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**George Shackle and The Schumpeterian  
Legacy.**

Stan Metcalfe

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Department of Economics  
Department of Public Economics  
University of Graz

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George Shackle and The Schumpeterian Legacy.

An Address to Karl-Franzens Universitat, Graz

In Celebration of the Distinguished Career of

o.Univ. Prof. Mag. Dr. Heinz D Kurz

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by

Emeritus Prof Stan Metcalfe

University of Manchester

*stan.metcalfe@manchester.ac.uk*

## George Shackle and The Schumpeterian Legacy.

### Prologue

To be invited to speak here today in celebration of Professor Kurz is a great privilege not only from the point of friendship but also in recognition of the outstanding contribution that he has made to economic understanding over a long and, thankfully, not yet completed career. I hope that you (and he) will allow me to take as my theme Schumpeter's extremely radical economic ideas concerning the inherent creativity and openness of an economic system that is instituted according to the capitalist rules of the game. This is a complex topic but one that is worth serious attention especially at a time when some fear that capitalism has lost its dynamic edge. I am not among them and I hope to show why in the following.<sup>1</sup>

In the past two decades Schumpeter has become an essential part of economic work in this University and for this we have Professor Kurz to thank. The Graz Schumpeter lectures in their variety and erudition are a beacon of creative thought, while, in his own writing, Professor Kurz has drawn many important connections between Schumpeter's economics and classical economic analysis, in which field he is an undisputed authority<sup>2</sup>. Moreover, it seems highly appropriate to focus my remarks on Schumpeter just over a century since he was appointed a member of the Graz University faculty (1911). I should add, if further justification were needed, that I think that Schumpeter's standing will be even further enhanced in the coming decades as economists

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<sup>1</sup> Indeed, I think the more likely problem is too much innovation that will be economically and socially disruptive but that is a separate story.

<sup>2</sup> See for example, Kurz, 2008, 2012 and 2013. In parenthesis, I was fortunate to be invited by Professor Kurz to give the first Graz Schumpeter lectures in 1995 and that work on evolutionary economics has occupied my attention ever since.

come to terms with the idea of open, complex systems<sup>3</sup>. That is the spirit in which I would like to speak to you today.

The revival of Schumpeterian economics is one of the remarkable developments in modern economics and there is today a vibrant community of scholars drawing on Schumpeter for inspiration. The combination of evolutionary systems thinking and a broad Schumpeterian approach to the economy has resulted in a renewed focus on the problem of how wealth is created from knowledge, which, I suggest, is the central distinguishing feature of the capitalist mode of economic organisation. Surely if Schumpeter is to be encapsulated in a single theme that theme would have to be the interrelation between the development of human knowing and the development of economic arrangements.

Why is this so? There are no doubt many reasons but in the forefront must surely be Schumpeter's insistence on the role of innovation in the economic process, indeed that innovation is integral to the functioning of the capitalist system. This fits so well with the historical record, our understanding that successive generations lead such different economic lives, and it even occupies the minds of governments across the world to a quite remarkable degree. But innovation rests so uneasily with the normal concerns of any economist who seeks to portray an economy as essentially a structure in equilibrium. Indeed, innovation is just the surface manifestation of a far deeper insight that Schumpeter shared with Marx and Marshall, namely the evolutionary nature of modern capitalism, and the corresponding challenge to

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<sup>3</sup> See, for example, Dopfer, *et al*, 2004, Dopfer and Potts, 2008, Potts, 2001. Loasby, 1991 and 2001, Foster, 2005, Foster and Metcalfe, 2012, Kirman, 2011 and Metcalfe, 2014.

explain why it could never be at rest<sup>4</sup>. Change from within is the key idea in Schumpeter's scheme it is the basis for what I like to term "restless capitalism."

But Schumpeter is not alone among modern economists in propounding the idea of development from within and that is why I want to draw your attention to the work of the quintessentially English economist George Shackle. To the best of my knowledge Shackle never mentioned Schumpeter in any of his works (even his exposition of the business cycle) but his thought is exactly in line with and helps us to understand the wider importance of Schumpeter's vision<sup>5</sup>.

I shall develop my argument in three stages. First, and at the risk of going over familiar ground, to highlight some of the essential characteristics of Schumpeter's scheme. Second, to show how George Shackle's radical ideas on time, knowledge and uncertainty form a natural complement to and foundation for Schumpeter's scheme. Third, to draw out some of the wider dimensions of their conjoined perspective and to highlight some of the implications for the understanding of modern capitalism.

## I. Vision

I begin with the *Theory of Economic Development*, for it encapsulates the contours of an economic vision that Schumpeter never revised in any

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<sup>4</sup> Schumpeter's appreciation of Marx and Marshall is not difficult to establish. In *TED*, he compared his own approach as parallel to that of Marx, "For according to him there is an *internal*, economic development and no mere adaptation of economic life to changing data (*TED*, p.60, emphasis in original). Much later, when Schumpeter (1941) wrote his semi-centennial appraisal of Marshall's *Principles* he made it quite clear that he considered Marshall's economics to be entirely evolutionary in form and method.

<sup>5</sup> George Shackle (1903-1992) was a product of the Keynesian revolution in the 1930s. So taken was he by the problem of how businessmen can know when and where to invest, the problem so graphically addressed by Keynes in chapter 12 of the *General Theory of Employment, Interest and Money*, that he devoted his entire career to the problem of how to choose when we cannot know the full consequences of our action. On Shackle's career see the delightful book by Frowen, 2004

fundamental way<sup>6</sup>. Its topography is repeated with only minor amendment in *Business Cycles*, albeit with greater resort to historical illustration, and refined and restated in *Capitalism Socialism and Democracy* to take account of the changing economic sociology of enterprise and the emergence of a corporate economy. At the most basic level, it concerns the internal dynamic of modern capitalism, where change is expressed in terms of the occurrence of novel events and the subsequent adaptation of economic structures to realize the possibilities that are immanent in economic novelty.

It is not to population growth and capital accumulation that we are directed in order to comprehend the economic record, for they are grey, derivative phenomena, but rather to enterprise, innovation and economic leadership, the vibrant colours that introduce qualitative transformation in its most fundamental terms: the doing of things that have never been done before. As in Marx and Marshall, the scheme is evolutionary in a very precise sense, in that it reflects the uneven, selective response of an economic system to the uneven generation of variation from within. Capitalism develops because it stimulates and allows individuals to dare to be different but it does not and perhaps cannot require everyone to behave in this way; the few are sufficient to establish the outlines of an ensuing history in which the many add the fine details.

In *TED*, Schumpeter is less than approving of evolutionary or rather Darwinian ideas but this hesitancy is more apparent than real. Leaving aside the fact that evolution is a mode of thought that is domain free; the whole structure of his argument is evolutionary in form. His innovations are the novelties that invade an existing population of production methods and the system responds

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<sup>6</sup> Compare Schumpeter, 1947 with the 1928 essay, the latter being one of the first papers to bring Schumpeter's ideas to the English speaking world..

with the new displacing the old, competition in tooth and claw. By the time he is writing *Capitalism, Socialism and Democracy* this is self evident, capitalism is by nature an evolving system that never can be stationary, indeed, it is creatively destructive. The balancing of competitive forces at the margins is small beer, what really counts is the decisive advantages in product or process that come with innovation, “*and which strike not at the margins of the profits and the outputs of the existing firms but at their foundations and very lives*”(Schumpeter, 1943, p.84)

This is a variation-cum-selection mode of reasoning. Innovations are variations, the new combinations of existing resources. They encompass much more than technical innovation in the narrow sense, new forms of organising business, new forms of organising the marketing process are just as valid sources of economic variation. If one wanted a generic description of innovation in Schumpeter’s work it is surely that every example constitutes a different model of business.

Yet innovation is only a necessary potential for transformation, it is not of itself sufficient. We also require the system to respond, to adapt to the possibility created by innovation and to do so through a process in which resources, formerly used in the production of the old goods and services, are switched to the production of the innovations. These are market mediated phenomena; they are necessarily matters of structural change that cannot be captured in any framework that insists on balanced, equi proportional expansion of all the activities in an economy, as if it were a regularly expanding stationary state. Uneven development is the necessary corollary to this story of creative destruction; it is a matter of understanding why different activities grow and decline at different rates, of the birth and death of different activities, so that quantitatively and qualitatively the system in view is transformed by economic processes. Decline is inseparable from expansion so Schumpeter’s vision of

growth is one in which the world that is being lost is as significant as the world that is emergent. This is a process story not a state of affairs story; it is a theory of self transformation embedded in a theory of self organisation, a scheme to understand history but not to forecast the future. There is no point enquiring as to the predictive power of Schumpeter's scheme other than to insist that the past and the future will be different in unspecifiable ways. You can see how museums make sense in his world; they are there to remind us that, whatever conventions we adhere to, the future will be different from the present. Perhaps then it is not too bold to claim that Schumpeter's *Theory of Economic Development* is the economics of positive feedback in open, restless systems.

So Schumpeter is dealing with a far from equilibrium system. It is strongly ordered by the market and other organised processes that give coherence to economic action but order is not to be equated with equilibrium. Order is a caused structure of relationships that have an inner logic but, as we shall see every order induces its own transformation into a new order in an unending sequence of challenge and response.

We can explore this claim by considering briefly three particular aspects of Schumpeter's scheme: namely, the relation between knowledge and enterprise; the process of competition; and, the transience of economic order.

## II. Three Pillars of Economic Development

### *Enterprise and Knowledge*

Schumpeter's treatment of knowledge is a particularly important and distinctive part of his scheme and it is grounded in the contrast between routine action and economic leadership. The broad flavour is as follows. In the circular flow of economic life action is a matter of routine, a habitual response to stable value data within the context of reliable understandings of cause and effect relationships along well worn customary tracks. This does not mean that the

economic data do not change, only that their changes never imply qualitatively new events. So risk is fully part of the system but risk implies a complete understanding and therefore a complete listing of the spectrum of possibilities and the likelihood that gains and losses will be of a temporary, reversible nature. Surprises are ruled out in this world. The structure of the system is stationary, because the understanding on which it is based is stationary sufficiently so that time and habit have hammered economic logic into decision making. Nor does this degree of rationality imply unbounded calculative skills, only that the skills are a sufficient match for the limited task of the moment.

Enter the entrepreneur, whose function is to exercise economic leadership not on the basis of prevailing wisdom but on the basis that our reliable knowledge of the world can be rendered different. Enterprise is sharply distinguished from routine management (perhaps too sharply from management in general), sharply distinguished from invention and, most important of all, enterprise cannot be based on what is known, it requires decision in the face of ignorance<sup>7</sup>. Tradition is no longer a reliable guide for, as he expressed the point,

*“Here the success of everything depends upon intuition, the capacity of seeing things in a way which afterwards proves to be true, even though it cannot be established at the moment, and of grasping the essential fact,*

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<sup>7</sup> Marshall, (1919, 1920) provides a far more extensive treatment of managerial tasks and organisation than does Schumpeter, and makes innovation one of the tasks that mark out a good managerial team. Like Schumpeter he recognises that there are leaders and followers when it comes to economic action but he also sees innovation as part of the daily routine. This is the continuity theme, the emphasis on the gradual and cumulative as contrasted with the discontinuous and entirely novel. But every innovation that has major transformative effects emerges not *de novo* but in terms of long sequences of gradual improvements as a design space is explored. There is less of a difference between the Marshallian and the Schumpeterian views than might otherwise be imagined. See Metcalfe (2007a & b) for further discussion.

*discarding the unessential, even though one can give no account of the principles by which this is done” (TED, p.85)*

Consequently, innovation may be usefully thought of as blind variation, in the sense that its consequences cannot be known in advance, although this does not mean it is thoughtless variation. In Schumpeter’s scheme to innovate is to be consciously and explicitly rational; the entrepreneur must calculate the consequences of the imagined conjectures, drawing on the support of past experience and acting on the basis of answers that cannot be more than plausible guesses.

Rationality is needed in precisely those circumstances where knowledge is absent, where action cannot be explained in terms of known principles and where we cannot act as habit driven automata. Is it possible that entrepreneurs form their conjectures in the same way, have expectations in common? The answer is to the negative. The conjecture differently for that is what it means to be an individual; indeed in Schumpeter’s scheme the capacity to imagine alternative economic worlds varies (greatly) across individuals, as does the capacity for calculation of their consequences. Thus, Schumpeter’s appeal to rationality provides an explanation of the founding principles of economic variation and an invitation to inquire into the ways entrepreneurial decisions are made. Rationality in this sense is certainly not premised on Olympian perfect foresight but rather the limited, local, differentiated and fallible understanding of what could be<sup>8</sup>. This too is Shackle’s theme, as we shall see.

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<sup>8</sup> While expectations are important in Schumpeter’s scheme they are not the uniform expectations of modern macroeconomic discussion. How could they be? No entrepreneur hopes to make a profit by doing what the purported rivals do. As G B Richardson (1960) made clear in a different context, a profit opportunity expected by everyone is a profit opportunity available for no one.

We begin now to see the link with the wider evolutionary frame. Entrepreneurs are different because they (rationally) believe differently and, while they may base these beliefs on differential knowing of technical possibilities, the fundamental point is that they perceive different economic possibilities and act on those possibilities<sup>9</sup>. This is why invention is not to be equated with innovation, or innovation with matters of physical technique alone. The test for an invention is “does it work?” and this test must be passed before any use of it as an innovation is possible. The test for an innovation is “is it profitable?” a quite different matter.

### *The Competitive Process*

The essential point to grasp about Schumpeter’s scheme is that the economic effects of innovation flow not from the innovation *per se* but from the adaptive response of the economy to the potential for change opened up by innovation. Development is premised on a competitive process. Schumpeter’s adaptive scheme is a market economy scheme and the significance of the market is the particular way in which it channels the process of adaptation. It is a process in which the price system is central, for it is the price system that induces change and makes available the resources for change.

How does competition work? Well, it is no dull matter of perfect competition, of market structure in an equilibrium circular flow. As in Marshall, it is a matter of open competition, the freedom to act and be different; it is the economic game as sport. The basis for competition becomes not the number of competitors but the differences between the rivals and the degree of competition is a matter of the rate at which the “new” displaces the “old” - categories, we might note, which have no place in equilibrium worlds.

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<sup>9</sup> Ulrich Witt (1998) has rightly insisted on the need for entrepreneurs to mobilize the contribution of others if they are to succeed.

In Schumpeter's scheme, this process is deeply connected to the existence of the pure profits that attach to an innovation because of its differential attributes and this is a category of realised economic return which is quite inconceivable in the equilibrium circular flow. But profits presuppose prices and the prices in question are the prices that sustain the old technology, or more generally, the least effective of the productive alternatives that are available, as Marshall also taught. It is because an innovation is evaluated in terms of the methods it will displace that it is possible to conceive of profits as a surplus above contracted payments for inputs.

Consequently, when the "new" has entirely displaced the "old" those profits will have disappeared and the price system will be adjusted in support of the characteristics of the new technology. Profit is conditional and transient; it *"has the most lamentable similarity with the drying up of a spring"*.

(*TED*.p.209) Like all evolutionary processes, competition consumes its own fuel and, unless yet further innovations occur, competition is exhausted and with it economic development. This is the vision that emerges later in *Capitalism, Socialism and Democracy*, capitalism decays because the conditions for sustained regeneration of economic variation are undermined.

Schumpeter is less forthcoming than he might have been about the precise nature of this evolutionary process. His preference is to rely on imitation; once the innovator has pointed the way the less venturesome are induced to follow by the prospect of the profits in view. This is not unimportant, especially when we take account of the possibility that imitation itself imposes some new innovative twist. But it masks the real issue, the need to build productive capacity to produce with the innovation and this is as true for the innovator as it is for the imitators. The link between prices, profits and investment is the centre piece of Schumpeterian dynamics; it is how he explains the uneven nature of economic development.

Of itself this process would be consistent with the survival of old methods, they simply diminish in relative importance but they remain in play. Schumpeter's process is different; the old methods are eventually driven from the market as scarce inputs are reallocated to the innovators. Full employment, or more generally limits on the availability of non reproducible resources, is essential to Schumpeter's idea of creative destruction. Such a system is clearly not a system of equilibrium relations. What then is it?

### *The Transience of the Prevailing Economic Order*

The fact that Schumpeter is dealing with an economy that is out of equilibrium does not mean that economic principles have ceased to be relevant. Quite the contrary, Schumpeter's world is not chaotic it is strongly ordered by market forces but the order that ensues is not to be treated as an equilibrium structure. Equilibrium states are states or sequences of states that have exhausted all reasons to deviate from their jigsaw like patterns, they are insulated schemes and they can only reconfigure via the action of external forces. What we are dealing with instead is a self-exciting system (to borrow Frank Knight's phrase<sup>10</sup>) a system in which every pattern of economic order is transient and the problem is to uncover the internal rules that transform each order into its successor.

The economic order in modern capitalism is not a stationary state, it is produced by the rules of the game, from the general to the particular, but the rules guide a process and leave open its consequences. This is how modern capitalism, as it evolved from the 15<sup>th</sup> century onward, is differentiated from a traditional society. In earlier times, innovations certainly occurred, as Lynn White has demonstrated, but the order was too fragmented by poor transport

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<sup>10</sup> See Knight, 1935, p170.

and communications for them to induce the full panoply of adaptations. Only with a connected market order could creative destruction underpin a steady and widespread increase in material living standards. Of course the pace of change waxes and wanes and it is unevenly distributed across different sectors at different points in time but it is always present. The forces of change work essentially to develop the structure of activity in such a way that the profits from innovation are diminished, in this sense there is gravitation of the classical kind, but it is not gravitation to a stationary state or a uniformly expanding economy. In this context capitalism seems to have a remarkable property, namely that the instituted rules which give rise to order are the very same rules which render every order open to challenge from within. Thus, while the rules generate a market order and give rise to predictable, repetitive behaviour they equally encourage the instigation of new ways of conducting economic activity.

Schumpeter gathers his sense of order from the Walrasian scheme in which, at each moment in time, preferences, technologies and the available resources interact to give coherence to economic action. But, as Professor Kurz has shown, the classical scheme serves just as well, indeed better from an innovation oriented viewpoint, given its emphasis on produced means of production and the fact that a preponderance of innovations are located within the structure of input output relationships in an economy..

Either way, the resultant order is caused, it has its inner logic but it cannot endure. Enter George Shackle.

### III. Schumpeter and Shackle on the Nature of Enterprise.

It is a corollary of these themes that innovation is a highly uncertain process, that uncertainty cannot be equated with risk. To uncover a deeper sense of the link between innovation and uncertainty it will be helpful to turn to the work of George Shackle on the relation between time, knowledge and

decision. No other economist, perhaps with the exceptions of Hayek and Lachmann, has placed the problem of understanding the roles of creativity, imagination and novelty at the heart of their economic scheme.

Shackle would have no difficulty in accepting the significance of Schumpeter's claim that "*the new is only the figment of our imagination*" (TED, p.85), indeed he devoted his entire career to working out its deeper meaning. How can the entrepreneur know that a project will succeed when success depends on diverting the channels of economic activity from an established path in unknowable ways?

Shackle's answer to this question is unwavering: entrepreneurial decision is a matter of *unknowledge* of necessary ignorance and cannot be based fully on facts because knowledge cannot be gained before its time.<sup>11</sup>

Enterprise starts from some facts, the understanding of the prevailing order but the entrepreneur moves outside of these facts and imagines that the prevailing order can be arranged differently. The resulting conjecture may succeed but it may not, or it may work out in a way completely unexpected by the instigating mind. Even the most rudimentary acquaintance with the facts of innovation points to the ever present surprises that colour the development of each possibility, the uses that were unforeseen, the complacent rivals who misjudged the significance of the new, and the complementarities that emerged with hindsight.

What does this tell us about the nature of the prevailing order? If it represented a completely deterministic world, there would be no scope for meaningful decision or action, for everything would be pre-programmed, the story already written and not capable of alteration. In such a world decision is

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<sup>11</sup> See Lachmann 1977, p.90.

mere *pretence* it is *illusory*<sup>12</sup>. Even the process of understanding more about that world is pre-programmed and the passage of time, as he puts it, is no more than the turning of the already written page.

Even further, in a human world of Olympian perfect foresight, decision is *empty* because its complete consequences are already fully understood and, since every aspect of the future is correctly known, there is no scope for any innovation; all possible innovations have already been made. Even if they are yet to be put into effect, the date at which they occurs and the sequela of outcomes that will follow are fully comprehended, there is no further novelty to emerge, no scope for the creation of anything new<sup>13</sup>. Perfect foresight is a natural but extreme complement of perfect determinism. Such a world is intellectually dead.

At the other possible extreme is a completely indeterminate world where no connection can be drawn between any action and its consequences; decision there would be, *pointless*, paralysed by the unboundedness of ignorance.

Consequently, meaningful decision exists in a middle and personal world of bounded ignorance. There it is possible to conjecture the consequences of action and to ground those conjectures in a present understanding of the natural, economic and social worlds. This is not a world in which anything goes, it is a world that is constrained but not predetermined. Decision of this kind goes beyond present knowledge it is creative, its emergence cannot be explained solely in terms of prior events, as Shackle puts it, this is *non empty* decision

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<sup>12</sup> This is also the the clouds vs., clocks theme of Popper (1972), Popper also presents the idea of determinism in terms of a motion picture film in which past and future are symmetrical and present simultaneously and where the future is just as much as immutable as the past. (Popper,1982, p.5 *et seq.*)

<sup>13</sup>In the Arrow Debreu world in which markets are redundant once the complete system of prices and contractual arrangements is established on the opening day.

premised on “inspiration”. Non empty, *inceptive* decision is very much the essence of Schumpeterian enterprise and innovation. To be entrepreneurial is to detach oneself from the present order and replace its image with internal thought. Enterprise in sum is creative conjecture, the imagined possibility that the economic world can be organised differently, allied with the capacity to turn the imagined into the actual

There is, therefore, a natural connection between Shackle’s radical notions of time and uncertainty and Schumpeter’s notion of creative destruction. Indeed, Shackle’s position is precisely that “*Economic values exist under the ever present threat of novelty*”, unanticipated novelty which can at any moment render redundant even the most traditional modes of economic activity.<sup>14</sup>

Here Shackle is open to misunderstanding, that his position is one of subjective nihilism- but this is not so, quite the contrary. As in Schumpeter order is essential. If imagined outcomes are to be connected to possible actions then the world must be structured so that choice is effective and it is the prevailing yet transient order that provides the basis for grounded, *inceptive, inspired choice*. This is certainly not nihilism.

Rather the system has an autocatalytic air to it, change begets change as every enterprising act alters the conditions which frame ensuing innovations “*via the thought and decision of others*” (Shackle, 1969, p 25). If economic order is the solution to a problem then in its emergence that solution transforms the problem<sup>15</sup>. There is no reason to expect that there are any bounds on this process as it operates over extended time. The worlds of Schumpeter and of Shackle can justly be described in terms of tales of the unexpected.

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<sup>14</sup> See Shackle 1972, p.361.

<sup>15</sup> Schumpeter puts it equally directly, “*Every process of development creates the prerequisites for the following*”. *TED*, p.64.

Of course this has a remarkable implication. Economic analysis has for long argued in terms of the stability of the market order, for this stability is essential to the ongoing coherence of the system. However, from the viewpoint of Schumpeter and Shackle the system must also be unstable in the very precise sense that the prevailing order is open to invasion by enterprising novelty. This is the sense in which Schumpeter and Shackle make common cause. The economic world under capitalism is never in equilibrium but neither is it chaotic. To paraphrase Popper, it is certainly not a *clock*, but neither is it a *cloud*. Enterprise truly is the imagined deemed possible.

#### IV. The Wider Consequences

Thus far I have sought to establish the connection between Schumpeter's ideas and those of George Shackle not least because, when they are conjoined, they lead to wider consequences that should be of great concern to students of economic change. What are some of these wider consequences? In particular, can their viewpoint help us answer the question we started from, namely "How is wealth created from knowledge?"

If by enterprise we mean challenges to the status quo of understanding, the prevailing order, it is clear that such behaviour exists in many worlds beyond the economic, enterprise is the essential concept required by an evolutionary account of science, technology and the arts as well as the economy. Entrepreneurs in the economy, like inventors and artists in the human built world and paradigm breaking scientists, believe something that nobody else believes; they share much of the information flux of their immediate fellow citizens but they conjecture and act on possibilities that others do not. So it is not only the economy that is an out of equilibrium system, this is true of knowledge producing systems in general.

So the chief characteristic of the Schumpeterian entrepreneur or the path breaking scientist is to de-correlate the prevailing state of knowledge, to sow doubt where previously there was understanding in common, that is to say to undermine the prevailing epistemic order.

Hence, the emphasis on novelty, on originality, on challenging existing practices and understandings that is typical of the Schumpeterian entrepreneur is also typical of the Kuhnian notion of the paradigm-breaking scientist. Thus, whatever their domain, all entrepreneurs have a dual role, one creative the other destructive. They develop understandings that are new to their sphere of influence and they undermine the correlated understanding that others possess. Since the “gains” to the innovators are “losses” to their established rivals, it is no wonder they are rarely thanked for their pains. In all spheres development is then a process of the successive correlation of understandings to establish order and the decorrelation of those understanding to impose development. It seems the boundary between the two cannot be irrelevant to the evolution of capitalism. Too much decorrelation and the order may fall apart, too little and it ceases to develop.

As an aside, it is perhaps worth saying that the conduct of science (including engineering and fundamental technological knowledge) and the conduct of a market economy contain remarkable parallels as instituted processes. Not surprisingly, since they are each organised, rule based systems for generating, and conserving new knowledge by testing the validity of conjectures and distributing the consequential information. In each sphere, high rewards are given for original claims that pass the accepted tests for valid accretions to knowledge, though the tests are very different as are the rewards<sup>16</sup>.

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<sup>16</sup>Compare Peter Higgs, the Nobel Laureate and proposer of the eponymous boson and Bill Gates, the billionaire founder of Microsoft.

In both science and the economy the challenging of order is in all its essentials an evolutionary process of innovation and selection. The nature of the conjectures and the modes of selection may be radically different but they are inherently evolutionary. The motion is unceasing; it transforms our ways of life almost beyond recognition, even the most cursory understanding of economic and business history makes this plain.

One might be led from this to the idea that Schumpeter and Shackle are thinking in terms of a knowledge based economy in such a way that the development of knowledge and the development of the economic apparatus proceed hand in hand. This is apparent common sense but it is misleading for we can with equal justification say that the defining issue is not knowledge but ignorance. We have already noted the seed of this idea in Shackle's work: the idea that non empty, inceptive decision is a creature of conjecture and imagination, a matter of unknowledge. That lack of knowledge is central to Schumpeter's vision too is not surprising but what is perhaps surprising is that this connects him not to Walras but to the classical economists and to Smith and to Marshall in particular. With his concept of the division of labour, Smith was drawing attention to the highly specialised, uneven nature of human knowing. Indeed, in his scheme specialisation is necessary for the growth of knowledge.

Even though it may be convenient to call capitalist economies knowledge economies, it is more accurate to say that they are described by a distribution of ignorance rather than a distribution of knowing. In a modern society, common knowledge is only a small part of the picture required for economic action. Instead, all individuals are distinguished by knowing a great deal about a narrow sphere of human action and, as a consequence, being reliant on the knowing of others for their standard of life. Moreover, the unevenly distributed nature of human ignorance is the epistemic fact that provides the context for entrepreneurial imagination of all kinds. Thus a world in which many

individuals know many different things is a world in which innovative conjecture is likely to arise in many different contexts. It is not at all accidental that Schumpeter emphasised the role of outsiders in the innovation process, it is a phenomena that is commonplace in business history and a deeper reflection of the nature of human ignorance and the barriers this may place on perceiving the obvious.

So Schumpeter and Shackle force us to confront a paradox, that our collective material richness in western society is a product of our pervasive ignorance as individuals. We might say that we are collectively rich precisely because we have learnt how to profit from our individual ignorance and to do so by creating forms of organisation (including markets) that connect individuals and render their limited knowings valuable<sup>17</sup>. Marshall too knew this, when he claimed that knowledge aided by organisation “*is our most powerful of engine of production*”<sup>18</sup>. It is only because we have invented and innovated to create the multiple forms of organisation required to benefit from our localised, differential knowing that we are able to benefit from the epistemic division of labour.

There is a certain irony in the fact that the economic world of capitalism is indeterministic for it means that we have no causal grounds for predicting the occurrence, timing and nature of innovations. This does not mean that the study of the history of innovation is futile, far from it. Scholars can and do understand what has happened, they note the resources devoted to innovation and the associated methods of organisation, they can identify the incentives that

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<sup>17</sup> We might reflect on the fact that the substantial resources devoted to education in Western capitalism are after a certain stage devoted almost exclusively to the inculcation of highly specialised knowledge, equally from this perspective; they are systems for the production of trained and valuable ignorance.

<sup>18</sup> Marshall, Variorum edition, 1961, p138

led to particular entrepreneurial action and sketch the opportunities that shaped the process. Similarly they can understand the barriers to setting up new businesses, the characteristics of the creative deviants who established them, but always *ex post*, never *ex ante*<sup>19</sup>. A predictive theory of innovation is a contradiction in terms. Was it not Schumpeter who claimed that the purpose of theory is to enable a reasoned study of history?

## V. Epilogue

Let me conclude. We can rightly claim that the economics of Schumpeter and Shackle is the economics of open evolving systems in which the future is indeterminate. Such is the nature of modern capitalism.

But this does not mean that the economic system is irrational. Distributed ignorance may mean that the rationality of each individual entrepreneur is highly localised but a far greater rationality lies at the system level in the design of the instituted rules of the game. There is far more innovative and adaptive capacity in an industry than in any firm and far more adaptive capacity in the economy as a whole than in any industry. It is the capacity to engage in trial and error action combined with the means to eliminate errors at the system level that gives capitalism its durability. For the study of economic activity it means the primacy of process, for process is more stable than the events it generates. Process does not lead to equilibrium: it leads to self transformation induced by self organisation. What we are to understand is the dynamics of an open system, open because human knowing is open, that is Schumpeter's great legacy.

Perhaps George Shackle may have the last word,

*“we need not regard every situation or event as the inevitable, sole and necessary consequence of antecedent situations or events, a history in which*

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<sup>19</sup> See Oakey 2014.

*therefore a situation or event can be essentially and inherently not fully explainable, not fully analysable not fully assignable to conditions or causes which are sufficient to guarantee the occurrence of it and it alone.” (Shackle, 1966, p.107)*

That is the essence of creative destruction. Gladly it means that the future is beyond human knowing only the past can be the subject of serious explanation.

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