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Psychology, Social Evolution and Liberalism: a Hayekian Trinity

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ABSTRACT *The work of Friedrich Hayek describes an extensive political economy, with explicit consideration of the psychological limits to human understanding, the market as a mechanism of information gathering and social coordination, and the relationship between market processes and the free society, where moral and political issues are relevant within a framework of continuous adaptation. Although the survival characteristics of social institutions largely defy rational enquiry, political liberalism secures the diversity that is necessary for evolutionary social adaptation.*

1. Introduction

Since his death in 1992, the work of Friedrich Hayek—his contributions to economics, epistemology, ethics, jurisprudence, politics and psychology—has become the subject of an extensive re-examination, wherein the relevance of psychology, the notion of spontaneous social evolution and the ethos of liberalism merit particular attention. There is a continuity in the broad themes of Hayek's publications over more than 60 years: the function of the money economy; money's relevance to business cycles; the division of knowledge; and the relevance of market transactions to a coherent and evolving social structure. Inevitably distinctions are drawn, for example: between the young Hayek focusing upon equilibrium analysis, and the mature Hayek elucidating the characteristics of a liberal social order (see Fleetwood, 1995); and between the early work which 'virtually identifies economic theory with equilibrium theory' and the later recognition that 'equilibrium must now take into account the fact that knowledge is subjectively-held and dispersed' (Caldwell, 1988, p. 529).

Across great detail in the chronology of Hayek's work (see also, Hutchinson 1981, pp. 203–232; Lawson, 1994; Foss, 1995; Witt, 1997; Lewin, 1997), one broad and pervasive issue—the linkage between Hayek's vision of political economy and his espousal of liberalism—may be understood through the relevance of psychology to a theory of social evolution. By its elucidation of the spontaneous order of the human mind, Hayek's theoretical psychology invites an extension of the principle of mutual adaptation to the evolution of a liberal social order.

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Having decided to pursue a career in economics after first considering one in psychology, the young Hayek, as any good journeyman, naturally sought to master the technical aspects of his subject. Yet, although he describes his early self as a 'very pure and narrow economic theorist' dealing with 'technical economics' (Hayek, 1994, p. 91), he was quick to realise the limitations of the mainstream approach: 'In his first major paper [Hayek, 1928] he criticizes the notion of timeless, stationary equilibrium' (Caldwell, 1988, p. 514). It is a safe assertion that Hayek's economics was never focused upon neoclassical optimisation. Instead, the emphasis was upon a social theory of human motivation, sequential causation and coordination, and this emphasis undoubtedly strengthened: 'though I still regard myself mainly as an economist, I have come to feel more and more that the answers to many of the pressing social questions of our time are to be found ultimately in the recognition of principles that lie outside the scope of technical economics or of any other single discipline' (Hayek, 1960, p. 3). Hayek's awareness of the limitations of Walrasian general equilibrium analysis (for its neglect of informational aspects of competitive markets) was sharpened by the socialist calculation debate of the 1930s. In that debate, Hayek concluded that socialism is flawed as an economic system, because the price mechanism is necessary to make efficient usage of dispersed and unarticulated knowledge, and to incite the entrepreneurial process of discovery. In Walrasian economics, entrepreneurship is rendered redundant by the neoclassical assumption that all agents possess perfect knowledge.

Section 2 examines Hayek's criticisms of mainstream neoclassical equilibrium economics. Those criticisms were elucidated in four publications—'Economics and Knowledge' (Hayek, 1937), 'The Use of Knowledge in Society' (Hayek, 1945), 'The Meaning of Competition' (Hayek, 1946), and 'Competition as a Discovery Procedure' (Hayek, 1968a)—in which the recurring theme is that unarticulated knowledge is captured by generally accepted institutional practices. These practices compensate for an individual's unique ignorance and uncertainty, by affording a basis upon which the actions and reactions of others might be reasonably anticipated. The adaptation and coordination of human action, which can be achieved when market processes are guided by liberal institutional structures, are mirrored by the adaptation and coordination of knowledge itself. In this regard, Hayek drew from his early work in psychology.

In the winter of 1919–20, Hayek had spent a few weeks 'in the laboratory of the brain anatomist von Monakow, tracing fibre bundles through the different parts of the human brain' (Hayek, 1994, p. 64). A crucial insight—'What I had from the beginning been unable to swallow was the conception that a sensory fibre could carry, or a nerve cell store, those distinctive attributes that we know mental phenomena to possess' (Hayek, 1952b, p. 289)—suggested the need for an alternative conceptual approach: 'though I felt that I had found an answer to an important problem, I could not explain precisely what the problem was' (Hayek, 1952b, p. v).[1] The relevance of Hayek's work in psychology is discussed in Section 3.

[1]An original 41 page manuscript entitled 'Beitraege Zur Theorie Der Entwicklung Des Bewusstseins' [Contribution to the Theory of The Development of Consciousness] is dated September 1920.

Yet, because the data of social science are not limited to rationally constructed ideas and concepts, human science extends beyond psychology. Social science seeks in large part to explain the unintended consequences of human action. These consequences and their methodological implications are considered in Section 4. The evolutionary context of Hayek's social science and moral philosophy, and the nature of social evolution *per se*, are respectively addressed in Sections 5 and 6. Finally, linkages to the philosophy and politics of liberalism are examined in a brief conclusion.

2. Subjective Data and Objective Facts

'Economics and Knowledge' is notable for Hayek's claim 'that the coordination problem is *the* central problem' and for his attempt 'to define equilibrium for both the individual and for society' (Caldwell, 1988, pp. 514–529). The 'knowledge and intentions of different members of society are supposed to come more and more into agreement' (Hayek, 1937, p. 45); but this can happen only if 'the subjective data of different people ... were due to the experience of the same objective facts' (Hayek, 1937, p. 44). Yet, knowledge 'only exists in the dispersed, incomplete, and inconsistent form in which it appears in many individual minds, and the dispersion and imperfection of all knowledge are two of the basic facts from which the social sciences have to start' (Hayek, 1952a, p. 50). The scientific problem is 'how the "data" of different individuals on which they base their plans are adjusted to the objective facts of their environment (which includes the action of other people)' (Hayek, 1946, p. 93).

If economics is to explain this process of harmonisation, it must deal with 'propositions ... about causation in the real world', that rest upon 'statements about how knowledge is acquired and communicated' (Hayek, 1937, p. 33). A high degree of correspondence between 'objective facts' and 'subjective data' is essential. For economics to explain how that correspondence is achieved, an empirically testable theory of learning and expectations formation is necessary. Learning improves an individual's ability to form reliable expectations, so that events can be anticipated with some degree of accuracy: the 'empirical element in economic theory ... consists of propositions about foresight ... [and] ... the concept of equilibrium itself can be made definite and clear only in terms of assumptions concerning foresight' (Hayek, 1937, pp. 33–34).

The joint emphasis upon subjectivism and knowledge coordination is taken further in 'The Use of Knowledge in Society', where Hayek defines 'the problem of a rational economic order' as 'a problem of the utilization of knowledge which is not given to anyone in its totality' (Hayek, 1945, p. 78). A central authority cannot deal adequately with 'the economic problem of society [which] is mainly one of rapid adaptation to changes in the particular circumstances of time and place.' It is not only that the information is (at least initially) dispersed, but that the statistical procedure of 'lumping together ... items which differ as regards location, quality, and other particulars leaves the central planner in ignorance of these circumstances of time and place' (Hayek, 1945,

p. 83). Non-theoretical, practical, unarticulated individually-held knowledge of local circumstances (endogenous knowledge) is crucial:

> The shipper who earns his living from using otherwise empty or half-filled journeys of tramp steamers, or the estate agent whose whole knowledge is almost exclusively one of temporary opportunities, or the *arbitrageur* who gains from local differences of commodity prices—are all performing eminently useful functions based on special knowledge of circumstances of the fleeting moment not known to others. (Hayek, 1945, p. 80)

One implication is that social coordination requires institutional structures that encourage the use of endogenous information; i.e., those which 'provide inducements which will make individuals do the desirable things without anyone having to tell them what to do' (Hayek, 1945; 1949, p. 88). Another implication is that endogenous knowledge makes any *ex-post* appraisal of past decisions difficult, if not impossible, because only the decision-maker is in a position to know exactly what he knew.

In 'The Meaning of Competition', Hayek gives further emphasis to the nature of social relationships as empirical processes of knowledge acquisition and dissemination: 'the decisions of many individuals influence one another and necessarily succeed one another in time' (Hayek, 1946, p. 93). This is the purposeless, continually re-adjusting, spontaneous market order (catallaxy) that has nothing remotely equivalent to the optimal conditions for achieving some well-defined organisational goal (economics). Prosperity derives from profits earned by those who 'discover new ways of doing things better than they have been done before' (Hayek, 1946, p. 101). Bankruptcies are important to processes of discovery in which efficiency and ingenuity are tested in open competition. Economically efficient methods of production and distribution become evident only as some producers succeed as others fail through an adaptive competitive process in which both merit and luck are relevant: 'We allow the individual share to be determined partly by luck in order to make the total to be shared as large as possible' (Hayek, 1968b, p. 91).[ns]

In addition to 'the mutual adjustment of individual plans', which the catallaxy achieves, Hayek asserts a further quality. It 'produces in some sense a maximum or optimum' (Hayek, 1968a, p. 183) in that 'as much will be produced as we know to bring about by any known method' (Hayek, 1968a, p. 185). So, competition 'is not a zero-sum game, but one through which, by playing it according to the rules, the pool to be shared is enlarged' (Hayek, 1968a, p. 186). And, unlike the logic of economic choice, which defines *a priori* a set of optimal conditions, the invisible hand is an empirical mechanism which facilitates the communication and the resource allocations that achieve an optimum 'in some sense'. Neoclassical optimisation has only limited application. By its formal analysis, tautologies are manipulated to arrive at 'a series of propositions which are necessarily true because they are merely transformations of the assumptions from which we start' (Hayek, 1949, p. 34). Logical deductions drawn from tightly specified assumptions relating to resources, techniques and goals, reveal the theoretical conditions that define an economically efficient outcome. Although important insights may be achieved, these can relate only to the intentions of a

single mind. It is quite hopeless to attempt to extend that logic of optimal choice to a social process where 'the decisions of many individuals influence one another and necessarily succeed one another in time' (Hayek, 1949, p. 93). Propositions about *causal* relationships can be achieved only with the identification of *empirical* processes whereby knowledge is acquired and disseminated. To qualify as a social (rather than a mathematical) science, economics must analyse such social processes: how does convergence (social equilibrium) occur in the context of changing endowments, changing technologies, and individuals' changing preferences and expectations? More generally, the focus is upon empirical propositions of the kind that 'if we find such and such conditions, such and such consequences will follow' (Hayek, 1946, p. 94). The greater the extent of social, economic and environmental change, the more problematic are our knowledge and behaviour. With that uncertainty, how might decisions best be made? In addressing that issue, Hayek gained crucial insights from his early studies in psychology—that knowledge itself is an evolutionary adaptation and that survival potential is enhanced by drawing upon all the categories of knowledge encapsulation: instinct, reason and culture.

3. Psychology

The Sensory Order (Hayek, 1952b) is central to Hayek's intellectual contribution and is of special importance to the relationship between his methodology (for analysing the complex phenomena of spontaneous social order) and the philosophy of liberalism: 'the view of knowledge which it defends can be shown to presuppose many of the positions Hayek adopted in economic theory and social philosophy' (Gray, 1984, p. 3). Hayek believed *The Sensory Order* to be one of his 'more important contributions to knowledge' (Hayek, 1994, p. 138) and he commented further 'that the insights I gained . . . both from the first stage in 1920 or later in the 1940s, were probably the most exciting events that ever occurred to me, and which shaped my thinking' (Hayek, 1994, p. 153). While *The Sensory Order* shows Hayek's epistemology and moral philosophy to be ontologically grounded, the external world is knowable only through the creative versatility of an individual mind. Yet, mind is the black hole of human science: no empirical evidence emanates from within. Behaviourism has no access to cognitive functions, so it cannot reveal motivation. Introspection gains access to mental images, not mental processes. Empathy may disclose motivation, but gains no insight into relevant neurological structures.

Working within those constraints, *The Sensory Order* provides the rationale for self-knowledge, social adaptation and social science generally. Without some degree of uniformity of minds, there can be no meaningful social interaction, which is why a human is more sensitive to (the perceptions of) other humans than to rats or (less still) to bats or (less still) to gnats. So, introspection may reveal (hypothetically, and given genetic and cultural similarities) what is thought by other minds; and that same kind of conscious self-examination provides a basis for ameliorating purely instinctive or emotional responses. It thereby admits a social dimension that invites both conditioned and considered reactions.

By the activity of the brain, the inputs from sensory receptors are classified to form memory, which is modified by each further experience of living in the material world: 'We do not first have sensations which are then preserved by memory, but it is as a result of memory that the physiological impulses are converted into sensations' (Hayek, 1952b, p. 53). Memory and thought are indistinguishable neurological processes—particular configurations of a complex neural network—that constantly adapt to stimuli from the external world. The mind is not a store of data that reflect (or are correlated with) characteristics of elements in the physical world. Rather, organisms rely upon a sensory order that is created by the central nervous system. For simple reflex action, higher centres receive simultaneous reports of both stimulus and response; but, at the highest levels of consciousness, responses to stimuli are modified by the influence of the widest range of current and past impulses. Between the extremes of reflex and conscious response, a continuous range of 'engaged' connections is hypothesised with no qualitative distinction afforded to the most abstract processes of thought. All experience is shaped by memory and understanding and, whenever a new experience is inconsistent with 'the classification based upon past linkages', the classification must be revised:

> While there can thus be nothing in our mind which is not the result of past linkages (even though, perhaps, acquired not by the individual but by the species), the experience that the classification based on past linkages does not always work, i.e., does not always lead to valid predictions, forces us to revise the classification. (Hayek, 1952b, p. 168)

The differentiating responses of the neurophysiological system are determined by linkages previously created within the organisational structure of the central nervous system: a system of connections 'acquired in the course of development of the species and the individual by a kind of "experience" or "learning"' (Hayek, 1952b, p. 53). Pre-sensory linkages determine 'the order of the apparatus of classification'; that is, the framework that determines all our 'conscious experience of qualitative attributes of external events'. Pre-sensory linkages—'relations of which we are not consciously aware' (Hayek, 1952b, p. 142)—are that part of *a priori* knowledge that 'is not learnt by sensory experience, but is rather implicit in the means through which we can obtain such experience' (Hayek, 1952b, p. 167).

The continuum of human experience is interpreted through the construction of mental models. The ability to construct such models develops with the accumulation of knowledge, which is the outcome of the relationships between three structures (see Hayek, 1952b, p. 39). These are: the physical world (*the physical order*); the human nervous system (*the neural order)*, which is a part of the physical order; and the subjective interpretation of reality (*the mental order*, or mind), which is created by the neural order.

The brain itself is a biologically evolving instrument of an adaptive system: the sensory order of mind. The three key principles of Darwinian selection by which it is shaped are *diversity* (of component elements), *interaction* (with the environment to test adaptive fitness) and *differential amplification* (successful variants are reproduced in relatively greater number). The potential fallibility of both the brain and the mind is a necessary characteristic to allow the Darwinian

selection process to operate. Knowledge is not a unitary entity that exists to a greater or less extent in different species. Knowledge is domain-specific: different genes direct the selection process of intelligence to produce different adaptations (knowledge) in different species. So it would be meaningless to ask how close perceptions are to the noumenal world: 'Which external events are recorded at all, and how they will be recorded, will . . . depend on the given structure of the organism as it has been shaped by the process of evolution' (Hayek, 1952b, p. 108).

We can have only a limited comprehension of the influences by which the mind is shaped, because a complete explanation would require us to know how our sensory perceptions represent the relationships that exist in the external physical world; and this would require our mind's representation of the physical world to include a model of the relationship between that model and the physical world; and so on *ad infinitum.* Indeed, 'to explain our own knowledge would require that we should know more than we actually do, which is, of course, a contradictory statement' (Hayek, 1952a, p. 86). The implication, that understanding extends beyond the limit of conscious expression, is illustrated by Hayek's own experience,

> I have always regarded myself as a living refutation of the contention that all thinking takes place in word or generally in language. I am as certain as I can be that I have often been aware of having the answer to a problem—of 'seeing' it before me, long before I could express it in words. Indeed, a sort of visual imagination, of symbolic abstract patterns rather than representational pictures, probably played a bigger role in my mental processes than words. (Hayek, 1994, pp. 134–135)

In setting a basis for the thesis that knowledge is an evolutionary adaptation, such that even the most advanced intelligence is necessarily ignorant of the degree to which the world as it appears represents the world as it is, *The Sensory Order* 'provided the starting points for a fully-fledged evolutionary epistemology that simultaneously analyses phylogenetic and ontogenetic aspects of human cognition present in the development of neuronal structures . . .' (Herrmann-Pillath, 1992, p. 147).[2] Knowledge is a neurological adaptation to external phenomena. The ability of the brain to create mental phenomena (mind) is protected unless it creates 'flawed' information that puts it at risk. Instinctive (phylogenetic) knowledge is driven by events: as a species adapts to environmental 'hazards' typically encountered over successive generations, 'good' instincts are naturally selected.

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[2]*The Sensory Order* appears remarkably modern in light of the book's dissatisfaction with classical theories of memory and brain function among clinical neurologists, child development theorists, psychologists, linguists and psychoanalysts, and the developments in these areas in the 1990s. Its conceptualisations are especially relevant to psychophysiological parallelism (i.e., the notion of a precise mapping between mental and physiological phenomena); and they anticipate the central thesis of Artificial Intelligence research, which is that the mind can in principle be 'realised in a wide range of different sets of material, both organic and inorganic' (Smith, 1997, p. 9). As the first proposal 'of cortical memory networks on a major scale' (Fuster, 1995, p. 87–89), it foreshadowed Gerald Edelman's (1997) *Neural Darwinism* and Henry Plotkin's (1994) evolutionary epistemology. **Q1**

For non-recurrent changes, a special class of adaptation—intelligence—is required to allow an organism to cope with present circumstances that are unlike those of the past. However, intelligent (ontogenetic) learning would be impossibly slow if it were necessary to investigate every new sensation. Instead, intelligence is primed by a deep-seated cerebral structure (the 'value system') that projects over the entire cortex:

> Values reflect events involving the nervous system that have been selected during evolution because they contribute to adaptive behaviour and to phenotype fitness. Examples of low-level values are: 'eating is better than not-eating' or 'seeing is better than not seeing'. (Edelman & Tononi, 1995, p. 85)

Synapses are naturally selected through their enhancement of the organism's survival potential and are further strengthened through repeated use. In this manner, intelligence is guided by knowing what it needs to know (e.g., in respect of eating, drinking, sense coordination, etc). Culturally transmitted knowledge (explicit and tacit) further extends the means of securing survival traits: it removes the need for successive generations to rediscover the speed of light, the precepts of sound hygiene, dietary balance or the features of political fascism and parliamentary democracy.

The relevance of the Darwinian paradigm to Hayek's psychology is stark. Although every mind representation is veridically suspect, the knowledge that it supports is rated by the 'sureness' of the behaviour that it guides. The tendency for any species to balance risk against caution is decided by a natural selection that operates across three interactive heuristics: instinct, intelligence and (in the human case only) culture. Safe behaviour is guided by soundly based knowledge. Yet, formal science aspires to knowledge that is qualitatively superior to that (however acquired) to which laymen have access.

4. Methodology

Unlike physical science, which can focus directly upon the phenomena of nature to draw inferences about their composite elements, social science must discover the 'principles of structural coherence' (Hayek, 1952a, p. 65) from a direct study of concepts and beliefs that determine rational interaction. The data of social science are the opinions of those who are involved in any action: 'Not only man's action towards external objects but also all the relations between men and all the social institutions can be understood only by what men think about them' (Hayek, 1952a, p. 57). In a narrow sense, human science is concerned with conscious or reflected action and, in this psychological context, it attempts to understand how phenomena are created by the classification of sense perceptions. Yet, psychology must face the social dimension, since understanding is determined by the categories into which the mind groups sensory stimuli, rather than by the characteristics of the object itself. If individuals react in like manner, it is because the commonality of their biological and cultural adaptation causes them to recognise situations as identical, rather than because those situations are alike in some physical sense.

Social order extends beyond the phenomena that are created by neurological processes: 'If social phenomena showed no order except insofar as they were consciously designed, there would be no room for theoretical sciences of society and there would be ... only problems of psychology' (Hayek, 1952a, p. 69). Yet, the unintended consequences of human action far outweigh those that are intended. Decisions made independently by different individuals produce an order that is undirected by any conscious or collective intention: the formation of language, the evolution of markets and prices, and the direction of production under competition are spontaneous formations that do not result from design. Moreover, even though ideas can exist only within individual minds, elements of the social structure remain largely unaltered across successive generations of individuals. Such enduring institutions, attitudes and relationships comprise a social structure that is distinct from (and that can be studied apart from) the particular individuals, who just happen to be 'the foci in the network of relationships' (Hayek, 1952a, p. 59). So in its widest application, social science seeks to explain the emergence of social order as the unintended consequence of human action.

Hayek abhorred the twentieth-century preoccupation with categories of social wholes: 'the economy', 'capitalism', 'the legal system', etc. These categories are pseudo-scientific misconceptions, he argued, since each comprises a collection of unique elements, whose order is definable only in terms of theoretical interrelationships. Social science does not deal with given wholes. Rather, it exists to construct those wholes: 'the wholes about which we speak exist only if, and to the extent to which, the theory is correct which we have formed about the connection of the parts which they imply, and which we can state only in the form of a model built from those relationships' (Hayek, 1952a, p. 98). Popular notions about social structures are not the data to be studied. The appropriate data are the concepts that guide an individual's behaviour. An individual's knowledge is contained by the adaptation of a single mind, whose comprehension of another's knowledge and behaviour is obtained through introspection, which is reliable only upon the basis of shared genes and shared experience and against a common cultural background. The social institutions of property rights, advertising, market processes, contracts, conventional practice and so on, harmonise the processes by which the evolutionary adaptation of knowledge is maintained.

Unlike physical science, which deals with 'relatively simple phenomena' of relations between things, social science deals with 'the more complex phenomena of life, of mind, and of society'. Complexity is a state that is identified by 'the minimum number of distinct variables a formula or model must possess in order to reproduce the characteristic patterns of structures of different fields'[3]:

> The 'emergence' of 'new' patterns as a result of the increase in the number of elements between which simple relations exist, means that this larger structure as a whole will possess certain general or abstract features which will recur independently of the particular values of the individual data, so long as the general structure ... is preserved. (Hayek, 1967, pp. 25–26)

[3]This is close to the definition of complexity given in the context of biological evolution (see Dawkins, 1988, pp. 2–13).

It is the property of 'emergence'[4] which distinguishes simple and complex systems,[5] but it must not be confused with the distinction as to 'whether structures are "open" or "closed" systems' (Hayek, 1967, pp. 25–26).

Artificially closed systems (laboratory experiments) can reveal simple relationships between a few component elements; these may permit further interrelationships to be hypothesised. However elaborate, they remain simple if nothing emerges. For example, meteorology deals with relationships, which are verified within closed systems of mathematics and physical mechanics. However, accuracy in weather forecasting is made difficult not only by elaborate interrelationships across a multitude of components, but also by the literally cosmic impact of the actual (open) system. Yet, meteorological forecasts are facilitated by the plausible assumption that new dimensions of complexity do not emerge from (say) 'attitudes' invoked (by some particular weather system) within individual mineral particles, air molecules, etc.

Meteorological forecasts (and successful space flights to the moon) succeed or fail on the basis of the competence of meteorologists (and flight engineers), whose performance rests upon an understanding of closed systems (experimental and mathematical) and upon the anticipation of complications from an open system. Yet, meteorologists and flight engineers deal with essentially mechanical phenomena:

> when we ask ourselves by what criteria we single out certain phenomena as 'mechanical' or 'physical', we shall probably find that these laws are simple in the sense defined. Non-physical phenomena are more complex because we call physical what can be described by relatively simple formulae. (Hayek, 1967, p. 26)

So, whereas the complexity of emergent systems 'is rather the exception in the physical sciences [it] is the rule in the sciences of the more highly organised structures'[6] that is, in 'a large part of theoretical biology, especially of the biological theory of evolution, and certainly of the theoretical social sciences' (Hayek, 1967, p. 261). Hayek argued that complex (emergent) systems of human interaction require a distinct methodology in which individuals' perceptions of events, rather than the events *per se*, are crucially relevant.

5. Social Science

Action is prompted when an agent has confidence in his perception of events. Doubt prompts caution and reflection. Here lies the relevance of evolutionary

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[4] 'The scientific meaning of emergent . . . assumes that, while the whole may not be the simple sum of the separate parts, its behaviour can, at least in principle, be *understood* from the nature and behavior of its parts plus the knowledge of how all these parts interact' (Crick, 1994, p. 11).

[5] The idea that Hayek believed 'that emergent powers are germane only to social science' (Peacock, 1993, p. 252) is clearly wrong: the 'conception of emergence derives . . . from John Stuart Mill's distinction of the "heteropathic" laws of chemistry and other complex phenomena from the ordinary "composition" of causes in mechanics, etc' (Hayek, 1967. p. 26 fn.).

[6] This is a doubtful assertion: 'We cannot even solve exactly for the motion of three bodies in Newton's theory of gravity, and the difficulty increases with the number of bodies and the complexity of the theory' (Hawking, 1988, p. 187).

epistemology. An enhanced survival propensity is the consequence of the evolving scope (dynamic interaction) of an individual's knowledge. Yet, no individual has more than a partial understanding of the interrelationships between his beliefs or motivations and the institutions (family, neighbourhood, workplace, nation state, etc) that provide the basis for choice and which guide civilised behaviour. These are the structures upon which social interaction relies. They exist as the conceptualisations (interpretations of reality) of individual actors. The social scientific investigation and interpretation of social processes (the interrelationships between those conceptualisations) is focused upon intentional human behaviour and its unintentional consequences. This means that explanations must be couched in terms of human beliefs, motivations and institutions (and their interrelationships) that set a structure for choice.

Individual agencies are vulnerable outside of the system to which they are naturally adapted. The criticism, which this invites—'Empirically, such a proposition is without content because it cannot be falsified' (Voigt, 1992, p. 465)—applies equally to biological evolution and was explicitly addressed by Charles Darwin. In the biological context, evolution is falsified 'if the geological evidence mounted to show that not enough time had elapsed' or 'if it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications' (Darwin, 1859; cited from Dennett, 1995, p. 46, fn 5). Although analogous considerations (regarding time-scale and complexity) would apply, social evolution is generally less embracing and many institutional structures are initiated having no evolutionary antecedents; which, of course, allows comparative scientific studies of the effectiveness of evolved and rationally-constructed institutional forms.

The concept of a scientific law which is valid for simple phenomena—that is, a definite rule which links two events as cause and effect—is not applicable to complex (emergent) phenomena. Hayek cites Darwin's exposition as 'the best illustration of a theory of complex phenomena, which is of great value, although it merely describes a general pattern whose detail we can never fill in' (Hayek, 1967, p. 31). Thus, a class of patterns, identified by scientific theory, may allow for predictions depending upon specific circumstances, that is, upon the extent of the empirical data. If these are insufficient to allow predictions, knowledge of the pattern is still useful; so 'while it is certainly desirable to make our theories as falsifiable as possible, we must also push forward in fields where, as we advance, the degree of falsibility necessarily decreases. This is the price we have to pay for an advance into the field of complex phenomena' (Hayek, 1967, p. 29).

The primary achievement of successful theories of complex social structures has been to show that events, which arise in the course of human interaction, depend upon so many concrete circumstances that we can never hope to be able to ascertain them all. Evolution is both an open and a complex (emergent) process, which allows only for 'pattern predictions':

> It is a theory which neither aims at specific predictions of particular events, nor is based on hypotheses in the sense that the several statements from which it starts are expected to be confirmed or refuted by observation. Although, as is

> true of any scientific theory, it does delimit a range of facts which are permitted by it against others which it 'forbids', our purpose in examining the facts is not to ascertain whether the different individual premises from which the theory starts are true, but ... to show why only certain kinds of events are to be expected while others are precluded. (Hayek, 1967, p. 12)

In short, scientific theories—whether social, biological or physical—may be judged to be more or less plausible on the strength of evidence that falls short of falsification.

6. Social Evolution

In abstract terms, evolution is the idea 'that a mechanism of reduplication with transmittable variations and competitive selection of those which prove to have a better chance of survival will in the course of time produce a great variety of structures adapted to continuous adjustment to the environment and to each other' (Hayek, 1967, p. 32). Adaptation and selection contribute to the emergence of coherent social systems. In a cultural context, evolution is 'a process in which practices which had first been adopted for other reasons, or even purely accidentally, were preserved because they enabled the group in which they had arisen to prevail over others' (Hayek, 1973, p. 9). Institutional practices become established as venerated (though not immutable) traditions in consequence of the advantages to groups which adhered to those traditions. Though evolution in a social context points to group selection upon the basis of well-adapted institutional practices, this is fully compatible with Hayek's espousal of methodological individualism. While all novelty is initiated and disseminated through the action of individuals, imitative activities are necessarily interdependent. Group selection is then explained by the personal advantages that accrue to individuals who chose to bide by rules that are generally followed. By the practices that survived, man was brought from 'the small horde to the organised tribe, the still larger clans and the other successive steps towards the "Great Society" ... [where] ... millions of men interact and where civilisation as we know it has developed' (Hayek, 1973, p. 14). That evolved social order is illustrated by institutions—religion, language, money, law, markets, etc—which prevail because they enhance the reproductive fitness of those whose reason is directed by them. Such institutions are the result of a multitude of individual adaptations. At best, only their general characteristics can be understood.

Hayek's thesis is that spontaneous developments brought man from primitive tribal arrangements to a modern world network of dynamic interrelationships. The morality of the tribe, which binds individuals by *personal* relationships, could never have supported that extended socio-economic order. Moreover, any attempt to impose an alternative order created by rational design is undermined by a complexity of detail that cannot be understood by any single individual or group of individuals.

The social harmony, which exists within small 'tribal' groups, is based upon a consensus upon common objectives. Inevitably, this is undermined as the number of participants grows. An alternative *extended* social order is required to promote

the cohesion of mutually advantageous exchange, where objectives are irrelevant. The rules that support the latter are necessarily qualitatively different from those that bind the former. The common objectives of the primitive group have their counterpart in the narrow but clearly defined goals of modern organisations: 'the general rules of law that a spontaneous order rests on aim at an abstract order, the particular or concrete content of which is not known or foreseen by anyone; while the commands as well as the rules which govern an organisation serve particular results aimed at by those who are in command of the organisation' (Hayek, 1973, p. 50).

Organisations and the spontaneous order are not mutually exclusive structures. The same group of people (employees of a firm) may act together as an organisation (on an assembly line) while spontaneous order is also maintained by adherence to conventional norms of behaviour; within every organisation, individuals are expected to operate according to general rules. However, there are limits to the growth of the organisation, beyond which its advantages (from the avoidance of transactions costs) are outweighed by those derived from market competition. Hayek's supposition, that the efficiency of the organisation is inferior to that of the market process at a relatively small scale of operation, is consistent with his belief in the efficacy of evolved spontaneous order and in the impracticality of centralised socio-economic planning.

The guiding principle is that of effective planning, i.e. to discover the most effective way of utilising knowledge. Is it to be achieved by hierarchical decision-making or by allowing decisions to be dispersed across individuals through the process of competition? Against the organisation, competitive forces more readily give access to knowledge of particular circumstances and processes which pertain at different times and locations: 'practically every individual has some advantage over all others because he possesses unique information of which beneficial use might be made' (Hayek, 1945, p. 79). In addition, the competitive market process provides the mechanisms by which individuals' actions are coordinated; but the market is unpredictable, and state intervention can neither prevent nor lessen the costs arising from that unpredictability. Indeed, the very attempt would be undesirable, for it would retard necessary adjustments. The competitive market serves prosperity and progress by rewarding those who are lucky enough to be able to satisfy particular demands arising from rapidly changing circumstances.

7. Conclusion

The essence of *any* evolutionary process is that survival is a consequence of an interactive relationship between replicators and their environment (which includes other replicators): the environment shapes the characteristics of successful replicators and, in shaping the environment, successful replicators gain greater protection. Mutations (new socio-economic characteristics) are tested within their environment; organisms (socio-economic institutions) with newly endowed characteristics are superior if their capacity for reproduction is enhanced. Within the evolutionary process, individuals' actions both create and are guided by this evolving social order. While no clear boundaries separate biological,

psychological and social adaptation, there are obvious variations in the pace of evolutionary change. In a social context, it is by a process of relatively rapid adaptation that the 'knowledge and intentions of different members of society are supposed to come more and more into agreement' (Hayek, 1937, p. 45).

The value of Hayek's work is that it describes the features of an extensive political economy, with explicit consideration of the psychological limits to human understanding, the role of the market as an information gathering process, and the relationship between market processes and the free society, where moral and political issues are understood within an evolving framework of adaptation. There are no means to determine in advance whether a cultural adaptation (or, indeed, a constructive rational design) is likely to enhance or to jeopardise survival prospects.

Herein lies the argument for liberal social systems where experiment, adaptation and selection have been such that 'practices which had first been adopted for other reasons, or even purely accidentally, were preserved because they enabled the group in which they had arisen to prevail over others' (Hayek, 1973, p. 9). Evolution (biological and cultural) requires diversity. It cannot proceed without mutations, whose impact upon organic function it is impossible to determine beyond the immediate future. A gene rarely acts alone or has a single effect; for example, those that determine sickle cell anaemia give enhanced protection against malaria. Intervention to preclude or to 'repair' the former may obstruct the latter. Similar considerations apply to social institutions whose survival characteristics are likely to be mostly hidden to rational enquiry. For this reason, political liberalism is a necessary means to secure the diversity that is a precondition for evolutionary social adaptation.

While many traits of social intercourse survive without articulated form, they nevertheless 'exist in the sense that they govern action' (Hayek, 1973, p. 76). [rao76]Rules survive and are copied when they achieve the end of allowing individuals to act, knowing the likely consequential interaction with other members of society. So, for example, each part of the legal system becomes ever more closely adapted to all the other parts, in a continuous process of judicial interpretation. The evolution of the common law is guided by abstract ideas of the 'right and proper' [rao69], rather than by particular purposes: 'The power of abstract ideas rests largely on the very fact that they are not consciously held as theories but are treated by most people as self-evident truths which act as tacit presuppositions' (Hayek, 1973, p. 70). [rao] Change inevitably benefits some and disappoints others; so it is necessary to indicate the abstract principles that determine legitimate expectations, that is, those interests that will be afforded protection.

Hayek's analysis of our knowledge of social *mores* and the law is no different from his treatment of knowledge in general; that is, it is obtained through a process of abstraction and classification of broad categories of phenomena. The freedom that is conferred by the application of abstract and universal laws exists only within a spontaneous order; for an order that is shaped to meet predefined goals must compromise the principle of generality in order to meet those goals. Just laws are abstract, general, prospective, known, certain, and equitable; they are beyond time and place and their enforcement involves no coercion for, in

observing them, 'we do not serve another person's end, nor can we properly be said to be subject to his will' (Hayek, 1960, p. 152).

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Queries

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Q1 Edelman (1997) in text but 1987 in References.