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F. A. Hayek, Complexity Pioneer

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ABSTRACT: An early adopter of complexity theory in the social sciences, the Austrian school economist F. A. Hayek consciously strove to construct a grand synthesis, conceiving of society as an information system. I suggest that Hayek's concept of complexity undergirds his promarket stances: it was his belief that because society is a complex information system, interventions which seek to transform the system as a whole inevitably run into insurmountable epistemological obstacles. Focusing mostly upon lesser-known texts dating from the 1950s and 1960s, I present a reading of Hayek concentrating on the role the concept of complexity plays in his work. Hayek viewed social complexity as inherently good and worthy of conservation from attempts to regulate society in various ways. Yet he also supported various forms of government interventionism. I argue that for Hayek complexity holds the key to determining which specific forms of intervention are permissible in Hayek's vision of a classical liberal "Great Society." On first impression, Hayek's idea of complexity seems lopsided toward spontaneous order. However, he considered on multiple occasions the possibility of systemic chaos, unintended consequences of policy, and disequilibrium.

The Austrian school economist F. A. Hayek was an early adopter of complexity theory in the social sciences. One of the most important social theorists of the twentieth century, Hayek consciously attempted to construct a grand synthesis, conceiving of society as an information system. He intended for this vast interdisciplinary effort to ontologically ground the normative claims of liberalism. That being said, I do not wish to imply that Hayek's liberalism preceded his focus upon complexity. Rather, a normative and a descriptive strand run in parallel in Hayek's thought from

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the 1950s onward. Hayek wished to update the classical liberal idea that society on the whole ought to be depoliticized and left to its own devices, but a realistic view of society as an emergent order also underlines the necessity of a liberal political philosophy. I suggest that Hayek's concept of complexity undergirds his promarket and prodecentralization stances: it was his belief that because society is a complex information system, deliberate interventions that seek to transform the system as a whole inevitably run into insurmountable epistemological obstacles.

In this article, I present a reading of Hayek concentrating upon the role complexity plays in his work. For the most part, I focus upon lesser-known texts dating from the 1950s and 1960s. In these writings, Hayek references concepts such as cybernetics, complexity, and self-organization with increasing frequency. He views social complexity as inherently creative and worthy of conservation from attempts to regulate society in various ways. Yet Hayek also supports various forms of government interventionism. Critics claim this indicates a self-contradiction in Hayekian social theory. Pushing back against such views, I argue that for Hayek complexity in fact holds the key to determining *which* specific forms of intervention are permissible within the "extended order" of the liberal Great Society and *when*. Those policies which allow for greater levels of complexity are judged to be more effective, while we ought to avoid ones that oversimplify social issues.

Hayek views complexity in a decidedly positive light, theorizing that societies operating in a decentralized, bottom-up way can spontaneously create more complicated networks and orders than centrally planned social forms. The elements of the former are left relatively unhindered, while elements of the latter are unable to follow their own goals or plans, leading to a simpler social structure displaying less division of labor. Economic liberalism in particular is therefore more desirable than interventionist policies, because it allows greater scope for the emergence of a diverse array of self-organizing orders. This train of thought is particularly apparent in Hayek's main works, *The Constitution of Liberty* and *Law, Legislation and Liberty*.

But what if spontaneity leads to disequilibrium, or even the absence of order? Complexity theories do not presuppose that order is the sole result of self-organizing processes. As a consequence, we must also deal with chaos. On first impression, Hayek's idea of complexity seems lopsided toward order. However, as we shall see,

Hayek also mentions the possibility of systemic chaos, unintended consequences of policy, and disequilibrium on multiple occasions. He acknowledges that complexity is not always a good thing.

HAYEK'S CONCEPT OF COMPLEXITY

In this first section, I present the outlines of a specifically Hayekian theory of complexity. A handful of authors have made steps in the right direction, but this area is still relatively under-researched compared to other themes in Hayek's work.

Antecedents of Hayek's Thought

It is no exaggeration to say that the spontaneous and uncontrollable nature of society represents a constant theme in Hayek's work. As a member of the Austrian school of economics, Hayek placed great emphasis on the concept of society as an unintended, spontaneous order. Already in his 1933 article "The Trend of Economic Thinking," Hayek advances the contention that the most important functions in modern society are conducted through "spontaneous institutions" (Hayek 1933). This reflects the influence of the Austrian school, of which Hayek was a member. Indeed, as Fabio Barbieri indicates, the "central themes of the Complexity Approach (CA) are effectively present in several Austrian theories" which explicitly influenced Hayek's work in economics as early as the 1930s, such as Carl Menger's theory about the spontaneous evolution of money and Eugen von Böhm-Bawerk's idea about the inherent heterogeneity of capital (Barbieri 2013, 51). My goal here, however, is not a reconstruction of Hayek's connection to classical authors of the Austrian school. Rather, I seek to elaborate what a specifically *Hayekian* concept of complexity entails.

One forerunner of complexity theory who immediately springs to mind when one reads of Hayek's "spontaneous order" is Michael Polanyi, who, in addition to sharing Hayek's normative commitment to liberalism, is often credited with having coined the term "spontaneous order."[1] However, even Struan Jacobs,

[1] Polanyi first writes of "spontaneous order" in one of his few economic texts (Polanyi 1948). It is an interesting circumstance that Michael Polanyi first began to write of "spontaneous order" after his visit to a meeting of the liberal Mont Pelerin Society in 1947. Almost certainly Polanyi learned of spontaneity through his conversations with the liberal participants of the meeting; as stated in the text, something similar to this concept was already in circulation within the Austrian school.

the most vehement representative of the hypothesis that Hayek simply borrowed the spontaneous order idea from Polanyi, admits that the two thinkers use the expression in very different ways.[2] Neither philological nor philosophical proofs can be furnished to support the idea that Hayek borrowed "spontaneous order" from Polanyi. In fact, quite the opposite seems to have been the case. Hayek cites Polanyi only sparingly, and he wrote of "spontaneity" before he had ever heard of or met with Polanyi (see Bladel 2005, 19). However interesting Polanyi's philosophy of science and social philosophy is in its own right, Hayek was the first major thinker to use the spontaneous order concept in social science. Indeed, Hayek mentions the expression already in "Kinds of Rationalism," an address given to the London Economics Club in 1936: "It was only through a re-examination of the age-old concept of freedom under the law, the basic conception of traditional liberalism, and of the problems of the philosophy of law which this raises, that I have reached what now seems to me a tolerably clear picture of the nature of the spontaneous order of which liberal economists have so long been talking" (Hayek 2014, 39–57, quote on 50).

The next explicit mention of "spontaneous order" in a social philosophy context occurs in a 1944 article by Otis Lee, a philosopher of minor repute.[3] Lee defines spontaneous order in the following manner: "Order which is imposed from without is repressive and tends to stagnation. But spontaneous order is a release of energy; people order themselves in relation to an activity which calls for a definite pattern and organization. Where there is autonomous, free activity, a natural order is generated, and the result is action that is two-way and mutual, and at the same time effective and disciplined" (Lee 1944, 346). There is little here that Hayek (or Polanyi for that matter) would disagree with. Yet historical inference points to Hayek's ideas on social complexity as having originated from idiosyncratic readings of Scottish Enlightenment moral philosophers such as Adam Smith, Adam Ferguson, and David Hume, as well as of Austrian school economists Menger, Böhm-Bawerk, and Hayek's dissertation adviser, Ludwig

[2] In Polanyi's case, for example, the spontaneous order can be teleological, an assertion which Hayek rejects (Jacobs 2000, 59).

[3] Lee was an American student of process philosopher Alfred North Whitehead whose sudden death at a young age tragically abbreviating a promising career.

von Mises; for there is no proof that Hayek was in contact with Lee or any other members of the (incidentally also politically liberal) Whiteheadian school.

We can also locate another possible source for Hayek's ideas on social complexity in his debate with John Maynard Keynes in the 1930s, which brought to the fore Hayek's skepticism regarding the neoclassical concept of economic "equilibrium." As Hayek maintained in his 1968 paper "Competition as a Discovery Procedure," "equilibrium" is "a somewhat unfortunate term, because such an equilibrium presupposes that the facts have already all been discovered and competition therefore has ceased" (Hayek 2014, 304–14, quote on 308). Peter J. Boettke is correct in identifying Hayek's 1930s work in economics as being the most probable genesis of Hayekian complexity theory (Boettke 2018, 286). Against the Keynesians, Hayek maintained that disequilibrium predominates in economic life and, furthermore, that there are no such things as economic "aggregates" (Hayek 1941, 36–39).[4]

Instead of engaging in further excursions into the history of economics, mapping out references to spontaneous order and complexity in Hayek's works will be far more fruitful. With the help of these citations, the specifically Hayekian concept of social complexity can be reconstructed.

"The Meaning of Competition" (1948)

Hayek's first use of the term "complex" seems to be in a 1948 article entitled "The Meaning of Competition." In essence a continuation of his 1930s feud with neoclassically oriented economists such as Keynes, the text constitutes a thoroughgoing rejection of the idea that "perfect markets" and "perfect competition" are useful to economics *even in theory*, let alone in practice. This may come as something of a surprise to many readers, for Hayek—mainly due to ideologically driven and overly simplistic readings—is often characterized as a dogmatic "free-marketeer" representative of neoclassical economics. As Melinda Cooper, an otherwise unsympathetic commentator on neoliberalism who

[4] Hayek's realization of the inadequacy of neoclassical economics was crucial in his transformation from a standard economist into a broad-ranging interdisciplinary social theorist and social philosopher, concerned with questions of ontology as much as epistemology (Caldwell 1988).

is nonetheless well-versed in Austrian school social theory has pointed out, already from its beginnings the neoliberal Mont Pelerin Society was internally split between economists who affirmed the positivism of neoclassical economics (Milton Friedman and Gary Becker come to mind) and representatives of the Austrian school, such as Hayek, who were antipositivists and antireductionists (Cooper 2011, 374).

In "The Meaning of Competition," Hayek claims that market competition is an epistemological tool, the function of which is making information about prices accessible, while also coordinating expectations relating to supply and demand. He sees market competition, like competition more broadly, as a necessary social institution. The fact that prices communicate information about supply and demand does not mean, however, that competition can, or even ought to, be "perfect." Hayek calls the competitive selection process a "voyage of exploration," employing a colonial metaphor which also brings to mind the uncertainty and liquidity of the ocean (Hayek 2014, 105–19, quote on 112). As with a voyage traversing unknown waters, he points out, we cannot determine the final outcome of the competitive process, which players will survive, or what information will prove most relevant in the end.[5] Market participants only know the prices of goods in the past and present, while the future remains the object of speculation. To make matters even more complicated, as the economist Ludwig M. Lachmann (a student of Hayek's) explains,

> the generic concept of capital without which economists cannot do their work has no measurable counterpart among material objects; it reflects the entrepreneurial appraisal of such objects. Beer barrels and blast furnaces, harbor installations and hotel room furniture are capital not by virtue of their physical properties but by virtue of their economic functions. Something is capital because the market, the consensus of entrepreneurial minds, regards it as capable of yielding an income. [But] the stock of capital used by society does not present a picture of chaos. Its arrangement is not arbitrary. There is some order to it. (Lachmann 1978, xv)

[5] This calls to mind the "information ocean" metaphor. As László Z. Karvalics explains, the "information ocean is a very diverse, grateful metaphor. Along with infinity, it also reflects the impossibility of being travelled, as its majority always remains hidden. . . . [F]or important information, we must undertake expeditions, and brave the open seas. We may also find the image of the ocean behind the two emblematic areas of the World Wide Web: the surface Web, easily reached by search engines, and the huge deep web, hard to explore and to navigate" (Karvalics 2017, 353).

For Hayek, the challenge, then, is to discover *how* order originates from limited knowledge. Aware only of the prices of objects selected for their appraised economic value (i.e., things with economic value), market players adjust their behavior to each other's expectations in a spontaneous way. Market competition originates from the need to adapt to the uncertainty of an unknown future (Hayek 2014, 113). The economy, defined here as the self-moving aggregate of individual transactions, can "identify" nothing from its environment apart from prices. As Hayek sees it, the human subject is inherently exposed to the vicissitudes of the open future, as well as to the vulnerable finitude of the human mind. Possessing knowledge relating to the future is a manifest impossibility. The best we can do is try to adjust our expectations in the present to the *possible* behavior of others. As a consequence of our human finitude, our individual knowledge relating even to present conditions is always incomplete. Still, market transactions occur, and competition proceeds. To Hayek, it is precisely the limited nature of individuals' knowledge which necessitates the spontaneous institution of market processes, which serve to integrate disparate knowledge:

> The confusion between the objective facts of the situation and the character of the human responses to it tends to conceal from us the important fact that competition is the more important the more complex or "imperfect" are the objective conditions in which it has to operate. Indeed, far from competition being beneficial only when it is "perfect," I am inclined to argue that the need for competition is nowhere greater than in fields in which the nature of the commodities or services makes it impossible that it ever should create a perfect market in the theoretical sense. (114)

Hayek holds that we would be severely mistaken to expect perfect equilibrium from a perfectly competitive market. Such concepts are nothing more than theoretical or ideological constructs. It is precisely the imperfection of human knowledge which makes us reliant upon collective structures such as market processes. Some competition is still qualitatively—that is, far—more desirable than the exclusion of competition altogether. Hayek sees the market as at once an adaptation to the irreducible complexity of reality in general and itself a way of reducing the complexity of economic decision-making. There is no such thing as "capital" or "commodities" in the abstract. Rather, heterogeneity characterizes both capital stock and the set of commodities which make up the economy. Through spontaneously aggregating prices, the market

collects knowledge in a way that no individual market participants (not even quasi-monopolies!) can, Hayek posits.

From the viewpoint of complexity theory, the most important observation is found at the very end of the text. Hayek emphasizes that the market is "a process which involves a continuous change in the data," the significance of which is "completely missed by any theory which treats these data as constant" (116). Despite its brevity, this conclusion is highly significant: there is no permanent, unchanging difference between information and noninformation. Hayek here is not only talking about how economic inputs and outputs are continuously changing—this in itself is fairly evident to any student of social phenomena—but also asserting that *the very circumstance of something becoming an economically relevant data point is also unpredictable*. As Stefano Fiori points out, for Hayek data in general are in a state of "continuous flow" (Fiori 2009, 274). In other words, what constitutes an economic fact is also relative and constantly shifting. Purely quantitative or formalized models are necessarily incompetent when it comes to the description of society and information. By the time we learn to quantify economically relevant facts, the consensus regarding what is a source of economic value will already have undergone a qualitative shift.

"Degrees of Explanation" (1955)

The impermanence of data is a fundamentally important insight that recurs throughout Hayek's works: solely quantitative or, worse, monocausal deterministic models do not have anything useful to say about complexity. Hayek's 1955 paper "Degrees of Explanation" represents a milestone in the evolution of the Austrian economist's thinking on complexity. Here Hayek claims in essence that social processes are inherently unpredictable. Following the lead of his colleague Karl Popper, Hayek proposes a form of falsificationism: Science does not explain the hitherto unknown through mobilizing facts; rather, the temporary absence of refutations lends us necessarily transitive knowledge about certain circumstances in our environment. Our knowledge can never extend to reality as a whole, for the latter is infinitely more complex than the human nervous system or, for that matter, any sentient system of intelligence. Differently put, there is a hard limit to human knowledge. The infinite nature of our open world implies an infinity of relations among elements which can never be entirely known.

We could, of course, say that Hayek was naïve and lived long before the advent of data science. However, Hayek had already made clear in his *The Sensory Order* (1952) that intelligence is always less complex than its environment: "Any apparatus of classification must possess a structure of a higher degree of complexity than is possessed by the objects which it classifies" (Hayek 1952, 185). Of course, the issue is that an organic mind is never as complex as the entirety of its environment. As Hayek makes clear, "an apparatus capable of building within itself models of different constellations of elements must be more complex . . . than any particular constellation of such elements of which it can form a model" (188). In Chor-yung Cheung's summarization, according to the Hayekian view of cognition as presented in *The Sensory Order*, "No explaining agent can ever explain objects of its own kind, or of its own degree of complexity," let alone entities of a higher complexity (Cheung 2011, 223). This is an axiomatic statement which has nothing to do with the state of technology at any given point in time. Epistemic finitude is a feature and not a bug of *all* sentient systems. We are condemned to imperfect knowledge. "Degrees of Explanation" is an elaboration upon this theme. As Alexander Schaefer highlights, "Hayek's characterization of complexity" in this 1955 text "mirrors contemporary characterizations of complexity" (Schaefer 2019, 79). On this reading, complexity would mean a network structure with a large number of elements, replete with nonlinear feedback mechanisms among these individual elements, that also displays emergent properties and path dependence. Key to this view of complexity is the unpredictability such systems generate.

Hayek distinguishes between simple (i.e., deterministic) and complex (i.e., indeterministic) systems. In the case of simple systems, we can make fairly certain predictions about their outcomes. However, "where the number of significantly interdependent variables is very large and only some of them can in practice be individually observed," things are very different, and "there may be no possibility of getting beyond" our epistemic quandary "by means of observation" or "systematic testing" (Hayek 2014, 195–213, quote on 200). In conformity with this distinction, Hayek also distinguishes between positive and negative predictions. The former can be used for simple, closed systems, showing information about what the outcome will be. The latter, however, applicable to complex, open systems, only tell us what not to expect. According to Hayek's rather radical ontological claim, biological and social

systems are indeterministic, open, and complex, and therefore we may only apply negative predictions to their behavior.[6]

Those who study complex systems, according to Hayek, "are unable to ascertain by observation the presence and specific arrangement of the multiplicity of factors which form the starting point of our deductive reasoning," hence instead of causal explanations, social scientists are restricted to "explanations of principle" (202–3). Hayek rules out even the possibility of quantification when it comes to social science, since social processes are characterized by radical instability (206). Hayek here represents a radical example of complexity thinking, claiming that neither society nor the economy is suited to a quantified or formalized treatment, because mathematizable "constants" simply do not exist (207)![7] He believes that society exhibits "radical uncertainty" (Lewis and Lewin 2015, 10) and finds that the permanence of change in social life implies the impossibility of quantification. There simply is nothing there for the social scientist or economist to measure. Social processes cannot be isolated or reduced to constants; therefore, quantified and datafied social science is just bad science.

As Frédérique Chaumont-Chancelier notes, Hayek is both an "anti-reductionist" and a "non-holist" when it comes to the study of social life (Chaumont-Chancelier 1999, 547–8). For Hayek, the correct social theory would be one which rejects empiricist, quantified modes of inquiry. To him, the mathematization of the social sciences constitutes a fundamentally illegitimate extension

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[6] Hayek's broader ambition was the elaboration of a systems theory along the lines of that of Austrian cybernetic theoretician Ludwig von Bertalanffy. The latter is cited extensively in *The Sensory Order* and exerted an important influence upon Hayek's work (Lewis 2016).

[7] Karl Popper, a philosophical ally of Hayek, later expresses a similar insight regarding supposed social "laws": When investigating social phenomena,

> we are faced with a twofold complexity—a complexity arising out of the impossibility of artificial isolation, and a complexity due to the fact that social life is a natural phenomenon that presupposes the mental life of individuals, i.e. psychology, which in its turn presupposes biology, which again presupposes chemistry and physics. The fact that sociology comes last in this hierarchy of sciences plainly shows us the tremendous complexity of the factors involved in social life. Even if there were immutable sociological uniformities, like the uniformities in the field of physics, we might very well be unable to find them, owing to this twofold complexity. But if we cannot find them, then there is little point in maintaining that they nevertheless exist. (Popper 1961, 12)

of the methodology of the natural sciences to areas where such modes of knowledge are doomed to fail. In the case of complex systems, we are restricted to "cultivation" instead of control: "Such activities in which we are guided by a knowledge merely of the principle of the thing should perhaps better be described by the term *cultivation* than by the familiar term 'control'—cultivation in the sense in which the farmer or gardener cultivates his plants, where he knows and can control only some of the determining circumstances, and in which the wise legislator or statesman will probably attempt to cultivate rather than to control the forces of the social process" (Hayek 1955, 210).

For Hayek, society is not a laboratory, the internal conditions of which we can control at will. Neither can social complexity be reduced to a set of deterministic relationships observed among isolated individual specimens. Indeed, Chaumont-Chancelier is also correct in observing that Hayek denies the existence of atomistic individuals separable from their sociocultural contexts (Chaumont-Chancelier 1999, 543). For Hayek, we are constituted by the social rules and traditions we follow (Galeotti 1987). This is a peculiar form of liberalism, one that sees human beings as inseparable from the institutional frameworks in which they exist as social animals. Hayek finds that the social scientist, despite the "veil of complexity" (Robert Axtell's expression, Axtell 2016, 97) restricting our knowledge of particulars, can nonetheless obtain knowledge about society through certain forms of experimentation aimed at gaining insight into principles.[8] More simply, his view is that social science ought to be a bottom-up discipline which strives to cultivate new social processes and experimentation, observing how these turn out instead of fruitlessly searching for deterministic social laws. For Hayek, sound social science avoids the pitfalls of one-size-fits-all scientism by avoiding the completely unwarranted quantification of qualitative phenomena. He asserts that it is far more fruitful for us to know what not to expect from certain social phenomena (negative predictions) than to know in advance the precise effects of social

[8] Indeed, complexity researchers Joshua M. Epstein and Robert Axtell have conducted computational agent–based experiments in the spirit of Hayek's cultivational paradigm (Epstein and Axtell 1996). Elsewhere Axtell explicitly connects their 1990s minisociety simulations to Hayek's "Degrees of Explanation" (see Axtell 2016, 96).

phenomena or, even worse, to conceitedly imagine that we have uncovered supposed social "laws."

COMPLEX PHENOMENA KNOW NO LAWS

Although no consensus regarding the definition of complexity presently exists, complex systems are generally characterized by emergence (a whole cannot be explained via the parts alone), indeterminism, hierarchical organization, self-organization, feedback, and novelty (Byrne and Callaghan 2022, 161; Holland 1998).

One of Hayek's most important writings on complexity is "The Theory of Complex Phenomena" (1964). Here Hayek begins his analysis with an observation on perception, pointing out that pattern recognition is a fundamental characteristic of human perception. Our minds are always spontaneously constructing patterns from various data located in our environment, helping orient us in a terrain full of both dangers and opportunities. Indeed, as Paul Lewis points out, "For Hayek social rules can—quite literally—become physically embodied in people's brains" (Lewis 2015a, 135). Hayek notes that the mind, like the market, is a self-organizing emergent order, built from perceived patterns extracted from the environment and integrated into and modelled by neural networks in the brain. This does not mean, however, that all perceived patterns are actually present: there is no simple translatability between perception and objective reality (Hayek 2014, 257–78, esp. 259). Psychology has since invented a name for the human projection of anthropomorphic meanings onto random features of the environment: *pareidolia*. Hayek claims that the same illusion, stemming from the selective nature of human perception, can also pertain in the case of perceived social phenomena. The perception of a pattern by no means implies that anything is really there; therefore, empirically grounded prediction of concrete outcomes in the case of complex phenomena is basically impossible (260). As Schaefer elaborates, "Tracing out the long-term effect of particular changes is impossible. Unlike simple problems, the landscape resulting from a complex problem is constantly shifting—as we change the values of certain variables in order to approach an optimum, this change in variables impacts other variables both by altering the values they may take and by altering the contribution to service characteristics that these variables make. In the terminology of complexity theory, the result is a 'dancing landscape'" (Schaefer 2019, 85).

Variables and constants alike, in the case of complex phenomena, are in a state of perpetual flux. Hayek seeks to integrate various disciplines into his own work, citing cybernetics and the concept of "emergence" in particular as being seminal influences on his own insights. For our purposes, the reference to emergence is of particular interest. In the 1964 essay, Hayek ventures the following insight regarding the relationship between scale and quality: "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 (as described, e.g., by an algebraic equation) is preserved" (Hayek 2014, 261–62).

In Axtell's interpretation, Hayek is here prefiguring the insights of a fellow Nobelist, the physicist Philip Anderson, who later demonstrated that "a wide array of physical phenomena have the property that as their scale is changed (typically increased), the qualitative character of the phenomena that can be produced can also change" (Axtell 2016, 88). Hayek is not saying that a pattern always persists or that a pattern is always there to be found, but rather that a change in size can lead to often-unpredictable shifts in qualities—to quote the title of Anderson's most widely cited article, "More Is Different" (Anderson 1972). Emergence may be productively defined as when an entity has novel characteristics which differ from those of its components.[9] Simplistically, an

[9] Hayek references Lloyd Morgan's *The Emergence of Novelty* as one of the first systematic treatments of the concept of emergence. We may also refer here to the related idea of open systems, which Hayek also emphasizes (Hayek 1964, 262; see also Morgan 1933). While Hayek omits any mention of him, it is almost certain that Morgan was influenced by the Jewish Australian-born British process philosopher Samuel Alexander, who is credited with coining the term "emergence." As Mihály Héder and Dániel Paksi explain,

> Emergentism did not become a real independent philosophical tradition even after [Samuel] Alexander because, firstly, it was swept away by the rising power of positivism and materialism. Secondly, none of Alexander's most important followers could acknowledge his starting point: reality in its deepest fundaments is *space* and *time*; therefore, even matter itself is an emergent aspect of reality. Both Lloyd Morgan and C. D. Broad started emergence by the *chemical* level based on the fundamental material level, while Alexander himself did not even claim that the chemical level is emergent . . ., he instead focused on life and mind, based on the fundamental level of space and time. The main emergent levels are the following, according to Alexander: *matter*,

emergent order is a system which is more than the sum of its parts. We can also add that the elements of both complex and emergent systems are systematically connected (Chaumont-Chancelier 1999, 548). This by no means implies that we are in an epistemological position to classify or identify all relevant differences between complex and hypercomplex systems. Indeed, the radicalness of Hayek's text lies in its denial of such a possibility. Hayek goes so far as to deny that "partition boundaries" can be constructed in open and complex systems (Hayek 2014, 262)! In the face of dynamically emergent phenomena, especially ones which display exponential and/or parabolic tendencies, drawing boundaries or even distinguishing between knowledge and nonknowledge becomes an impossible task.[10]

Open systems are, by definition, unbounded, and we cannot infer their emergence from a set of prior circumstances. Deterministic relationships can be observed only in the case of relatively simple, closed systems. If we think about society in quantitative terms, we run the risk of oversimplifying our thinking about it. Hayek points out that hypotheses about complex phenomena are less falsifiable than in the case of simple phenomena (Hayek 2014, 264). Because of the veil of complexity, he asserts, we are not really in a position to judge the optimality of products resulting from complex processes, let alone the processes themselves. This insight is highly counterintuitive indeed. Why would we deny that we can evaluate social outcomes in the case of, say, something fairly simple and quantifiable? Surely certain measures can be invented which make statistical comparisons possible. Social scientists regularly evaluate

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> *life*, and *mind*. So in a sense, space and time are reality itself, the dynamic nature of reality comes from the nature of time, and even space and time are in an emergent relationship with each other. (Héder and Paksi 2022, 180)

[10] Among many examples, we may cite the rapidly evolving COVID-19 global pandemic, which led to severe governance failures in many affected countries. Because of both the sheer number of factors involved and the inscrutably hybrid nature of the phenomenon, there was simply no way of determining what was the correct or incorrect policy response—not even in retrospect, let alone during the most active phases of the pandemic (Pennington 2021). Predictably (from a Hayekian perspective, that is!), predictive models utterly failed during the COVID-19 pandemic (see Heneghan and Jefferson 2022; Ioannidis, Cripps, and Tanner 2022). Hayekian knowledge problems also came to the fore when the issue of designating "essential" versus "nonessential" sectors arose during lockdowns (Storr et al. 2021). For a broader Hayek-inspired treatment of bioethical issues relating to public health governance, see Pennington (2023).

and compare countries based on various metrics such as "competitiveness," "human development," or "happiness indices."

But the proponents of a statistical approach can already be rebutted by Hayek at a scale much smaller than whole countries. For example, the Dvorak Simplified Keyboard (DSK) is deemed objectively "better" than the standard QWERTY keyboard because it has been statistically proven through speed-typing competitions that typing with the DSK is faster. From the fact that the QWERTY keyboard predominates, economist Paul A. David famously argued that path-dependent suboptimal equilibria are actually a common feature of economic life (David 1985). The market seems to make suboptimal outcomes possible, and is apparently incapable of weeding out technological lock-in phenomena such as the dominance of the "inferior" QWERTY keyboard. Does this invalidate the position of promarket thinkers such as Hayek?

Hayek's answer is disarmingly simple, yet also provocatively radical: when it comes to complexity, statistics prove nothing. As Hayek explains, "Statistics . . . deals with the problem of large numbers essentially by eliminating complexity and deliberately treating the individual elements which it counts as if they were not systematically connected" (Hayek 2014, 265). Furthermore, "the relative position of the different elements in a structure may matter" in ways a simplified statistical treatment cannot capture. Hayek here is saying two things which are interrelated: (1) the many elements composing complex systems are difficult, if not impossible, to separate from one another (being, as they are, "systematically connected"); and (2) a purely statistical view remains necessarily insensitive to qualitative differences originating from structural changes.

Regarding the QWERTY versus DSK keyboard example, Barbieri stresses that, on a Hayekian view, we cannot declare that the former is less optimal than the latter purely on the basis of a statistical test (Barbieri 2013, 66–67). The speed-typing competitions extract just one variable (number of characters typed) from among a multitude of factors. Statistics can tell us the answer to "How much?" but not what we ought to be measuring and comparing in the first place. How do we know that this measure is the deciding factor when it comes to the optimality of the technology in question? David's example proves or disproves absolutely nothing about the relative merits or demerits of various uses of the two keyboard formats,

let alone about something as complex as the whole technological system, the market, or any other social institution. Even though the DSK format is faster than QWERTY, optimality is irreducible to a single variable.

According to Hayek, when it comes to the study of complex wholes, "we can hardly ever ascertain all the facts which will contribute to determine the outcome" (Hayek 2014, 269). Reductivist explanations or statistical reductions contribute nothing to our understanding of society. Hayek's idea of complexity constitutes an insurmountable (i.e., a *hard* epistemological) boundary. The best we can do is make negative predictions pertaining to possible outcomes: there is zero probability that government interventions will yield only those results intended by decision-makers.[11] Social scientists, he states, cannot predict the trajectory of a society, but they can at least know what cannot be expected. The "empirical content" of a proper sociological theory "consists in what it forbids" (267). In social life, there are no simple regularities; similarly, economic statistics are mere abstractions, which, while useful for building models, do not tell us much about complex phenomena. Here Hayek repeats his view that economic aggregates do not exist outside of the economist's mind (270–71); as observers of social processes, we must be very careful when attributing patterns to society.

Hayek conceives of social evolution as the more or less unconscious selection of rules and orders. Gerald F. Gaus is correct in emphasizing that, in the Hayekian model of cultural group selection, the unit of selection is not the individual, but rather "systems of cooperation—arising out of systems of rules" (Gaus 2006, 241). Lewis is entirely correct in emphasizing how Hayek goes beyond garden-variety "methodological individualism."

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[11] For example, following Hayek's train of thought, one could state as an axiom that while government interventions can sometimes hit specific targets, on the whole the consequences of these decisions are bound to outstrip the original intentions of decision-makers. This of course applies to all bureaucratic organizations. To cite one concrete example among many, the abandonment of coal-fired and nuclear-powered energy use in one country can increase CO_2 emissions in neighboring countries and regions, as well as lead to higher energy prices for consumers (Farsaei et al. 2020). In the case analyzed by the paper, a specific government intervention in the Finnish energy market did succeed in reducing emissions, but on a broader view it led to deleterious longer-term consequences for the wider Baltic region.

The hypothesis of cultural group selection and the rejection of atomistic individuals together present a far-from-conventional type of individualism, one in which the individual is embedded within a broader social context and in which collective institutions also behave as individual units of evolutionary selection (Lewis 2015a, 128–29).[12] On Hayek's view, the general structure of society[13] is mostly the result of the autonomous evolution of rules from usually unconscious patterns of individual human behavior.

There is limited space for individual or collective revision of rules in the Hayekian model (Lewis 2015b, 1186). In a 1967 paper, "The Results of Human Action but Not of Human Design," Hayek writes that the social order as a whole, however, is the unintended consequence of countless individual choices or interactions (Hayek 2014, 293–304).[14] Comparing the evolution of social orders to the emergence of new animal species, Hayek holds that we cannot engage in positive predictions about the final outcomes of such processes (Hayek 2014, 267). More seriously, the Austrian economist also claims that complex phenomena are not governed by any predetermined, static, or constant laws (276–77). This statement is in line with Hayek's observations, cited above, regarding the unquantifiability and inseparability of individual elements.

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[12] In the view of process philosophy, there is no such thing as an isolated fact. If we say, following Whitehead, that "no fact is merely itself" (Whitehead 1938, 13), then this also applies to human individuals embedded within a social context. Indeed, for Hayek, not only are humans enmeshed with their social environments, but they themselves are always already constituted by explicit and implicit social rules. One could even go so far as to declare that Hayek succeeded in "extending the intentional stance" to macro-level entities, definitively breaking with dogmatic individualism (Denis 2014).

[13] Even the human mind is no exception. As Lewis highlights, in *The Sensory Order* Hayek advocates for the social plasticity of human perception: "The structure of neurons found in people's brains is the material embodiment of a set of rules governing perception, along with all the other activities of our minds and much of human action" (Lewis 2015b, 1182). Here, for reasons of brevity, I must pass over a reconstruction of Hayek's philosophy of mind, a fascinating research topic that is thankfully now in the process of being rediscovered.

[14] This is a reference to the eighteenth-century Scottish Enlightenment philosopher Adam Ferguson's famous sentence: "Every step and every movement of the multitude, even in what are termed enlightened ages, are made with equal blindness to the future; and nations stumble upon establishments, which are indeed the result of human action, but not the execution of any human design" (Ferguson 1995, 119).

However radical the above assertions may seem, over half a century since the publication of "The Theory of Complex Phenomena," sociology has failed come up with a single proven, lawlike regularity. There simply is no such thing as a social "law." The only workable solution seems to be for the social sciences to accept their own epistemic boundedness, reducing and localizing the scope of their concepts while practicing abstinence when it comes to the (ab)use of general, universal concepts (see Kittel 2006). Hayek is an indeterminist, and for good reason. If by "law" we understand the causal relationship between two clearly separable phenomena, then complex phenomena, where neither separability nor quantifiability hold, do not obey any kind of law whatsoever (Hayek 2014, 277). Complexity cannot be subordinated to any law and is impervious to all forms of reductionist explanation. Society is necessarily more complex than any observation of society. Because complex processes are emergent phenomena, irreducible to their circumstances, the very phrase "sociology of knowledge" is an oxymoron lacking any content, a pretense of knowledge rather than the real thing (Hayek 1952, 192–93).

THE CONCEPT OF COMPLEXITY IN HAYEK'S MAIN WORKS

In light of these writings, it should come as no surprise that the idea of complexity plays a huge role in Hayek's systematic works, *The Constitution of Liberty* (1960) and *Law, Legislation and Liberty* (1973–9). Many critics of Hayek have claimed that there is an underlying tension in the Hayekian project. On the one hand, he rejects political interventionism as potentially ruinous of the spontaneous order. On the other hand, though, Hayek also advocates for liberal interventions in society. Indeed, the third and final volume of *Law, Legislation and Liberty* contains proposals in favor of far-reaching reforms of the way society operates. Because the spontaneous order necessitates legislative action both to institute it and to maintain it in the face of endogenous and exogenous threats, Richard Bellamy, an interventionist, claims that Hayek simply cannot avoid some form of political "constructivism" (Bellamy 1994, 431). Similarly, Jeremy Shearmur, an author on the anti-interventionist end of the spectrum, maintains that "Hayek's own constitutional suggestions seem to me still to give too much scope to government for voice [individual political action] to be effective," making Hayek a nonlibertarian (Shearmur 1996, 209).

The Constitution of Liberty (1960)

An important point, one widely recognized by contemporary complexity theorists, is that "public agencies are not naturally disposed towards the interdisciplinarity and complexity posed" by complex systems (Kirsop-Taylor and Hejnowicz 2020, 3). How may we resolve the apparent tension between Hayek's advocacy for both limited government and extensive government action? Where is the dividing line separating the Hayekian more-than-minimal government from government overreach? In response to critics, Schaefer claims that it is precisely Hayek's theory of complexity which serves as "the logical foundation of Hayek's views on intervention" (Schaefer 2019, 70). In this section, I seek to shed light on the role complexity plays in the Hayekian political philosophy, in particular on how this concept serves to legitimate certain forms of government intervention while disqualifying others. By the end of this investigation, I hope to have shown that Hayek's position is in fact consistent and does not depend on fruitless examinations of where exactly a "minimal" form of government ends and a "more-than-minimal" form begins.

As outlined above, epistemic boundedness is for Hayek a constant of human nature. No mind can ever attain the level of complexity of its environment. As Hayek observes in *The Sensory Order*, "what we call 'mind' is . . . a particular order of a set of events taking place in some organism and in some manner related to but not identical with, the physical order of events in the environment" (Hayek 1952, 16). Such modelling is only ever partially reflective of the ecology of the organism. Hayek finds that the increase in scientific knowledge, far from helping alleviate this fundamental circumstance, actually deepens our plight. With the modern specialization of the sciences, individuals actually grow ever less capable of processing the stock of knowledge stored in human civilization as a whole. In a relative sense, we are less knowledgeable than our predecessors: "While the growth of our knowledge of nature constantly discloses new realms of ignorance, the increasing complexity of the civilization which this knowledge enables us to build presents new obstacles to the intellectual comprehension of the world around us. The more men know, the smaller the share of all that knowledge becomes that any one mind can absorb" (Hayek 1960, 78).

The growth of collective knowledge paradoxically makes individuals *more* underinformed and, worse, vulnerably dependent

upon science communicators who have their own ideological agendas. Of course, we do not have to know the exact chemical properties of sea urchins or the gravitational forces at work on distant gas planets, but modern specialization, especially since the twentieth century, does seem to have made the polymaths of old antiquated. The complexity of our society has exceeded the stage whereby we can achieve a holistic view of the whole. Instead, human knowledge is "dispersed" and we are reliant upon "information-gathering institutions such as the market," which "enable us to use such dispersed and unsurveyable knowledge to form super-individual patterns" (Hayek 1992, 15–16). No Archimedean perspective exists; not even the sociologist or the economist can observe society in the aggregate. The extended global order in which we live is, on the whole, the unintended consequence of infinite interactions, even before taking into account literally endless variations of nonhuman factors and externalities.

"The emergence of order," writes Hayek, is "the result of adaptive evolution" (Hayek 1960, 115). He holds that a good society is one which guarantees freedom to individual agents, while also preserving both the integrity and flexibility of the systems of rules governing the actions of the elements which make up the spontaneous order. Decentralization is required, but not because of moral abstractions such as human rights. Shearmur is correct in describing Hayek as a "system utilitarian" (Shearmur 1996, 57). Hayek posits that a desirable social order promotes the smooth functioning of the complex extended order of society. Ideally, this coincides with the interests of human individuals, but this need not always be the case. Decentralized societies are more desirable for Hayek than centralized societies because they result in larger and more creative social forms. Complexity is not just a descriptive element in Hayek's thinking, but also a normative category. Insofar as we, following Hayek, describe society as a self-organizing spontaneous order—that is, the unintended and mostly involuntary product of evolution—we may exclude forms of interventionism which presuppose the ability of humans to consciously change the whole structure of their society.[15] As Hayek makes clear, "we have never

[15] Of course, identifying precisely which forms of interventionism promote the growth of spontaneity in society is no simple task. Occasionally, well-intended deregulation can paradoxically result in an increase in bureaucracy (Størkersen et al. 2020). There are no easy answers to the problem of governing spontaneity.

been able to choose our morals"; that is, the collective evolution of social rules is autonomous of human agency (Hayek 1992, 133).

There is no possibility for *purposive* collective action in the Hayekian framework. Holistic rationalism is for Hayek an epistemically impossible position, for the mind itself is in large part the product of cultural evolution, emerging via the interiorization of social rules. The very reason we follow rules without always questioning them stems from the human need to reduce cognitive complexity: "The reliance on abstract rules is a device we have learned to use because our reason is insufficient to master the full detail of complex reality" (Hayek 1960, 127). Calvin M. Hoy is entirely correct in stating that Hayek never discusses "ideas of resistance, rebellion or revolution," but that the reason for this does not lie in some kind of inveterate conservatism or uncritical traditionalism (Hoy 1984, 123). Rather, the key concern of Hayekian social theory is to show how the complexity of society places limits on individual and collective action. Hayek theorizes that without an extended order which is autonomous, even independent of its components, the latter would never have come into existence, nor could they persist. Rule following, by unburdening us of the constant need to exercise our reflexive capabilities, makes possible both conformity and innovation. Without the ability to restrict its thought processes, the human mind would be swiftly overwhelmed by the unprocessable complexity of its environment.

One of the most important insights of Hayek's social theory is his questioning of the value of reflexivity. The possibility of reflexive entanglement is today widely recognized, denoting a situation in which agents and organizations are unable to act because of their excessive reflexivity (Huber 2018, 7).[16] Similarly, when one thinks for too long about a future action, one risks becoming unable to successfully execute the action. Today it is far from evident that reflexivity would actually solve large-scale social problems.[17]

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[16] The Hayekian knowledge problem can, of course, also exist within privately owned companies. In itself, private ownership is not enough to fully decentralize decision-making. The latter must also be delegated in an efficient manner. Hayek was almost certainly too optimistic in believing that a free market is capable of overcoming the knowledge problem.

[17] Critics of Hayek such as Hilary Wainwright claim that greater societal reflexivity, to be achieved through consciousness raising (or, less charitably, indoctrination), can transcend the epistemological limits posited by Hayekian social theory (see

When agents follow rules unreflexively, they free themselves from reflexivity constraints. We are not forced to exercise self-critique every time we cross the road, and similarly we do not have to question the philosophical bases of private or commercial law every time we sign a rental contract. It is also of great interest that Hayek views social complexity on the whole as a positive civilizational achievement.

One of the few exceptions he notes, somewhat surprisingly, is the welfare state. "The extreme complexity and consequent incomprehensibility of the social security systems" can create serious headaches for society, resulting in a variety of unintended distortions, dysfunctions, and unexpected economic feedbacks (Hayek 1960, 411).[18] Already in the context of *The Constitution of Liberty*, we may see that certain social constructs can indeed generate negative forms of self-organization. Alongside spontaneous order, chaos is also a possibility.[19] Complexity can be undesirable. Most of the negative forms of complexity Hayek mentions are connected in some way with large-scale social interventions. There is unfortunately some truth to Jerry Z. Muller's assertion that Hayek devoted far too little space to market failures or the negative externalities of the economy (Muller 2007, 204).

Wainwright 1994). Against Wainwright's optimism, Chris Matthew Sciabarra maintains that Hayek would most probably answer in the following manner: "Greater self-knowledge would not eliminate unintended social consequences. In Hayek's view, such consequences are so intimately bound up with sociality, that they are constitutive of its very meaning" (Sciabarra 1995, 115). Even perfect knowledge and complete self-transparency, supposing such things were possible, would not automatically imply unlimited agency.

[18] Regarding the complexity problems raised by the welfare state, see Harris's study on the unintended complexity of the British social welfare system (Harris 2013). An interesting example elsewhere highlights the possible unintended and unethical consequences of animal conservation (see Learmonth 2020, 1–14).

[19] Following Lewis, we may call this possibility—one recognized by later Austrian school economists—"discoordination": "The tendency to discoordination produced by creative human agency may even outweigh the capacity of the liberal market economy to bring plans more closely into conformity with each other so that the operation of the market process leads to less, not more, plan coordination" (Lewis 2015b, 21–22). Of course, one could respond by emphasizing that the agency of individual actors, however chaotic it can be, still pales in comparison with the social damage caused by the unintended consequences of deliberate state policy. An epistemic problem is distinguishing between spontaneous individual actions and those actions resulting from compelled adjustment to erroneous government policies.

As a liberal, Hayek was strongly opposed to various forms of both right—and left-wing economic interventionism, which were widely popular until the stagflationary crises of the 1970s. Hayek's skepticism was directed primarily at the problematic aspects of expert rule, scientism, and government interventionism. He deemed technocracy especially dangerous because it applies an engineering mindset to the whole of society, an approach that works in the case of relatively closed, small-scale systems, but is doomed to failure when implemented in a global, one-size-fits-all manner (Hayek 1960, 412). To Hayek, an authentically liberal politics would be based on the recognition of the irreducible complexity of social processes. In this regard, he brooks no compromises: systematic government interventionism is incompatible with a liberal social order. As Schaefer emphasizes, this by no means entails a rejection of all forms of government interference, only those which result in laws not in conformity with the liberal principles of "generality, equality, and certainty" (Schaefer 2019, 93).

For Hayek, the rule of law means that laws are valid for all individuals, without discrimination, while also being neutral. Above a certain size, "the very complexity" of certain tasks "requires a technique of co-ordination which does not rely on the conscious mastery and control of the parts by a directing authority but is guided by an impersonal mechanism" (Hayek 1960, 413). The unavoidability of complexity means that we must rely upon abstract, neutral rules instead of discretionary or discriminatory practices. To summarize his position, "aiming at particular outcomes, as expediency dictates, would yield policies and rules incompatible with the requirements and limitations presented by complex systems" (Schaefer 2019, 96). The aggregation of social knowledge is an example of a "complex" problem, one which no single organization or institution can manage. All Hayek is saying is that certain forms of complexity (which I choose to call "hard complexity") cannot be handled by any deliberate intervention and are unamenable to quantitative treatment.[20] He holds that the

[20] Stefano Fiori finds a distinction between quantitative and "logical-relational" views of complexity within Hayek's work (Fiori 2009, 269). This use of words is in my view slightly misleading. Hard complexity is qualitative, indicating the character of an order, whereas soft complexity is amenable to statistical melioration or improvement. Hence, the terms "qualitative" and "quantitative" would be far more enlightening.

best we can do is rely upon decentralized information-processing institutions, such as the market or judge-made law, but that there is absolutely no guarantee that these will be successful (Hayek 1960, 477).[21] Sometimes, government action may be needed.

Law, Legislation and Liberty (1973–79)

Commentators such as Timothy Sandefur, who accuses Hayek of lacking any concept of social reform, utterly miss the mark (Sandefur 2009, 19–20). It is not a question of intervention versus the absolute absence of government action; rather, the question is whether a given form of government action is compatible with the functioning of the complex social order. As Hayek will go on to explain in his magnum opus, *Law, Legislation and Liberty*, rules may certainly be changed, but only "in a manner appropriate to the function which the whole system of rules serves" (Hayek 1973, 116). When deciding whether to intervene, a liberal government must always remain attentive to the ways in which a certain legislative change will impact the spontaneous order. Hayek emphasizes once more at the commencement of the book the limited nature of human knowledge: "Neither science nor any known technique enables us to overcome the fact that no mind, and therefore also no deliberately directed action, can take account of all the particular facts which are known to some men but not as a whole to any particular person" (16). The complexity of reality[22] is a constant and unavoidable ontological circumstance.

In a very enlightening passage, Hayek stresses in no uncertain terms the link between liberalism and complexity: "Because our intellect is not capable of grasping reality in all its complexity . . .

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[21] It must be emphasized, though, in opposition to the charge of "economism" levelled against Hayek on a regular basis, that Hayek also highlights the critical role of evolved nonmarket institutions such as moral codes and networks of knowledge. The market is merely a derivative of older institutions, including the aforementioned systems of norms (see Hayek 1960, 126).

[22] We may also call this "organized complexity." As Hayek declares in his 1974 Nobel Prize acceptance speech, "The Pretence of Knowledge," "Organised complexity here means that the character of the structures showing it depends not only on the properties of the individual elements of which they are composed, and the relative frequency with which they occur, but also on the manner in which the individual elements are connected with each other" (Hayek 1989, 4). Decision-makers cannot alter connections at will without often-destructive consequences to the functioning of the whole.

liberalism for this reason restricts deliberate control of the overall order of society to the enforcement of such general rules as are necessary for the formation of a spontaneous order, the details of which we cannot foresee" (Hayek 1973, 32). *Abstract* rules are the most suitable because they are intended to serve merely as general frameworks for action, instead of aiming for concrete outcomes (see Hayek 2014, 314–38). To play a game of chess, I need to know the rules of the game, but from these rules I cannot extrapolate the set of steps or the final outcome. Nor is such knowledge necessary for the game to proceed.

Hayek's liberalism is an ontological liberalism, for it is based upon a thesis about the structure of reality. It is also epistemological, because of the emphasis on limited knowledge. For him, the degree of complexity of the spontaneous order, being beyond the grasp of individual and collective rationality, also makes possible greater growth. Believing that complex systems are nonteleological (society has no purpose or goal), Hayek proposes that by reconstructing society along the lines of universalist ideals, we run the risk of damaging its functioning, breaking down social complexity into oversimplified partial problems.

While "spontaneous orders are not necessarily complex," as distinct from "deliberate human arrangements, they may achieve any degree of complexity" (Hayek 1973, 38). There is no upper limit to the complexity of a spontaneous order. For Hayek, this is both an opportunity and a risk. Such orders are fragile, and the more so the larger they become. Alongside order, chaos is also an ever-present possibility. Hayek mentions chaos but twice in *Law, Legislation and Liberty*, referring to the chaotic *appearance* of the spontaneous order (Hayek 1979, 170). Echoing the insights of his earlier papers, Hayek also maintains that spontaneous order "need not have such sharp boundaries as an organization will usually possess" (46). A Hayekian form of interventionism would consist of "piecemeal tinkering" in the specific operations of organizations, as well as of revision of the application of abstract rules, while excluding deliberate system-wide change (118).[23] Because

[23] In this regard, Hayek was in agreement with his friend and colleague Karl Popper. The latter held that *piecemeal social engineering* is in alignment with a free society, while rejecting the desire for holistic social change. Popper characterizes the latter as "utopian social engineering" (Popper 1945, 138). The exact borderline between holistic and partial (i.e., illegitimate and legitimate) social engineering

we cannot delineate where a spontaneous order begins and ends, and the same problem does not pertain to organizations, only the latter ought to be made subject to regular interventions and changes.[24] Intervention is sometimes needed, according to Hayek, but should be restricted to the organizational level, addressing specific dysfunctions in specific organizations and institutions.

As a consequence of its theoretical nature, *Law, Legislation and Liberty* does not supply the reader with concrete policy recommendations such as may be found in *The Constitution of Liberty*. Neither are we supplied with any measure to differentiate the degree of complexity displayed by a given system. Of greater concern is that Hayek seems to neglect the possibility of interventionism from *outside* of the state. Only in volume 3 of *Law, Legislation and Liberty* do we find mentions of "parastatal" entities in addition to government. There Hayek maintains that certain organizations (he singles out trade unions in particular) can function in parasitical ways, distorting the division of labor in the economy (Hayek 1979, 13).[25] He goes so far as to advocate for strict government regulation of organizations, hardly an anarchist or libertarian position! This enmity toward closed organizations such as trade unions stems from the perceived danger of the favoritism and monopolism which can develop if society becomes too rigidly organized into interest groups. As the economist observes, "To allow the established producers to decide when new entrants are to be permitted would normally lead simply to the status quo being preserved. Even in a society in which all the different interests were organized as separate closed groups, this would therefore lead merely to a freezing of the existing structure and as a result, to a gradual decline of the economy as it became progressively less adjusted to the changed conditions" (93).

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is, however, imprecise and open to debate. Recent discourses relating to "nudge," or soft government intervention, open up a potentially disturbing range for state interference, disturbing precisely because of its subtlety (Thaler and Sunstein 2021).

[24] On a Hayekian view, central planning is highly questionable even in the case of a subnational or regional entity like a city. The latter too is more often than not primarily a grown order: self-organizing flows must be taken into account, and a myriad of circumstances prevent full transparency. Urban planning centered around rational top-down control is doomed to failure. (For a highly compelling example of what Hayekian city planning could look like, see Moroni 2015.)

[25] Hayek wrote earlier of the potentially destabilizing effect of trade unions as labor market monopolies in *The Constitution of Liberty* (Hayek 1960, 384–405).

This passage gives the lie to critics who describe Hayek as a conservative unwilling to change society for the better in any way whatsoever. Quite the reverse is the case: Hayek, as a liberal, is concerned about conserving society's ability to evolve, adapt, grow, and change, and his opposition to closed forms of social organization is a direct corollary of the perceived threat they pose to societal flexibility. In the liberal order, organizations should be far more tightly regulated than persons (Hayek 1979, 90). Unfortunately, aside from these comments, Hayek does not flesh out the point—namely, that certain organizations can pose a threat to the spontaneous order—in greater detail.

The bigger philosophical issue here, irrespective of whether we hold trade unions to constitute a force for good or a force for evil, is the broader topic of "bad" complexity. By introducing favoritism into the workings of society, monopolies and trade unions (the latter, in Hayek's estimation at least, are a form of monopoly) undermine the economy, making it more unpredictable than it otherwise would be. Other possibilities of negative complexity also exist, however. For instance, regarding taxation, Hayek veers toward the libertarian camp, emphasizing the generally negative effects of too-complicated systems of taxation: "It is probable that the whole complexity of the tax structure we have built up is largely the result of the efforts to persuade citizens to give the government more than they would knowingly consent to do" (Hayek 1979, 127). In our age, when practically any social crisis is utilized by certain interests to legitimate a bigger role for government in the regulation of life, and faith in the ability of government to regulate society is approaching perilously high levels, liberal dosages of skepticism seem more than warranted (see Oakeshott 1996).

There is a latent self-contradiction in the above passage on taxation which is not addressed by the author in *Law, Legislation and Liberty* or elsewhere. It would appear that there are certain forms of undesirable complexity in social life. An example never mentioned by Hayek himself, but referenced by scholars working within the Hayekian tradition, is the case of *lynching*, a form of extrajudicial (in)justice which operates in a more or less bottom-up way.[26] This would seem to constitute another example of a "bad"

[26] For Hayek-inspired scholars who reference lynching and racism as problematic spontaneous orders, see Harrison (2018, 233–59); Martin and Storr (2008, 73–91); Kato (2011, 143–72).

or "perverse" spontaneous order, in addition to the proliferation of monopolies and overcomplex taxation structures.[27] If intervention should be avoided, then it is difficult to see how such egregious actions as lynchings can or should be stopped.

A Hayekian response to this concern would be that in some cases government intervention is not only justifiable, but also unavoidable to maintain the rule of law. As we have seen, Hayek emphasizes strong government regulation of monopolies—for example, the restriction of trade unions. In the case of closed, neotribal associations and perverse spontaneous orders, therefore, action is definitely warranted even within a Hayekian liberal utopia. We are not constrained to accept complexity as being necessarily good.

CONCLUSION

There is no true conflict between Hayek the complexity pioneer and Hayek the political economist. Rather, in this framework, complexity is the primary ontological justification for liberal politics. "Complex structures" are characterized by their ability to "maintain themselves by constant adaptation of their internal states to changes in the environment," yet biological evolution also recognizes the possibility of *maladaptation* (Hayek 1973, 158). Following Ilya Prigogine and Gregoire Nicolis, Hayek also highlights how evolution results in ever more complicated structures (Hayek 1979, 158; Prigogine and Nicolis 1972).

We can speak of complexity in all cases where "changes in structure are brought about by their elements possessing such regularities of conduct, or such capacities to follow rules, that the result of their individual actions will be to restore the order of the whole if it is disturbed by external influences" (Hayek 1973, 158). Hayek seems to be optimistic regarding the prospects of self-maintaining structures. But these structures are fragile too. It would seem that good forms of interventionism contribute to enhancing the adaptive capabilities of social systems, whereas bad forms of interventionism interfere too much in the operations and functionality of spontaneous orders, resulting in unintended consequences.

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[27] There is an abundant sociological literature on the unintended consequences of the spontaneous growth of bureaucratic orders (Dawson, Johnston, and Stewart 2017; Guy 2018; Evans 2023; Humes 2022).

Critics are correct in emphasizing that Hayek mostly (but by no means exclusively!) associates the concept of complex, spontaneous social phenomena with the decentralized, albeit imperfect market. They are incorrect, however, in their association of Hayek with a rigid conservatism closed to change. If Hayek is a conservative, he is a dynamic one who seeks to maintain the ability of society to evolve further and build up its complexity to higher levels. "Growth crises" are possible on both social and organizational levels.[28] The ecological crisis points to the need for a radical restructuring of society. But any plans for social change must take into account the knowledge problems associated with Hayekian hard complexity.

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[28] This expression describes the instability and turbulence generated by fast rates of change in societies and organizations. Above a certain size, for example, growth can endanger the internal structures of companies. Too much expansion, including acquisitions, can even result in financial ruin. (For one of the first uses of the term, see Slywotzky and Wise 2002.)

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