. Sraffa’s analysis provided the basis for showing, in general, that no such relationship exists.

3.5 Robinson

Robinson’s struggles with time, with her neoclassical adversaries, and with her Sraffian colleagues all turned on the stock/flow problem. It began in earnest with her efforts to develop a long period Keynesian theory. ‘She wrote an article about the Hayek/Keynes exchanges in 1931 . . . not published until 1933’ (*JR*, p. 24) in which:

short period equilibria converge over ‘time’ on the long-period position, the full stock/flow equilibrium in which normal profits and wages are received. . . . But . . . there is concern with the process of price formation in, first, markets where flows dominate stocks, and, secondly, in markets where stocks dominate flows and, thirdly, the vital importance of having a class of speculative traders who take views on the future course of market prices while not being producers of the commodities concerned themselves. In the context of the exchanges between Hayek and Keynes, it is the consumption goods trades that are characterised by the first sort of market, the capital goods trade, by the second, and the market for securities, by the third factor. (*JR*, pp. 24–25)

Twenty years later, such concerns were central to her critique (Robinson, 1953) of the production function and the theory of capital which led up to *The Accumulation of Capital*. In the latter work:

Joan Robinson makes utterly clear that ‘everything that happens in an economy happens in a short-period situation, for an event occurs or a decision is taken at a particular time [when] the physical stock of capital is what it is’ (Robinson, 1956, p. 180). But there are long-period as well as short-period aspects of all happenings . . . the short-period aspect of accumulation is to be a major determinant of aggregate demand, while the long-period aspects concern the rate of growth of productive capacity . . . and the technique of production. (*JR*, pp. 93–94)

She was equally clear in her rejection of the equilibrium analysis of a process of accumulation. Her initial attack is one part of her critique of 1953, excised from the original and reprinted in the second volume of her *Collected Economic Papers*,¹¹ where it is followed by a definitive and polished 1959 version. The other part, about half of the original paper, is what attracted all the attention.

Harcourt and Prue devote a chapter to Robinson’s critique of 1953, which marked the beginning of the ‘Cambridge–Cambridge debates in the theory of capital’ (*JR*, p. 89). The

¹⁰ This had been granted by Hahn (1966) and Samuelson (1967) and may be inferred from Dorfman *et al.* (1958, pp. 321–22).

¹¹ The removal of large chunks of the original article—there is only one transitional passage added to the reprinted version—with no affect on the flow of the argument, makes one wonder how the original paper was put together.

lack of any systematic relation between the rate of profit (uniform across all activities under pressure of competition) and the relative capital intensity of the economy as a whole—a key result of those debates—was seen as undermining the mainstream interpretation of factor prices as measures of relative factor scarcity. One side considered it a knock-out blow. The other retreated to stock/flow, intertemporal equilibrium models in which certain notions of ‘conservation of capital value’ can be entertained (Samuelson, 1990).

For Robinson, the stock/flow problem and its connection to the problem of ‘getting into equilibrium’ had always been paramount, but this was not central to the thinking of her Marxian colleagues. Dobb, in responding to ‘her attempt to “translate” Marx’s dialectical argument by reducing it to a propositional system based on static concepts and deductive logic . . . reiterated his disapproval: “I’m afraid I’ve never been able quite to see the fuss about this stock-flow problem . . .”’ (*JR*, p. 37).

Robinson joined ‘with Naqvi in 1967 . . . [in] her last intervention in the reswitching and capital-reversing debates as an analyst of the technical issues themselves. From then on, she increasingly stressed the other strand of the critical arguments (in which she was joined by economists within the neoclassical camp, especially Christopher Bliss and Franklin Fisher) about using differences to analyse changes’ (*JR*, p. 113). Harcourt and Prue cite ‘the particularly forceful statement of this view in her 1974 paper, “History versus equilibrium”’ (*JR*, p. 113). That there was no meeting of minds became clear in her 1975 article on the ‘The unimportance of reswitching’ to which she appended Samuelson’s response in its reprinted version (Robinson, 1979, pp. 76–89). Rather than recognising and elaborating upon the obvious connection between her concerns about ‘getting into equilibrium’ and the ‘Hahn problem’, Samuelson merely suggests at the end of a long footnote that ‘the vast literature’ on the stock/flow problem be consulted. In view of his own candid assessment in the conclusion of Samuelson (1967), this seemed disingenuous (see Gram, 2009).

3.6 Kaldor

Complex relationships between stocks and flows—in particular, between the stock of knowledge of production techniques and the flow of learning as part of the development process—were recurring themes in Kaldor’s numerous writings on circular and cumulative causation. He was surprised, too, at how elastic the stock/flow relationship could be. In an ‘excursion into national income accounting, written with his Hungarian colleague Tibor Barna, . . . [Kaldor noted how Britain’s wartime] “performance greatly exceeded the promise. The latent reserves of our peace-time economy system have proved to be greater than even the most optimistically . . . minded observer could have expected”’ (*NK*, p. 44).

Another paper, ‘arguably the best’ (*NK*, p. 27) of Kaldor’s early work focused on stabilising/destabilising effects of speculation in stock markets. In traditional theory, ‘the existence of speculators enables the system to behave with more foresight than the average individual in the system possesses. . . . The possibility that speculative activity might . . . lead to the transfer of goods from more to less important uses, was not seriously contemplated. . . .’ (Kaldor, 1939B, p. 1). Recalling chapter 12 of *The General Theory*, Kaldor saw that speculators could live off themselves while losing as a group (Kaldor, 1939B, p. 2), but his main purpose was to show that ‘speculation, in so far as it succeeds in eliminating price fluctuations will, in many cases, generate fluctuations in the level of incomes. Its stabilising influence on price will be accompanied by a de-stabilising influence on activity’ (Kaldor, 1939B, p. 2). Kaldor was not cited when others took up the same

question in a formal analysis of stock–flow equilibrium, and came to the same conclusion (Jorgenson, 1960, p. 893).

King recalls Hicks’s comment to Kaldor that his 1939 article on speculation ‘was “the culmination of the Keynesian revolution in theory.” ... Kaldor remained justifiably proud of the paper, which convincingly analysed real-world capitalist markets where stocks dominate flows...’ (NK, p. 30). King describes the paper as ‘an important—if unheralded—contribution to the theory of finance’ (NK, p. 28). At the same time, he observes in connection with Kaldor’s analysis of the trade cycle, published just a year later: ‘It is as if “Speculation and Economic Stability” had been written by someone else altogether’ (NK, p. 32). Still, by ‘drawing a very long bow it is just possible to detect [in an even early paper (Kaldor, 1932)] ... an early version of Hyman Minsky’s theory of financial instability (Minsky, 1986), in which the operating losses of bank-owned industrial enterprises in Austria forced them into a “vicious circle” of Ponzi finance, borrowing repeatedly to cover their commitments from previous loans’ (NK, p. 18).

4. Epistemics and economics

Our six Cambridge economists also reflected on the relationship between knowledge, novelty, and the science of wealth. In every case, it is the creative, dynamic production paradigm rather than the allocative, static exchange paradigm (cf. Pasinetti, 2007) that directed their thinking about ‘knowing’.

4.1 Marshall

In ‘Ye Machine’, an early philosophical paper, Marshall ‘relied on associationist and evolutionist neuropsychology and neurophysiology ... to shed light on the mechanical impact of the nature of sensations, ideas and actions ... Brain (ideas) and body (actions) are represented by the machine’s wheels connected with bands (the nervous system) ... simultaneous actions akin to ... the calculating automaton proposed by Charles Babbage ... give the machine access to language, communications, arithmetical operations and geometry’ (AM, pp. 35–6). What was beyond its capabilities was *creative* activity. In claiming that this early foray into psychology and the mind/body problem had ‘implications for Marshall’s subsequent intellectual development’ (AM, pp. 35–6), Groenewegen anticipates Marshall’s enduring fascination with increasing returns to scale.

Groenewegen tries to save Marshall from his proselytisers, noting that he did not assume perfect competition ‘as a realistic notion of market structure’ (AM, p. 4); and, in *Industry and Trade*, ‘warned that the line of division between competitive business and monopoly is very indistinct in practice. ...’ (AM, p. 154). He also makes numerous references to Book IV of the *Principles*, which included five chapters on industrial organisation. ‘Book IV ... embodied the fruits of Marshall’s factual research in factories ... This enabled him to turn production economics into a broad analysis of industrial organisation, productivity and industrial leadership ...’ (AM, p. 154). *Industry and Trade* also includes chapters on business organisation: ‘Financial, administrative and creative skills are all crucial attributes for sound management ...’ (AM, p. 156).

Capital and organisation are produced ‘agents’ of production, evolving unpredictably as the scale of industrial activity expands. Marshall attempted to reconcile ‘increasing returns ..., [a] beneficial tendency in business organisation ... with maintaining a competitive economy’ (AM, p. 7) by invoking a life cycle of firms. This prompted

strenuous and sustained debate in the pages of the *Economic Journal* and elsewhere. More recently, there has been an enormous outpouring of work in evolutionary economics. Loasby (1998) is especially helpful in drawing out the many ways in which Marshall, from his earliest work on a multi-level brain (Raffaelli, 1994), came to regard the “business man endowed with genius” . . . [as] especially skilful in devising experiments . . . As Smith . . . knew, patterns are invented and imposed on phenomena . . . what matters is always the next trial, and the result of that can never be guaranteed’ (Loasby, 1998, p. 144). In the classical heritage of Marshall, one finds a rich vein from which a modern theory of the firm might be developed, bypassing the production function as a summary statement of available technical knowledge, freely accessible to all (cf. Loasby, 2010).

4.2 Keynes

Hayek’s *Prices and Production*, though described by Keynes as “one of the most frightful muddles I have every read . . . must set the reader thinking” (*JMK*, p. 24). Davidson cites the well known passage from a letter Keynes had written to Harrod: “I accuse the classical economic theory of being itself one of these pretty, polite techniques which tries to deal with the present by abstracting from the fact that we know very little about the future. . . .” (*JMK*, p. 34). When decision makers ‘recognise that they do not “know” and cannot know the future in a statistically reliable sense . . . it is . . . sensible to store some portion of their income in . . . liquid assets that can be readily converted into money, as long as future liabilities can be expected to be legally discharged by the tendering of money’ (*JMK*, p. 54). Keynes drew his oft-repeated conclusion:

Our decisions to do something positive, the full consequence of which will be drawn out over many days to come, can only be taken as a result of animal spirits—of a spontaneous urge to action rather than inaction . . . If the animal spirits are dimmed and the spontaneous optimism falters . . . enterprise will fade and die;—though fears of loss may have a basis no more reasonable than hopes of profit had before. (*JMK*, p. 64)

The source of true uncertainty in a monetary-production economy is rooted in the fact that ‘decision makers create . . . the future’ (*JMK*, p. 112). Davidson cites Shackle’s ‘concept of crucial choice . . . where a decision is made that changes forever the economic environment . . . The future is transmutable in that it is created by crucial choice decisions although *the future that is created is often not precisely what anyone intended*’ (*JMK*, p. 112). Crucial choices arise frequently because no decision is fully reversible. Failure of the ergodic axiom in a world in which the future is transmutable should not be regretted, despite the havoc it wreaks on macro-econometrics,¹² for the simple reason that it provides what is unavailable in mainstream models: ‘an analytical rationale for the existence of fixed money contracts and non-neutral money’ (*JMK*, p. 113). *Ipsa facto*, it justifies ‘a permanent role for the government to work with the private sector to improve the economic performance of markets . . . to develop economic institutions . . . to limit future outcomes to those that are closely compatible with full employment and reasonable price stability’ (*JMK*, pp. 114–15).

¹² Davidson cites Keynes’s criticism of Tinbergen’s econometric methodology and notes that ‘non-homogeneity of data [through time] is a sufficient, but not a necessary condition, for a non-ergodic process’ (*JMK*, p. 203, n. 7).

4.3 Robertson

During the 1920s, the fashion took hold among academic writers in Cambridge of drawing inspiration from the works of Lewis Carroll (pseudonym of Charles Lutwidge Dodgson). By all accounts, Robertson turned it into an art form (*DR*, p. 100). Fletcher's rather different conclusion is that: 'What Robertson found in the ['Alice'] books was ... a practical philosophy for facing up to life—to the harsh realities of human existence' (*DR*, p. 102). Dodgson, 'a Victorian clergyman and Oxford mathematics don ... [conjured] a universe that is both God-less and meaningless, cold and uncaring. In ... the 'Alice' stories, it is necessary for our hero to assume a strategy for survival and sanity of mind: she must be brave, keep smiling, *create* a system of order and meaning ... an effect that is warm and reassuring' (*DR*, p. 103). The form of the stories is 'a self-contained game played by known rules ... a simplified form of life in which possible outcomes are limited and known' (*DR*, p. 103). Fletcher maintains that: 'The (Classical) Cambridge economics of Robertson's day ... was built on a foundation of atomistic, frictionless barter. This, like 'nonsense', was made up of discrete elements, of which any total could be no more than the sum of the parts. ... money was of little consequence, being seen as merely a veil ...' (*DR*, p. 104). Keynes, 'in recognising the uncertainty of the real world ... destroyed the game-like quality of classical economics ... [introducing] theoretical devices that produced totals ... different from the sum of the parts' (*DR*, p. 104).

Fletcher's closely argued thesis is the remarkable claim that: 'With [the Keynesian Revolution] went Robertson's professional roots and his emotional security: no wonder he remained obdurate in the face of Keynes's triumph' (*DR*, p. 104). A sympathetic reader must digest the whole of *Robertson* before passing judgment on 'the equivalence, as unitive elements, of love (with respect to 'Alice') and money (with respect to economics) ... also the equivalence of the one big 'One' (with respect to Walt Whitman) and the doctrine of organic unity (with respect to Moore) and its economic manifestations' (*DR*, p. 176). What all readers can discern in the poetry of Robertson's economics is the fact that 'crucial' investment decisions *create* both order and disorder, transmuting the future. 'Knowing' within the 'nonsense game' of a dynamic general equilibrium of supply and demand is no substitute for creating institutions capable of taming the potential chaos, although their existence may well create an illusion that no such controls are necessary. Robertson had no such illusions despite what ended up, in Fletcher's account, as a psychological aversion to the revolution wrought by Keynes.

4.4 Sraffa

Production of Commodities by Means of Commodities is a notably austere work, sometimes defended on the grounds that it is concerned strictly with the measureable and 'objective' facts of economic life as opposed to what is internal to the mind and therefore 'subjective', but this does not solve the epistemic problem of knowing what the facts are. 'Sraffa gives no direct indication concerning the problem of the type of technology in use' (*PS*, p. 52). Roncaglia, after noting the influence of 'socio-political factors ... on the technical coefficients of production' (*PS*, p. 53), states that 'a concrete concept of a "reference technology", should not in itself be considered as an objection ... in principle, at least, the technology can be identified' (*PS*, p. 53). And yet, the circular flow of production of commodities by means of commodities depends on what firms know about production. How this knowledge (whether true or false) is acquired, how it is preserved, changed, or lost ought to be central theoretical concerns. Loasby (1989) is referred to by Roncaglia

(*PS*, p. 20) as playing down the importance of the critique of Marshall in Sraffa (1925[1986], 1926, 1930), but Loasby, (1998, 1999[2002], 2010) has had so much more to say about how production knowledge and institutions evolve. His lead may well provide a most fruitful direction in which those engaged in a revival of the great themes of classical economics should direct their energies.

4.5 *Robinson*

Throughout her later writings, in particular, Robinson comes right up to the point where epistemic questions arise. One such paper (Robinson, 1977A), widely read and cited by Harcourt and Prue (*JR*, pp. 113–15), provides several points of reference. In it, she refers to Shackle in a critical vein: he ‘treated “high theory” as a purely intellectual movement’ (Robinson, 1979, p. 1), failing to recognise the connection between her Keynesian insistence on the importance of uncertainty and Shackle’s mature work (Shackle, 1972[1991]) in which an unknowable, transmutable future is *created* by ‘crucial’ investment decisions. She remarks upon ‘the exploration of imperfect and monopolistic competition set afoot by the challenge from opposite directions, of Piero Sraffa (1926) and Young (1928)’ (Robinson, 1979, p. 1), but does not elaborate Young’s perspective on the growth of knowledge (cf. Loasby, 1998, p. 142). She cites a discussion paper by Loasby: ‘The full information required to make a correct choice can never be available because of the inescapable fact that “the basic data simply do not exist, and cannot exist, no matter what information is devised”’ (Robinson, 1979, p. 7), yet seems unaware of his first book on epistemic questions in economics (Loasby, 1976). She notes the disruptive effects of learning, citing Norbert Weiner: “. . . even the first skyscraper made of aluminium instead of steel will turn out to affect the whole future demand for structural steel, as the first diesel ship did the unquestioned dominance of the steamship” (Robinson, 1979, p. 3–4), but associates this mainly with the problems faced by statisticians in collecting time series data of uniform significance. She applauds Morgenstern (1972): ‘Competition means struggle, fight, maneuvering, bluff, hiding of information—and precisely *that* word is used to describe a situation in which no one has any influence on anything . . .’ (Robinson, 1979, p. 6), but relegates to a footnote Penrose (1959[2009]) and Eichner (1976) who were both concerned with the process by which firms create new products and discover new processes of production. Even Marshall is under-appreciated. In another paper (Robinson, 1977B, p. 62), his ‘factors of production’ are listed as land, labour and waiting (as opposed to capital), with the notable omission of the fourth—organisation.

Harcourt and Prue emphasise that, for Robinson, equilibrium was a barrier to understanding: “As soon as the uncertainty of the expectations that guide economic behaviour is admitted, equilibrium drops out of the argument and history takes its place. . .” (Robinson, 1974)’ (*JR*, p. 114). Presumptions about knowledge were central to her complaints about all theory. Most were directed to her neoclassical protagonists, but she was just as insistent that realised expectations were central to Sraffa’s analysis of prices of production (Robinson, 1977B). This left her isolated from both camps. Perhaps if she had taken up the epistemic questions raised by Young (1928), Penrose (1959[2009]), Richardson (1961[1997]), Shackle (1972[1991]), and Loasby (1976), all of whose work now underlies a burgeoning literature,¹³ the robustness of her complaints, never fairly

¹³ There are new editions of Penrose (1959), Richardson (1961), and Shackle (1972), published, respectively, in 2009, 1997 and 1991; and collections of papers on Penrose (Pitelis, 2002), Richardson (Foss and Loasby, 1998), Shackle (Earl and Frowen, 2000), and Loasby (Dow and Earl, 1999), whose award winning 1999 Graz/Schumpeter Lectures were republished in paperback in 2002.

answered, would have served to build more robust links between Keynes, Sraffa and that other titan of twentieth century economics, Schumpeter.

4.6 Kaldor

The London School of Economics was Kaldor's academic base from 1927 to 1947 during which time 'he came under the influence first of the idiosyncratic American Marshallian, Allyn A. Young, and then of Young's charismatic successor to the chair of Economics, Lionel Robbins, [who] absorbed the Austrian variant of general equilibrium theory during his time in Vienna under Ludwig von Mises. ... Hayek, ... [at the time] a convinced neoclassical of the Walras–Wicksell variety ... briefly ... had a profound impact on Kaldor. ... Among his closest friends were ... the future Noble laureate John Hicks. ... young colleagues included Thomas Balogh ..., Paul Rosenstein-Rodan and ... Tibor Scitovsky. ... Kaldor began a friendship with John von Neumann. ... Hicks ... introduced Kaldor to the Swedish school and ... "made me such an easy convert to Keynes"' (NK, pp. 4–7). And these are just a few highlights of the trilingual Kaldor's *pre*-Cambridge academic life! King recalls the influence of Young (1928):

in one of his own earliest and most original papers (Kaldor, 1934), and [how Kaldor] returned to the implications of increasing returns over and over again in the final two decades of his life. ... Young 'showed that the main function of markets is to transmit impulses to economic change, and thereby *create* more resources through enlarging the scope of specialisation and the division of labour—rather than to secure an optimum allocation of a *given* quantity of resources. And he also showed that with increasing returns continuing change is self-generated and propagates itself in a cumulative way. Hence no analysis which describes the forces operating on the economy as tending towards a state of equilibrium can capture the manner in which the development of markets make[s] for perpetual change' (Kaldor, 1978, p. xxv). (NK, p. 5)

The Austrian influence had always alerted Kaldor to the fact that 'it is only by means of a "theory of the path" (a theory showing what determines the actual path followed) that a causal-genetic approach can arrive at generalisations concerning the nature of equilibrium" (Kaldor, 1934, p. 128)' (NK, p. 21). Twenty years later, he sounded a distinctly Robertsonian theme:

... it is the strength and duration of booms which shapes the trend rate of growth. It is the economy in which business-men are reckless and speculative, where expectations are highly volatile, but with an underlying bias towards optimism ... which is likely to show a higher rate of progress over longer periods; while it is an economy of sound and cautious business-men, who are slow at reacting to current events, which is likely to grow at a slow rate (Kaldor, 1954, pp. 68–69). (NK, p. 61).

His 1957 full employment growth model and the Mark II version (with Mirrlees) both made technical progress the main engine of economic growth, but there is only 'a hint ... that Kaldor was beginning to ponder the reasons for ... slow ... growth' (NK, p. 71). Finally, in what King calls the Mark III version, there reappears the old theme 'of increasing returns to scale, which had been stressed by Adam Smith, by Alfred Marshall and above all by Kaldor's old LSE professor, Allyn Young. ... increasing returns ... were related to the growth of output, not the level of output. They were connected with learning, which was itself the product of experience, and they were a "macro-phenomenon", since each industry benefited from the expansion not just of its own output but of output as a whole' (NK, p. 73).

It is surprising that Kaldor drew no connection between the creative functions of markets and Shackle's concept of the 'crucial' investment decision, nor is the resource

creating hypothesis of Penrose (1959[2009]) referred to at the point where it fits in so well:

When every change in the use of resources—every reorganisation of productive activities—creates the opportunity for a further change *which would not have existed otherwise*, the notion of an ‘optimum’ allocation . . . becomes a meaningless and contradictory notion: the pattern of the use of resources at any one time can be no more than a link in the chain of an unending sequence and the very distinction, vital to equilibrium economics, between resource-creation and resource-allocation loses its validity. (Kaldor, 1972, p. 1245)

The explanation may simply be that ‘Kaldor . . . “was never an avid reader” (Thirlwall, 1987, p. 24)’ (NK, p. 166).

5. Conclusion

The accomplishments of our six titans of Cambridge economics are recorded and expounded upon in the *Great Thinkers in Economics* series with great verve. Peter Groenewegen, drawing on his celebrated 1995 biography, *A Soaring Eagle, Alfred Marshall 1842–1924*, and a vast amount of other work, remains dispassionate and scholarly, preferring to evoke the richness of Marshall’s legacy than to enter into Marshallian controversies. A great strength of his book is the connections it allows one to make with the developing field of evolutionary economics. Paul Davidson writes in an altogether different style about ‘the greatest thinker in economics in the 20th century’ (JMK, p. xiii). He admits openly to presenting a gloss on Keynes, found throughout his own writing, but not found in *The General Theory* (JMK, p. 35). Some will object to this approach to intellectual biography and perhaps also to the space devoted to Davidson’s own ideas, even though very much rooted in the economics of Keynes. Gordon Fletcher is touched by the tragic aspects of his subject, drawing the reader into a convoluted tale of ‘duty and desire’. Its twenty-three short chapters, drawn from a decade of work beginning with the published version of his dissertation (Fletcher, 2000), pull the reader along, even through some dense thickets. Alessandro Roncaglia strikes a confident note about the significance of Sraffa’s distinction between basic and non-basic commodities but remains wary of interpretations that have given prominence to prices of production as ‘centres of gravitation’. He is perhaps too brief, certainly in comparison with *The Wealth of Ideas* (Roncaglia, 2005), which draws on his understanding of the role played by *Production of Commodities by Means of Commodities* in the revival of interest in the Classical economics of Smith, Ricardo and Marx, and which received much acclaim when first published in Italian. Geoffrey Harcourt and Prue Kerr, bringing together decades of earlier work and an intimate knowledge of their subject, occasionally sound regretful that such a stalwart Keynesian did not fully succeed in connecting the contradictions she found in theory with those that plague the history of capitalism. John King, with reservations, often speaks in the very voice of his hero, conveying Kaldor’s strongly argued positions and remaining to the end optimistic about their enduring value.

In touching on just three related themes in this overview, much has been left for the reader to discover, not least of which are the biographical details. Marshall’s attitude towards the academic rights of women is not endearing (AM, pp. 133–37). Keynes found in the fear of illiquidity the cause of the business cycle, but he had no such fear himself (JMK, p. 9). Robertson was one of the most respected economists of his day, but this did little to appease his personal longings or his dreams of the stage (DR, pp. 30–36). Sraffa,

the cloistered academic, famous for keeping his own counsel, was both courageous and politically astute (*PS*, pp. 6–9, 22–25). Robinson did not welcome the efforts, even of her most attentive readers, to reduce her complex arguments to a formal model (*JR*, pp. 123–26). Many dismissed her work on the grounds that their formalisations of it appeared trivial, but this did nothing to reduce her appeal to generations of students who marvelled at her dogged insistence on getting answers to her questions, not to mention her longstanding antiwar positions (*JR*, pp. 218–20). Kaldor's life story gives proof to the thought that a single surviving son of a prosperous middle-class Jewish family (*NK*, p. 3), surrounded in later life by adoring women, may just be an unstoppable force. Reports on the consequences of following his policy advice, which was ever ready, became legendary (*NK*, pp. 123–26).

It will come as a surprise to the modern student who reads these books that the mathematical abilities of six economists who once dominated the field were either nil or kept decidedly under wraps.¹⁴ None became enthralled with Walrasian general equilibrium theory, the mainstay of modern mathematical economics—surely the most important fact for the modern reader to bear in mind. It is essential for such a reader to make the extraordinary effort required to give up the goal of formulating a complete theory¹⁵ and to embrace instead those partial and open theories that leave space for ethical and moral concerns; which reject the idea that a knowable future is (in probabilistic terms) fully accounted for in present stock/flow equilibrium prices and quantities; and which open the way to a recognition of the creative role that economic actors have in determining their own future, for good or ill. That creative impulse, fuelled by scientific breakthroughs and the urge to compete, generates a relentless flow of new, faster and often more fragmented ways of producing both the familiar and the novel, transforming life in unimaginable ways while knitting together in ever tenuous webs a vast international system of specialisation and exchange. Sudden, unpredictable change in the values of stocks, both of goods and of knowledge, create and destroy fortunes and lives, while subject to no obvious rules of the game in a world of ever more unfathomable forms of financial contracting. The insistent moral question, 'Who is your neighbour?' becomes impossible to contemplate, much less to answer and so to establish a modern ethical foundation for economic theory. To the extent that the *Great Thinkers in Economics* series opens the minds of those who have become entranced, not so much by the formalism of modern economics, which is not to be decried, as by its closedness—its inability to countenance a role for other disciplines and to leave unanswerable questions unanswered, at least provisionally—the project that Professor Thirlwall has undertaken will be the great success it deserves to be.

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¹⁴ The exception may be Sraffa who, acknowledging the help of mathematicians, nevertheless insisted on making his own way through the formal difficulties that his investigations threw up (see Salvadori, 2010).

¹⁵ 'Completeness' often has a very narrow meaning in modern general equilibrium inspired economics. However simple and dimensionally small, a model is thought to be complete if and only if it has a well-specified objective function subject to constraints, including market clearing or some other notion of equilibrium, where the 'givens' are: technology, tastes and the quantity and ownership of 'resources', which nowadays includes 'information'.

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