

## CHAPTER 6

# SPONTANEOUS ORDER

DANIEL J. D'AMICO

## INTRODUCTION: WHAT IS AND WHAT IS NOT A SPONTANEOUS ORDER?

MERRIAM-WEBSTER'S dictionary defines the word *spontaneous* as, "1. proceeding from natural feeling or native tendency without external constraint, 2. arising from a momentary impulse, 3. controlled and directed internally, 4. produced without being planted or without human labor, 5. developing or occurring without apparent external influence, force, cause, or treatment and 6. not apparently contrived or manipulated."

Dictionary definitions and/or encyclopedic treatments of the fuller term *spontaneous order* are more rare, as it is a more complicated and nuanced idea. It is also less widely used in common parlance beyond the professional fields of social science and economics. One well-researched and thorough survey,<sup>1</sup> "The Tradition of Spontaneous Order," by political philosopher Norman Barry (1982), alludes to the apparent tension between formal definitions, on the one hand, and the more detailed meanings implied throughout the history of thought behind the longer terminology, on the other:

The simplest way of expressing the major thesis of the theory of spontaneous order is to say that it is concerned with those regularities in society, or orders of events, which are neither (1) the product of deliberate human contrivance (such as a statutory code of law or a *dirigiste* economic plan) nor (2) akin to *purely natural* phenomena (such as the weather, which exists quite independently of human intervention). While the words *conventional* and *natural* refer, respectively, to these two regularities, the "third realm," that of *social* regularities, consists of those institutions and practices which are the result of human action but not the result of some specific human intention. (7–8)<sup>2</sup>

<sup>1</sup> See also Hamowy (1987).

<sup>2</sup> Barry (1982, n. 2) cites Hayek (1967) and Ullman-Margalit (1978) as additional high-quality survey sources on the history of thought surrounding spontaneous order theory. See also Barry (2008).

Nobel laureate and Austrian economist F. A. Hayek is most often credited with coining the particular phrasing *spontaneous order*, because much of his research program was focused on elaborating and applying the idea.<sup>3</sup> Drawing from Hungarian philosopher Michael Polanyi's idea of "polycentric order" (1951), Hayek's earliest usage of the fuller terminology is found amid his legal and political theories elaborated within *The Constitution of Liberty* (1960). He writes: "When order is achieved among human beings by allowing them to interact with each other on their own initiative—subject only to the laws which uniformly apply to all of them—we have a system of spontaneous order in society" (160). Here Hayek is not offering a full operational definition per se, but the essence of the meaning of the term is fully intact, namely, that the functional and desirable aspects of the systemwide patterns governing different individuals cannot be attributed back to the preferences, interests, or intentions of any of those particular individuals. The functional and orderly qualities of society develop and persist spontaneously and distinctively from any of the interests that so happen to constitute it.

In later work,<sup>4</sup> Hayek (1973) gives a more detailed exposition and definition of the concept. First, he defines *order* more generally: "a state of affairs in which a multiplicity of elements of various kinds are so related to each other that we may learn from our acquaintance with some spatial or temporal part of the whole to form correct expectations concerning the rest, or at least expectations which have a good chance of proving correct" (36). He goes on to differentiate "made" or "designed orders," which he terms *taxis*, in contrast to *cosmos*, "unplanned" and or "grown" orders:

[A] spontaneous order or *kosmos* . . . [i]ts degree of complexity is not limited to what a human mind can master. Its existence need not manifest itself to our senses but may be based on purely *abstract* relations which we can only mentally reconstruct. And not having been made it *cannot* legitimately be said to have a particular purpose, although our awareness of its existence may be extremely important for our successful pursuit of a great variety of different purposes. (38)

Herein Hayek reemphasizes the defining features of spontaneous orders. The patterned nature of the order, in a way, helps the various actors within the system better fulfill their separate goals, because it offers them some reliable predictability from which to inform their plans. Though beneficial and, for some, even aesthetically preferable (Klein and Osborn 2009), this orderliness was not historically intended or designed by any of the individual actors that nonetheless constitute and contribute to it. Furthermore, no individual could have possibly designed the orderly outcome, neither within the system nor apart from the system. First, this is because the nature of the knowledge required to successfully navigate and comprehend even partial facets of the system requires a

<sup>3</sup> Boettke (1990), Petsoulas (2001), and Hunt and McNamara (2007) trace the inspirations, development, applications, and criticisms of spontaneous order throughout Hayek's work and beyond.

<sup>4</sup> Jacobs (1997, n. 7) comments on Hayek's stated motivations for drafting his later work *Law, Legislation and Liberty*; he sought to complete and correct the substantive content of his earlier expositions because he saw them as inadequate.

direct participation within the system, which is often referred to as tacit<sup>5</sup> and/or local<sup>6</sup> knowledge (Hayek 1945). Second, the system's degree of complexity simply surpasses that which any individual mind could feasibly foresee.

Jacobs (1997; 1999; 2000) suggests that Polanyi's (1941; 1951) use and understanding of the term *spontaneous* preceded and arguably inspired Hayek's, although Polanyi's influential role in the coinage or resurgence of spontaneous order theory is less appreciated.<sup>7</sup> Jacobs (1997, 18) notes that Polanyi (1951) first makes explicit use of the full phrasing *spontaneous order* and highlighted the phenomenon's operation throughout a variety of social contexts prior to Hayek's (1960) use and later definitional treatments. Bladel (2005, 23) counters Jacobs and emphasizes theoretical differences between Polanyi and Hayek. He notes that Ropke (1937, 4–5), a colleague of Hayek's, described the market economy explicitly as a spontaneous order even before Polanyi's use. Much of Jacobs's case rests on Polanyi's uses of *spontaneous* apart from the fuller phrase *spontaneous order*, and his apparent appreciation for the fuller meaning of the theory prior to the explicit coinage of the complete phrase.<sup>8</sup> Such a case can also be made for Hayek's understanding and use because his prior economic writings (1936; 1945; 1949a) arguably convey a full understanding of the concept despite lacking the explicit terminological label.<sup>9</sup>

Such is similarly the case throughout the intellectual history of spontaneous order theory more generally. Various thinkers, working on different subject matters, in different contexts, nonetheless identified and attempted to explain the origins and operational features of social orderings as unplanned and inherently complex phenomena.<sup>10</sup>

<sup>5</sup> Polanyi (1958) first discusses and explains the relevance of tacit knowledge in social processes; see Polanyi (1966). Lam (2000) and Collins (2010) are recent contributions explaining the role of tacit knowledge in the production and maintenance of effective social institutions. On the meaning and significance of tacit knowledge in Hayek's work, see Oguz (2010).

<sup>6</sup> Local knowledge is most often highlighted as a tool of effective managerial decision-making. Lavoie (1985) first coined the term *knowledge problem* when referring to national economic decision-making lacking tacit knowledge garnered through local-level perspectives and experiences. Ostrom (1990) and Ostrom (2007) similarly emphasize knowledge problems endemic to centralized management schemes.

<sup>7</sup> Polanyi applied *spontaneous* and cognates to one of these modes, writing variously of "spontaneous ordering," "spontaneously arising order," "spontaneously attained order," and "spontaneous mutual adjustment" (1941, 432, 435). In this particular essay, however, he never used "spontaneous order" as such, preferring "dynamic order," "dynamic system," and "dynamic forms of organization" (435). Polanyi represented "dynamic order" as grounded on freedom and spontaneously emerging from mutual adjustment of free actions (Jacobs 1997, 15).

<sup>8</sup> Polanyi (1962; 1975) explicitly used the full term *spontaneous order* (Jacobs 1997, n. 6). Gray (1986) and Cronk (1988) describe Polanyi's treatment of spontaneous orders confined to the process of science. Jacobs (1997, n. 11) disagrees. Hayek biographer Caldwell (2004, 294) remains agnostic on the debate surrounding first use of the term.

<sup>9</sup> Jacobs (1997, 1, nn. 1–3) cites Ross (1987), who traces Hayek's use of the term *spontaneous* throughout his early economic writings (Hayek 1936; 1945; 1949a). Barry (1982; 2008) also attributes the coinage to Hayek. Jacobs (1997, 1, n. 4) cites Roche (1976), O'Brien (1994), Letwin (1977), Moldofsky (1989), and Cubeddu (1993) as also attributing the term's origin to Hayek.

<sup>10</sup> Barry (2008, 485) notes that similar ideas of self-organization can be found in the writings of ancient Chinese philosopher Chuang Tzu and sixteenth-century Jesuit priests from the school of Salamanca. See also Smith (2006).

Regardless of the term's specific historical origins, three things are commonly and rightly agreed on about the intellectual history of spontaneous order theory. First, the substantive theoretical concepts implied by the term are now relatively well defined and better understood than in previous decades. Namely, the functional features of society are as such not because of the planned intentions of particular individuals, authoritative decision makers, or any individual designers' intentions. Rather, most social outcomes, particularly functional and orderly processes, are more often and better understood as the unplanned by-products of decentralized human interactions. The definition of spontaneous orders is often well captured by the succinct but accurate description of social institutions being "the result of human actions but not necessarily the product of any particular human design."<sup>11</sup> Second, spontaneous order theory traces its origins throughout a long and rich intellectual tradition. Most notably, the first renditions of spontaneous order theory were forged amid the Scottish Enlightenment, the intellectual tradition surrounding the political philosophy of liberalism, and the classical school of economics.<sup>12</sup> Last, in the wake of Hayek's research and professional success, scientific interest and appreciation for spontaneous order theory have revived and multiplied.

These latter points of agreement are not coincidental. It is not surprising that the historical context of the Scottish Enlightenment happened to be the spawning ground of spontaneous order theory. Nor is it serendipitous that the discipline of economic science and the particular methodological tradition surrounding Hayek, the Austrian school of economics, has been most responsible for harboring the greatest appreciation for spontaneous order theory. Contemporary Austrian scholars continually perform applied research to expand the relevant cases of observed spontaneous orders. This will be more fully explained throughout this chapter.

With renewed attention to spontaneous order theory have also come new debates, disagreement, and occasional obfuscation. Some are made explicitly uncomfortable by the common use of the term *spontaneous order*. While it well differentiates from intentionally designed social systems such as clubs (Buchanan 1965) or formal business firms (Coase 1937), anxiety remains concerning the connotations of randomness that the term *spontaneous* seems to imply, as if the functional features of a spontaneous order occur through sheer luck or by happenstance. Again, refer to the definitions from Merriam-Webster's: "arising from a momentary impulse . . . developing or occurring without apparent . . . cause." Similar implications admittedly occur throughout the term's historic usage. For one example, the fuller quotation of Ferguson's earliest description reads: "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*

<sup>11</sup> Hayek (1967) adopted Enlightenment era political philosopher Adam Ferguson's ([1767] 2001, 119) original description of social processes in this way by titling one of his own essays "The Results of Human Action but Not of Human Design."

<sup>12</sup> Hayek (1967), Ullman-Margalit (1978), Barry (1982; 2008), Hamowy (1987), Otteson (2008), Petsoulas (2001), and Smith (2006) trace spontaneous order theory throughout the Scottish Enlightenment and especially in the works of Adam Smith.

establishments, which are indeed the result of human action, but not the execution of any human design” ([1767] 2001, 119; emphasis added). It is not unreasonable for writers and thinkers to be dissatisfied with these connotations, just as describing evolutionary processes as random or chaotic is a disservice and obfuscation to the procedural realities of natural selection, adaptation, and genetic mutation that occur within biological and other natural processes.

For some writers, the term *emergent order* is sometimes synonymously and at other times preferably used for *spontaneous order*.<sup>13</sup> Within its definition of *emergence*, Merriam-Webster’s reprints material from the concise encyclopedia Britannica:

In the theory of evolution, the rise of a system that cannot be predicted or explained from antecedent conditions. The British philosopher of science G. H. Lewes (1817–78) distinguished between resultants and emergents—phenomena that are predictable from their constituent parts (e.g., a physical mixture of sand and talcum powder) and those that are not (e.g., a chemical compound such as salt, which looks nothing like sodium or chlorine). The evolutionary account of life is a continuous history marked by stages at which fundamentally new forms have appeared. Each new mode of life, though grounded in the conditions of the previous stage, is intelligible only in terms of its own ordering principle. These are thus cases of emergence. In the philosophy of mind, the primary candidates for the status of emergent properties are mental states and events.

An emergent phenomenon is the result of some complex causal procedure, meaning that the outcome of said process cannot be inferred as a simple summation of its constituent parts. Hence, *emergence* successfully refers to the unplanned but structurally patterned characteristics of complex processes, and the term does so perhaps without invoking connotations of serendipity or randomness, as the word *spontaneous* inappropriately does. It is therefore not surprising that some writers opt to use *emergent* over *spontaneous*, although such equivocation, especially regarding the topic of specifically human-social processes, has significant analytical consequences.

<sup>13</sup> In the plenary essay of the aptly titled journal *Studies in Emergent Order*, DiZerega (2008) writes, “Hayek encapsulated the process he described by his term ‘spontaneous order.’ Today other terms describing *the same basic dynamics* are in more common use, particularly ‘complex adaptive systems’ and ‘emergent orders’” (1; emphasis added). The paper proceeds to use the terms interchangeably, as do most authors in the journal. Martin and Storr (2008) initially use the terms interchangeably but resolve upon *emergent* over *spontaneous*. Lewis (2011, 171) cites Wagner (2010) as falsely conflating spontaneous and emergent orders and neglecting to offer definitions. Wagner (2011) concedes this point.

The term *stigmergy* (Grasse 1982–1986; Beckers et al. 1994; Bonabeau 1999; Elliott 2006; Heylighen 2007; Marsh and Onof 2007; Christensen 2007 and 2008) has been coined to refer to features of certain logistical traits of some social species and computer software platforms that allow various users to simultaneously but separately contribute to products and outcomes distinctively more functional and complex than any of the individuals’ particular actions. Ants secrete pheromones assisting them to follow one another’s trail to and from food sources. Similarly, open-source software platforms such as Wikipedia provide a logistical medium particularly convenient for complex collaboration among dispersed individuals and groups without conscious or concerted collective action or agreement.

First, spontaneous orders are not the inevitable result of chaotic or random processes. Active substitution away from the term *spontaneous* in favor of *emergence* in part promotes this confusion. Second, passive and or inadvertent equivocation blurs a more nuanced and accurate distinction between these two concepts. The intellectual tradition of spontaneous order theory possesses a unique connotation that is not necessarily endemic in today's parlance surrounding the use of the term *emergence* within the dedicated fields of study on complexity, agent-based modeling, self-organizing processes, or stigmergy.<sup>14</sup> Conflating terms without attention to the distinct facets of those processes that are rightly and uniquely spontaneous orders risks modeling such complex human social phenomena inaccurately.

Finally, the distinctive use of *spontaneous* puts unique emphasis on the human features of spontaneous orders relative to how the term *emergence* is more broadly used. Following Hayek's (1973) defining descriptions of spontaneous relative to planned orders, he writes:

Most important, however, is the relation of a spontaneous order to the conception of purpose. Since such an order has not been created by an outside agency, the order as such also can have no purpose, although its existence may be very serviceable to the individuals which move within such order. But in a different sense it may well be said that the order rests on purposive action of its elements, when "purpose" would, of course, mean nothing more than that their actions tend to secure the preservation or restoration of that order. The use of "purposive" in this sense as a sort of "teleological shorthand," as it has been called by biologists, is unobjectionable so long as we do not imply an awareness of purpose of the part of the elements, but mean merely that the elements have acquired regularities of conduct conducive to the maintenance of the order—presumable because those who did act in certain ways had within the resulting order a better chance of survival than those who did not. In general, however, it is preferable to avoid in this connection the term "purpose" and to speak instead of "function." (39)<sup>15</sup>

In short, the harmonization processes that occur amid interacting human agents are distinct from those that occur between other types of agents, specifically because of the greater range of subjective purposes sought by humans relative to nonhuman actors. Again, spontaneous orders are identified by the distinction between the intentions of

<sup>14</sup> DiZerega (2008) explains that various research fields attuned to emergent orders, such as self-organizing systems and agent-based modeling, have arisen independently of the Smith-Hayek tradition. Key examples of these parallel research streams include, but are not necessarily limited to, Ross (1947) and Holland (1992). See also Harper and Lewis (2012) and the various research surveyed therein. See also the comments and citations on stigmergy in note 13 above.

<sup>15</sup> In reflecting on Barry's survey, Buchanan (1982) affirms the a-purposivity of complex social processes. "[T]he 'order' of the market emerges only from the process of voluntary exchanges among the participating individuals. The 'order' is, itself, defined as the outcome of the process that generates it. The 'it,' the allocation-distribution result, does not, and cannot, exist independently of the trading process. Absent this process, there is and can be no 'order'" (7).



the agents within the system and the seemingly functional but unintentional aspects of the system writ large. In the course of acting to pursue personal interests, individuals contribute to a general condition of social order. While the general conditions of the social order complement various individual interests, such functionality occurs irrespective of those interests. This gap of intentionality is precisely the reference point of the spontaneous terminology. Such interactive purposivity cannot be said to occur amid nonhuman orders.<sup>16</sup>

Insofar as *emergence* can also refer to complex outcomes of nonhuman processes, equating spontaneous orders with emergence diminishes the focused need for unique methodological considerations when investigating human social phenomena relative to other natural-science subject matters. Natural sciences afford a larger and more appropriate role of mathematical formalism and precise statistical forecasting. Such techniques are more prone to error and misspecification when applied to human social processes, because the potential diversity and conflict of subjective intentions is exponentially greater.<sup>17</sup> When spontaneous human social orders are treated as if they are no different from nonhuman emergent orders, through applied public policies or strategic initiatives for social change, significant unintended consequences may ensue and are in many ways inevitable. Hayek ([1941] 1980) argues so boldly as to suggest that the historic course of real contemporary social problems in the twentieth century were largely the result of methodological failures within the professional social sciences to account for the operational features of human society as they accord to spontaneous order theory.<sup>18</sup>

It is most appropriate for a handbook on Austrian economics to include a chapter dedicated to spontaneous order, as the theory has played both a significant and an essential role throughout the school's intellectual history. One should also recognize inversely, that were it a dedicated volume to the theory of spontaneous orders, there would need to be a dedicated chapter, or several, on the Austrian tradition because of its emphasis on the methodological challenges inherent in the investigation of human actions and complex social processes.<sup>19</sup> Once the idea of spontaneous social orders had been recognized and somewhat fleshed out, society could be better seen to conform to some degree of orderly pattern, wherein a variety of systematic relationships could be seen to hold and therefore could also be scientifically investigated and objectively understood. This is to say that spontaneous order theory was groundbreaking in that it provided a method to

<sup>16</sup> Hamowy (1987, 40) summarizes Merton (1936) and Forbes (1954) as similarly conflating spontaneous orders with the law of unintended consequences. Schneider (1967) recognizes the similarity of spontaneous orders as exemplary of unintentionality but highlights their uniquely social functionality and coordinative effects as essential to spontaneity's meaning.

<sup>17</sup> Hayek (1967, 25, n. 8) surveys Nagel (1961), von Neumann (1951), and von Bertalanffy (1952), estimating the degree of complexity found in interactive biological processes relative to basic physionatural operations to be many degrees of magnitude larger. In addition to a substantive difference of type, Hayek explains that social processes still also possess exponentially larger degrees of complexity.

<sup>18</sup> See also Boettke (1997), Mirowski (2002), and Beinhocker (2007), who trace the practical consequences of methodological failures in professional economics. Huemer (2012) infers such social complexity to support passivity over activist preferences and strategies for social change.

<sup>19</sup> See Menger ([1883] 1985) and Mises ([1933] 1978) as classic examples.

investigate human behaviors and social processes through objective science in a way that was untenable before then. One could argue that with spontaneous order theory, the Scottish Enlightenment in effect invented social science as a positive research program.

This chapter is a defense and explicit support for the terminology of *spontaneous order*, properly understood. Although it is not a rejection of the term *emergence* in all of its own uses. In other words, *emergent* and *spontaneous* have similar meanings, but they are differentiable. They are neither totally exclusive nor oppositional ideas. They have unique definitions with overlapping applications, but they still have separable and nonsynonymous meanings. Simply put, “emergence refers to a broader domain of phenomena than does spontaneous” (Wagner 2011, 217). In this vein, all spontaneous orders possess emergent qualities, but not all emergent processes are necessarily spontaneous orders. Figure 6.1 portrays a simplistic Venn diagram to visualize this distinction. A subset area representing distinctive spontaneous orders is nested fully within a larger set of emergent orders.

Spontaneous orders possess a unique feature relative to nonspontaneous emergent orders, namely, the presence of multiple and likely conflicting human intentions that are shaped subjectively by the unique preferences and choices of individuals. Spontaneous orders proceed in ways that promote and contribute to human social coordination and cooperation. The institutions that develop as a consequence of and facilitator to human coordination and cooperation require unique methodological considerations to understand their developmental and operational processes relative to the coordination mechanisms that occur in nonhuman emergent orders. How do social scientists retain positivity while describing and analyzing the behaviors of agents and groups who possess normative preferences?

The next section specifies the definitional differences between emergent and spontaneous orders by offering a conceptual framework to distinguish between the scientific nature of the agent types of an orderly system and the degree of complexity derived from those agents’ interactive behaviors. Examples are offered for each category. The

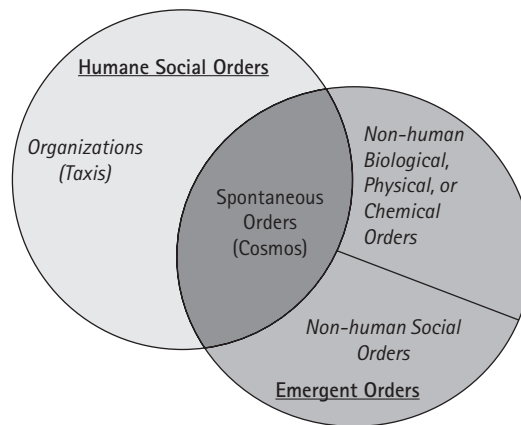


FIGURE 6.1 Spontaneous relative to emergent orders.



necessary features for each type of social order to prove sustainable are identified. The presence of purposeful human intention contributes to the development of distinctive institutions in the human social realm unparalleled in complexity and coordinative potential by any other subject matter throughout the natural sciences. Animals and certainly inanimate objects do not communicate with languages as detailed or abstract as those of humans. They do not truck, barter, and/or exchange goods and services and hence possess no monetary currencies or market price exchange ratios. Many species often do conform their behavioral patterns to social standards akin to moral norms or even rules of law, although nonhuman actors do not reflect back on the desirability or optimality of their orders, whereas humans do. And herein lie the determining factors of society's progression through coordination and cooperation or its destabilization through discord and strife.

The following section surveys the intellectual history surrounding spontaneous order theory in an attempt to complement and justify the framework laid out in the previous section. Smith's and Hayek's research programs have been particularly influential in shaping spontaneous order theory. As social scientists, both sought to develop consistent models to account for processes of social change across varied institutional realms—language, morality, legal and political norms, and economic development. Both saw the phenomena of economic production as uniquely human and obviously complex beyond the potential of human design. Both sought unique methodological frameworks to cope with the distinct challenges of this subject matter; thus, they are most recognized for significantly shaping the theoretical tradition. While economic science provided the most ideal theoretical techniques for identifying and explaining the operational features of spontaneous orders, several writers throughout the spontaneous order tradition have noted the fate of harmonious social operation to rest on the interplay between spontaneous processes of material prosperity with moral social and cultural perceptions regarding the causes and consequences of prosperity and its associated social changes.

## DIFFERENT CATEGORIES OF ORDER

There is a need for a separable terminology when referring to complex human social processes relative to similar orders found amid nonhuman agents and groups. This is simply because the conditional factors of individual human choices are distinct from those facing nonhuman conscious agents, comparable to how processes of nonhuman conscious agents are significantly distinct in complexity from nonconscious objects. In other words, the predictability of the order that develops amid a community of human people is significantly more complex than that found amid a flock of birds or a school of fish, in much the same way as the degree of complexity amid a flock of birds is significantly greater than the patterns of operation amid balls on a billiard table. Billiard balls do not act but are acted upon. Birds act but do not make distinctive plans and intentions

apart from their biologically shaped instincts and needs for survival. While the difference in agent type may be a matter of degree rather than type, the social experience of humans is of a significant difference in type relative to nonhuman social contexts. By interacting in an environment made up of intelligent and intentional interacting agents, human social systems emerge and require institutional regularities, informational signals, and enforcement mechanisms to help promote coordination and cooperation.

In all such cases, order can and does emerge, although the human condition allows for the development of social institutions that are of both a greater degree of complexity than and a distinctive type of complexity from those forms of coordination mechanisms common amid nonhuman processes. In particular, human languages, legal and political rules, commonly accepted moral norms of conduct, and decentralized economic decision-making through the advanced division of labor and market price signals are all uniquely human institutions considerably more complex than any of the behavioral patterns found in nonhuman systems.

This section provides a framework to categorize different types of complex orderly processes. Figure 6.1 first clarifies the degree of complexity demonstrated within different types of orders by listing the relative number of conscious agents within an orderly system. Separate rows are included for zero agents, one or few agents in relative harmony to one another, and many competing agents. Second, a distinction is made regarding the nature of the agents within the supposedly orderly phenomena. Biophysical processes or nonhuman systems are differentiated from human ones. Each cell within the body of the figure is labeled with its own letter, A through F, and will be explained below. Processes within cells A, B, C, and F exhibit sufficient characteristics to warrant the title of emergent orders, while only processes within cell F ought to be considered spontaneous orders. Cells D and E are planned orders or examples of designed *taxis*, as Hayek (1973) used the term.

		Subject Type	
		Bio-physical	Humane
Number of Conscious Agents	Zero	A: sunflower seeds, honeycomb, snail shells, flower pedals	D: a garden, architecture, interior design
	One or few in harmony to one another	B: schools of fish, flocks of birds, ant colonies, beehives	E: sports teams, business firms, formal organizations or clubs
	Many potentially competing against one another	C: ecosystems, species evolution, planetary orbits	F: market prices, commodity currencies, the division of labor, private property rights, the common law

FIGURE 6.2 Classifications of order.

Beginning in the upper left corner, cell A lists various examples of complex patterns observed in the natural world. Such patterns conform to the basic definitional characteristics of complex orders. The individual components of the orderly system have particular features. A sunflower seed is a particular shape and size, as are the hexagons of a honeycomb, the spirals of a snail shell, and the petals of a flower. When fitted together, these noncomplicated parts generate a pattern with its own size, shape, and proportioned characteristics distinctive from those features of its constituent parts. If one were to view the individual components of the order apart from the order itself, it would be difficult to foresee or predict the complex pattern.

Cell B is similarly focused on nonhuman complex orders, just as in cell A, but cell B includes examples of processes that possess a greater degree of complexity than those in cell A. This greater complexity is a function of the fact that the agents in the system, while not human, are somewhat autonomous. They engage in their own unique behavioral actions based on their own individual perceptions, influences, and stimuli. In other words, there is a similar emergence of order amid the patterns of seeds on the face of a sunflower and the orderly flow of ants within a colony's mound, but there is a significant difference between the two. Ants walk about in accordance to their own individual actions. In the context of interacting with other ants, any individual ant faces a degree of variability in the potential outcomes of its behavior unparalleled by the distribution of seeds on the face of a sunflower.<sup>20</sup>

Orders within cell C demonstrate yet another level of complexity beyond those found within cells A or B. Not only are the agents within cell C autonomous relative to one another, but they are of various different species from one another, and as such they are most often in conditions of conflict and or competition with one another regarding food, territory, sexual mates, or all of the above. While planets and terrestrial objects would not seem autonomous, their distinct properties of movement relative to one another and interactive effects on others suffice to be included in cell C.

Interspecies competition is most common. Species exist as innate predators and/or prey to one another. Interspecies coordination is also common but only as a function of optimized interspecies competition. Different species contribute to the functioning of a vibrant ecosystem in harmonic symbiosis with one another, but the health and vitality of any nonhuman ecosystem depends on the relative success of some species

<sup>20</sup> There remain different meaningful types of order found with cell B characteristics. First, lower organisms such as slime molds and some social insects such as ant colonies and beehives perform coordinated behaviors amid such large groups; some have inferred the collective unit itself as the more relevant organism. Different types of agents, drones versus worker bees, for one example, operate more akin to organs with specialized functions rather than independent agents themselves. Tullock (1994) and Resnick (1994) describe the emergent qualities of social species. Seabright (2004) notices that social species share much higher rates of genetic homogeneity relative to others. Equipped with biological adaptations such as bio-determined divisions of labor and stigmergic mechanisms (see note 13 above), lower organisms can form groups of hundreds of thousands of agents, whereas more intelligent species maintain smaller group sizes. De Waal (1990) describes the proto-legal and moral norms evolved and required to resolve conflict amid various ape species. Differences across social norms are primarily shaped by biological factors such as gendered differences and sexual reproductive habits.

and/or populations over others (Forsyth and Miyata 1987). Foxes and rabbits have yet to discover an institutional arrangement wherein both species may thrive without the episodic predation of rabbits by foxes. Interspecies cooperation or symbiosis is not impossible but is more rare and typically the result of unique evolutionary conditions.

Cell D is the first type of order listed within the human category and is also the first nonemergent type of order surveyed thus far. Examples such as gardens, architecture, and interior design are orderly insofar as they promote particular functions and purposes. Good gardens are usually both aesthetic and conducive to the healthy growing of the plants therein. But such orders are the result of direct planning insofar as they are intelligently designed and constructed by a gardener; hence, they are not fully emergent. Walking through a forest and stumbling upon a well-groomed garden, while the observer could remark on the well-ordered nature of the garden, he would obviously not infer that the garden had developed naturally without some intelligent designer.

That being said, a successful garden must operate within the natural parameters beyond the gardener's design or control. The gardener may desire to optimize the growing and cultivation of a particular plant or crop, but his ability to do so will be determined in part by his ability to identify, tap into, and harness the unplanned natural conditions of his environment and the interactive conditions of the fauna he chooses to plant.

Cell E is another nonemergent form of order, but it does express a degree of complexity beyond those orders found within cell D. While cell D orders result from the application of human intelligence imposed on nonhuman entities, cell E results from a singular or unified human intention being imposed on and accepted by other human agents. Firms, organizations, clubs, and formal governments are all orders with cell E characteristics.<sup>21</sup> Here again, the success or failure of the particular intention chosen by the order's designer will hinge on his ability to identify, tap into, and harness the unplanned and/or emergent conditions operating within the population of individuals he has selected to work with.

Now, fully within the realm of human social interaction, one could make a distinction within cell E of voluntary versus coercive arrangements akin to Smith's ([1776] 1904) distinction of "raping, pillaging and plundering" relative to "trucking, bartering and exchanging."<sup>22</sup> The coercive arrangements like those conflicting interests across species in cell D orders are zero sum, meaning that one agent gains at the others' expense. But unlike cell D orders, human agents have a significantly greater capacity to counterreact, be it through foresight, evasion, and/or cooperative retaliation. Smith's ([1759] 1790) comments on the personality types of "men of systems" bear relevance here:

The man of system, on the contrary, is apt to be very wise in his own conceit; and is often so enamoured with the supposed beauty of his own ideal plan of government,

<sup>21</sup> For thorough investigations of decision-making within the firm and formal organizational settings, see Coase (1937) and Williamson (1981; 2002).

<sup>22</sup> See also Oppenheimer ([1908] 2012).

that he cannot suffer the smallest deviation from any part of it. He goes on to establish it completely and in all its parts, without any regard either to the great interests, or to the strong prejudices which may oppose it. He seems to imagine that he can arrange the different members of a great society with as much ease as the hand arranges the different pieces upon a chess-board. He does not consider that the pieces upon the chess-board have no other principle of motion besides that which the hand impresses upon them; but that, in the great chess-board of human society, every single piece has a principle of motion of its own, altogether different from that which the legislature might chuse to impress upon it. If those two principles coincide and act in the same direction, the game of human society will go on easily and harmoniously, and is very likely to be happy and successful. If they are opposite or different, the game will go on miserably, and the society must be at all times in the highest degree of disorder. (233–234).

Sustainable coercive relationships such as slavery or conscription required unique enforcement technologies and costs. Over time, such balances of power endure gales of creative destruction as changes in the conditional factors affecting the costs and benefits of coercion alter its equilibrium conditions (Acemoglu and Robinson 2012). For one example, the invention of the cotton gin radically increased the value of a marginal slave worker but lowered the net demand for the quantity of slaves writ large.

In contrast, voluntary cooperation mechanisms are a uniquely human institutional arrangement wherein multiple parties may benefit despite alternative, competing, and/or conflicting interests. Private property rights, contracts, rules of law, arbitration, and dispute resolution are all mechanisms to aid and facilitate the harmonization of the individual designers' intention with the surrounding conditions of environmental resources and the ulterior motives of other human agents. Hence, again, we see that the relative success of an individual plan is at least in part determined by its ability to nest compatibly amid a broader condition of unplanned interactions (Koch 2007).

Last, cell F is reserved for spontaneous orders properly understood. Rather than individual human actors within a system comporting their behaviors to a particularly designed intention, each of the members of a spontaneous order pursues intentions of his or her own accord. Here it is perhaps important to emphasize that all such behaviors are not necessarily harmonious or without conflict. In fact, systemic disorder and instability can be and often are stable outcomes for a variety of social contexts (Martin and Storr 2008). Although the contributing conditional factors of such disorderly states are similar to those that accommodate spontaneous order outcomes, the results of such processes do not conform to Hayek's proffered definition of order as providing predictable reliability. Such disorderly states are also possible under cell B and cell C conditions. Seabright (2004) and Boettke, Caceras, and Martin (2013) suggest in comparison that the potentials and realities of conflicting disorderly states far surpass orderly alternatives; hence, ordered outcomes are all the more demanding of account and explanation.

Although the potential for disorder is great and arguably surpasses that for order, it has been theoretically (Demsetz 1967), historically (Ellickson 1991; Anderson and Hill 2004), and even experimentally demonstrated (Kimbrough, Smith, and Wilson

2010) that human agents are inclined to conform their behaviors to not conflict with other human agents to the extent that conflict is costly and or uncertain. Given humans' greater capacity to impose costs amid conflict, this provides a greater incentive and greater potential for coordination in cell F than in other cells. To the extent that agents can recognize that their own plans may be better fulfilled under conditions of nonconflict coordination, individuals will prefer conditions of peaceful coexistence relative to conflict. Hence, cooperation and coordination in human societies without formal state enforcement mechanisms are feasible in relatively smaller and homogeneous groups (Landa 1994; Zerbe and Anderson 2001; Greif 2002; Dixit 2004; North, Wallis, and Weingast 2009) but rarely observed in large-scale heterogeneous social orders.<sup>23</sup>

Agents may intentionally conform their behaviors to rules of conduct and/or institutional patterns that explicitly signal nonthreatening intentions to others and accurately communicate information regarding interpersonal behaviors so that individuals within the system are best informed regarding how they may navigate action without conflict. Such institutional participation inadvertently contributes to a social environment more conducive to and accommodating for the fulfillment of ever greater and more diversely selected plans and agents. Institutional mechanisms such as language, property rights, contracts, rules of law, moral norms, market pricing mechanisms, and an advanced division of labor, though not designed by any individual actor, crucially aid and assist the plans of the participants within them because they funnel and churn knowledge more systematically and effectively amid the members of the system.

## THE HISTORY OF THE SPONTANEOUS ORDER TRADITION

Equivocation between emergent and spontaneous orders obfuscates the meaning that theorists intended to convey throughout spontaneous order's history of thought. Although common parlance of spontaneity implies that the subject matter develops as

<sup>23</sup> Samuelson (1964), McKenzie and Tullock ([1975] 2006), Landes and Posner (1975), and Cowen (1992) all highlight public-good dilemmas surrounding the provisions of law, security, and punitive enforcement. The positive externality conditions and high potential for free riding surrounding law-enforcement services are presumably inherent and logistical, thus limiting the potential for spontaneous order to sufficiently support large-scale heterogeneous networks of anonymous exchange.

In contrast, Friedman (1979) argues that multiple equilibriums are possible in alternative societies. Benson (1992), D'Amico (2010), and Allen and Barzel (2011) trace criminal institutional changes and consequences through legal history. Gambetta (1993), Kaminski (2004), Leeson (2008a), Leeson and Skarbek (2010), and Skarbek (2010; 2011; 2012) explain functional punitive enforcements in criminal networks wherein group interests are conveniently aligned against formal state enforcement by the nature of their illicit intentions. Hoebel (1954) shows similarly for remote tribes. Leeson (2008b; 2009; 2014) and Benson (1989a; 1989b; 1990) argue that self-enforcing exchange is more durable than is commonly recognized and at least possible in some larger heterogeneous cases.



if from nowhere and/or operates through random happenstance, spontaneous orders, as described by their most noted contributors, are decidedly not the inevitable result of chaotic interactions and/or serendipity. Spontaneous orders are instead the unintended result of certain structural features inherent to the processes of human decision-making and human interaction. Although they are unplanned, such phenomena are not random.

The history of thought specifically surrounding spontaneous order theory, stemming most notably from Smith amid the Scottish Enlightenment, academically resurrected by the research program of Hayek, and continued by the contemporary scholarship associated with the modern Austrian school of economics highlights the unique methodological considerations necessary for investigating and accurately understanding human behaviors and complex social processes relative to subject matters more common throughout other natural sciences. The tradition of scholarship most responsible for developing the idea and terminology of spontaneous order theory has continuously been an effort to conduct objective positive social science, given the realization that human beings and human societies are more complicated subject matters and require unique methodological considerations compared with other natural subjects. In short, the process of coordinating human intentions contributes to the formation of institutions and societal outcome patterns that require uniquely gauged methods in order to accurately identify, understand, and/or compare objectively without systemic error or unintended consequences.

Each of the theorists surveyed in this section highlights a particular facet of the spontaneous ordering of economic production and material prosperity. The increased population, density, and diversity afforded by material abundance often inspire subsequent cultural, moral, and ideological change. This feeds back on the stability of economic prosperity. The processes of individual perception, collective coordination, and reactive cooperation of such sociological processes are a distinctively human process in need of uniquely human, socially scientific, methodological considerations to accurately understand and objectively assess. Contemporary research and parlance surrounding the more general term *emergence* are less uniquely focused on distinctively human social processes.

The idea of spontaneous social order was at first an inferred conclusion regarding the essential causes of the conspicuous social changes surrounding Enlightenment writers nested within the early stages of the industrial revolution. Spontaneous social ordering through processes of interindividual interaction was, in effect, a basic alternative hypothesis to the previous dominant theories that associated prosperity with the superior foresight and/or divine rights of ruling authority. Having endured similar political arrangements for relatively long periods of previous history, ruling intentions were simply insufficient explanations for the distinct levels of prosperity, human population, and social diversity all found more systematically throughout the developed world amid industrialization than ever before. One could simply not proclaim to be a philosopher dedicated to investigating and understanding human behavior and human society without devoting significant attention to those unique features of the human social world distinctive from all other times, places, and sectors of the natural world.

Though not a researched piece of formal social theory or political philosophy per se, Bernard Mandeville's lyrical fable *The Grumbling Hive: or Knaves Turned Honest* (1705) was nonetheless one of the earliest presentations of the spontaneous order theory and arguably was most responsible for first popularizing the idea throughout the eighteenth century. The poem was quickly republished with additional commentary under the modified title *The Fable of the Bees: or Private Vices, Public Benefits* ([1714] 1992). Both publications gave rise to heated debate and provided significant theoretical inspiration for subsequent theorists and classical liberals throughout the Enlightenment period.

Mandeville's poem remarkably conveyed a relatively complete essence of spontaneous order theory as a hypothesis for explaining the causes and operations of complex social order, namely, that the prosperous, functional, and generally peaceful welfare of human society rests more on the unplanned processes of interacting human individuals than they stem from the plans of ruling authorities or moral theorists. Mandeville's poem was even so bold as to allude to and explicate a nuanced model of socioinstitutional interaction, in other words, how economic prosperity relates to society's moral and cultural qualities and vice versa.

Just as prosperity is not the planned result of authority, neither is the virtuous or depraved character of society, or the general moral patterns of people within it, the product of conscience philosophical reflection or explicitly planned moral campaigns. In short, moral norms are themselves spontaneous orders, and individual moral beliefs are developed within this context.

Mandeville's narrative implied, first, that private vices did not necessarily contribute to broader moral depravity, let alone any sort of material consequences, as many at the time and arguably still today tend to presume. Such is evidenced merely by the simultaneity of prosperity, increased opportunities for vice, and peaceable social functioning. If self-interest, competition, consumption, and vice are so socially problematic, then why amid the observed periods of the greatest increased opportunities and expressions of these behaviors has society undoubtedly progressed materially, culturally, and peaceably?

Thus every Part was full of vice,  
Yet the whole Mass a Paradise;  
Flatter'd in Peace and fear'd in Wars,  
They were th' Esteem of Foreigners,  
And lavish of their Wealth and Lives,  
The Balance of all other Hives. (Mandeville [1714] 1992, 24)

Second, the subtitle of the second publication refers to "Private Vices, Public Benefits"; insofar as self-interested and competitive behaviors are contributors to social order, supposed vice and vanity may be inevitable correlates to prosperity. The freedom required to afford producers and innovators the environment to make and trade goods and services will also provide the requisite freedom to accommodate and afford

a broader variety of civic behaviors, many of which will inevitably strike against previously held moral sensibilities.

Finally, Mandeville implies a specific theory of culturally and ideologically driven social change, hence the descriptor “grumbling” in his original title. Concerted moral campaigns cannot refine their efforts solely to eliminate supposedly harmful vices without also casting aspersions on the general behaviors of self-interested consumption, profit seeking, and competition. Thus, they tend to throw the material progress baby out with the unvirtuous bath water or kill the ornery goose that happens to lay golden eggs. Here, Mandeville is significantly ahead of his time in recognizing that the maturing process of cultural and moral evolution occurs in stride and is related to a society’s material prosperity. Given Puritanism’s popularity and political influence at the time, it is not surprising that Mandeville’s essay provoked such contention. In contrast to the social harms invoked by moral crusades, regulators, and prohibitionists, vice appears marginally welfare-productive.<sup>24</sup>

After Mandeville, Ferguson ([1767] 2001) is often credited with having first recognized the concept of spontaneity when describing the functionality of legal and political systems. His turn of phrase is frequently echoed to convey a succinct but essentially accurate definition for spontaneous order theory:

Men in general, are sufficiently disposed to occupy themselves in forming projects and schemes: But he who would scheme and project for others, will find an opponent in every person who is disposed to scheme for himself. Like the winds that come we know not whence, and blow whithersoever they list, the forms of society are derived from an obscure and distant origin; they arise, long before the date of philosophy, from the instincts, not from the speculations of men. The crowd of mankind, are directed in their establishments and measures, by the circumstances in which they are placed; and seldom are turned from their way, to follow the plan of any single projector.

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. (119; emphasis added)

As Hamowy (1968, 257–258) explains, Ferguson, like Mandeville, also recognized the correlation between material prosperity and the moral attitudes of society:

Many mechanical arts, indeed, require no capacity; they succeed best under a total suppression of sentiment and reason; and ignorance is the mother of industry as well as of superstition. Reflection and fancy are subject to err; but a habit of moving the hand, or the foot, where the mind is least consulted, and where the workshop may, without any great effort of imagination, be considered as an engine, the parts of which are men. (Ferguson [1767] 2001, 182–183)

<sup>24</sup> Such was coincidentally the similar intellectual setup and public reaction to Block (1976).

Ferguson also parallels Mandeville in his recognition that economic prosperity may invoke cultural processes that are potentially self-defeating to prosperity. Specialized populations in the division of labor may not afford the time or energy to comprehend the operational features of the social system they live within, contribute to, and benefit from.

But if many parts in the practice of every art, and in the detail of every department, require no abilities, or actually tend to contract and to limit the views of the mind, there are others which lead to general reflections, and to enlargement of thought. Even in manufacture, the genius of the master, perhaps, is cultivated, while that of the inferior workman lies waste. The statesman may have a wide comprehension of human affairs, while the tools he employs are ignorant of the system in which they are themselves combined. The general officer may be a great proficient in the knowledge of war, while the soldier is confined to a few motions of the hand and the foot. . . .

The practitioner of every art and profession may afford matter of general speculation to the man of science; and thinking itself, in this age of separations, may become a peculiar craft. . . .

[T]he labourer, who toils that he may eat; the mechanic, whose art requires no exertion of genius, are degraded by the object they pursue, and by the means they employ to attain it. Professions requiring more knowledge and study; proceeding on the exercise of fancy, and the love of perfection; leading to applause as well as to profit, place the artist in a superior class, and bring him nearer to that station in which men are supposed to be highest; because in it they are bound to no task; because they are left to follow the disposition of the mind, and to take that part in society, to which they are led by the sentiments of the heart, or by the calls of the public. . . .

We look for elevation of sentiment, and liberality of mind, among those orders of citizens, who, by their condition, and their fortunes, are relieved from sordid cares and attentions. . . .

[Thus,] in every commercial state, notwithstanding any pretensions to equal rights, the exaltation of a few must depress the many. (183–186).

Perhaps not coincidentally, just as Jacobs (1997; 1999; 2000) has inspired dispute regarding whether Hayek or Polanyi originated the term *spontaneous order*, Hamowy (1968) surveys Rae (1895), Carlyle (1910), and Oncken (1909), suggesting that the innovative origins surrounding the idea of the division of labor was a point of personal conflict and made accusations of quasi-plagiarism between Ferguson and Smith. Smith's ([1776] 1904) opening sentences in the first chapter of his economic treatise define the division of labor and cite it as the primary source for the greatest influence upon material growth:

The greatest improvement in the productive powers of labour, and the greater part of the skill, dexterity, and judgment with which it is any where directed, or applied, seem to have been the effects of the division of labour.

The effects of the division of labour, in the general business of society, will be more easily understood, by considering in what manner it operates in some particular

manufactures. It is commonly supposed to be carried furthest in some very trifling ones. (13)

Smith proceeds with applied descriptions of the specialized division of labor within a pin factory, the decentralized production of a common woolen coat, and eventually the inventory processes of corn houses as they operated in conjunction with various tax codes under the corn laws.<sup>25</sup> In all such cases, Smith highlights the self-regulating and equilibrating results of profit-seeking market decision-making. Herein Smith's initial outlines of the classical model of the economy first took form.

Hamowy (1968, 259) suggests that Smith's insights regarding the division of labor are more limited to the economic sphere, compared with Ferguson's more sociological, cultural, and political applications. Smith ([1776] 1904) does address the cultural consequences of expansions in the division of labor and the material progress it engenders:

In the progress of the division of labour, the employment of the far greater part of those who live by labour, that is, of the great body of the people, comes to be confined to a few very simple operations, frequently to one or two. But the understandings of the greater part of men are necessarily formed by their ordinary employments. The man whose whole life is spent in performing a few simple operations; of which the effects too are, perhaps, always the same, or very nearly the same, has no occasion to exert his understandings, or to exercise his invention in finding out expedients for removing difficulties which never occur. He naturally loses, therefore, the habit of such exertions, and generally becomes as stupid and ignorant as it is possible for a human creature to become. The torpor of his mind renders him, not only incapable of relishing or bearing a part in any rational conversation, but of conceiving any generous, noble, or tender sentiment, and consequently of forming any just judgment concerning many even of the ordinary duties of private life. (book V, chap. 1, part 3, article 2)

While it is textually accurate to say that Smith's observations regarding the causes and consequences of the division of labor were relatively limited to the economic sphere of human society, a wider review of his broader sample of writings demonstrates an attempt to fully survey the totality of human social interaction by means of a unified theory of human behavior and socioinstitutional operation. Spontaneous order was in essence the mechanism of operation found throughout various social arenas, from language to morality, economic production, and legal policies. In all applications, there is an inevitable interplay between individual human actions via rational decision-making on the one hand and the existence of structural institutional rules and incentives on the other.

Again, Smith's coining of the phrase "invisible hand," when referring to the self-organizing properties of buyers and sellers in the market economy, is commonly inferred as synonymous with spontaneous order (Nozick 1974, 18–22; Ullman-Margalit

<sup>25</sup> Leonard Read's *I, Pencil* (1958) adopted this same pedagogical technique to great popular success.

1978) and most often referred to its centrally found location (Klein and Lucas 2011) within his most economically oriented work:

But the annual revenue of every society is always precisely equal to the exchangeable value of the whole annual produce of its industry, or rather is precisely the same thing with that exchangeable value. As every individual, therefore, endeavours as much as he can both to employ his capital in the support of domestic industry, and so to direct that industry that its produce may be of the greatest value; every individual necessarily labours to render the annual revenue of the society as great as he can. He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it. I have never known much good done by those who affected to trade for the public good. It is an affectation, indeed, not very common among merchants, and very few words need be employed in dissuading them from it. (Smith [1776] 1904, 455–456)

However, as Hamowy (1986, 78) notes, Smith's ([1759] 1790) earlier work on moral theory also used the "invisible hand" phrase and generally comported to the same idea, that the functional and harmonizing facets of cultural mores and social norms are more the product of unplanned interindividual human behaviors than they are the direct result of conscientious philosophical reflection:

They consume little more than the poor, and in spite of their natural selfishness and rapacity, though they mean only their own conveniency, though the sole end which they propose from the labours of all the thousands whom they employ, be the gratification of their own vain and insatiable desires, they divide with the poor the produce of all their improvements. They are led by an invisible hand to make nearly the same distribution of the necessities of life, which would have been made, had the earth been divided into equal portions among all its inhabitants, and thus without intending it, without knowing it, advance the interest of the society, and afford means to the multiplication of the species. (184–185).

Hamowy (1986, 78) also refers to Macfie (1971) rightly noting that Smith's ([1795] 1982) first mention of "invisible hand" is found in his "History of Astronomy," probably written but not published prior to *Theory of Moral Sentiments*:

For it may be observed, that in all Polytheistic religions, among savages, as well as in the early ages of Heathen antiquity, it is the irregular events of nature only that are ascribed to the agency and power of their gods. Fire burns, and water refreshes; heavy bodies descend, and lighter substances fly upwards, by the necessity of their own nature; nor was the invisible hand of Jupiter ever apprehended to the employed



in those matters. But thunder and lightning, storms and sunshine, those more irregular events, were ascribed to his favour or his anger. Man, the only designing power with which they were acquainted, never acts but either to stop, or to alter the course, which natural events would take, if left to themselves. (vol. 3, section 3).

This chapter lacks the forum or expertise to definitively resolve such matters of historical usage and/or creative authenticity among authors, although the context of Smith's initial use of "invisible hand" within his dedicated material on specifically nonhuman subjects and scientific methodology does seem pertinent. In other words, viewing the range of Smith's applied subject matters, one sees an attempt to develop a theory of human decision-making universally applicable in all variety of social realms: political-legal, cultural-moral, and economic. Smith's forays into non-human natural sciences also appear to be explicit attempts to forge methodological techniques capable of identifying and comprehending the operations of complex systems. With both a theory of individual decision-making and a method for understanding complex interaction in hand, Smith's economic analysis hosted his most systematic contributions to spontaneous order theory. The quantifiable nature of market prices and material production provided analytical traction of spontaneous order processes within the economic sectors more so than in other institutional arenas despite their uniquely human identity, such as language, moral norms, or legal processes.

It is not coincidental or unwarranted that Smith is given prominent attention for most early and systematically identifying and developing the theory of spontaneous orders.<sup>26</sup> It is arguably his particular attention and dedicated analysis of economic processes that afforded him this vantage. Hence, it is within the tradition of economic science, and the Austrian tradition's unique attention to methodology therein, that the most significant attention and insight regarding spontaneous order theory have stemmed from in the wake of Smith.

Most notably, Carl Menger's (1892) account of the spontaneous origins of monetary currency from amid the incentives and procedural behaviors of agents within a barter economy subsequently inspired the research programs of Austrian figureheads Ludwig von Mises and Hayek. Mises's ([1912] 1953) initial goal was to incorporate a theory of money consistently into the broader model of individual decision-making and economic production. Hayek (1945) in turn traced the communicative and epistemic value conveyed by monetary prices in an exchange economy to promote material production and social harmony.

Hayek's initial definitions and applications of spontaneous order theory have been sufficiently summarized above, although it is worth pointing out how significantly his latter insights regarding social morality paralleled other enlightenment thinkers.

<sup>26</sup> Hamowy (1986, 65) cites Kettler (1965), who notes that "Hume found Ferguson's style both unsystematic and inexact."

Hayek (1941) lays out a detailed model of social change wherein social harmony and/or systemic problems hinge critically on the presence of accurate methodologies within the professional social sciences. His shorter essay, “Intellectuals and Socialism” (1949b), proffers an account of the apparent animosity toward market processes popular among professional intellectuals. In his final work, Hayek (1988) explicitly refers to Mandeville’s insights regarding the sociological effects of prosperity. He outlines how tensions arise among instinctive moral beliefs, designed moral beliefs, and evolved moral beliefs.

Throughout the long and active history of thought surrounding spontaneous order theory, a variety of key contextual factors were critical in shaping its substantive content and applications. First, the historical conditions and knowledge of comparative social environments provided thinkers in the tradition with the common vantage to recognize the complex nature of material prosperity and social progress. All began from the basic premise that advanced material production and social harmony conformed to a sufficient degree of patterned operation so as to be investigated and understood scientifically. In turn, these contributors shared a deep appreciation for gauging scientific methodology to suit the needs of human social science.

## CONCLUSION

In a way, spontaneous order theory is both the alpha and omega of a shared research project in positive social science. With its discovery and elucidation, thinkers could utilize the spontaneous order framework as a baseline for comparative institutional analysis. Given the incentive structures of interacting individuals, their diverse interests, and the resource constraints of a particular social context, theorists were left to ask what moral, legal, political, and economic institutions are likely to evolve. How do they compare with those real institutional attempts to manage social welfare by design? Spontaneous order provides the ability to identify and diagnose natural social problems apart from those social problems stemming from unintended consequences of failed plans.

Spontaneous order is the omega of social science insofar as it became for many of its key theorists the critical subject matter to continuously identify and comprehend its procedural operation in all walks of human association. To understand human action and human association essentially requires a keen recognition of spontaneous orders in society and a thorough comprehension of how they operate. Hence, the intellectual tradition stemming from Smith to Hayek and beyond has been keenly focused on both tracking the institutional histories and operations of spontaneous orders throughout social contexts and methodologically reflecting on how best to identify and comprehend social meaning in a complex world of human individuals.

## REFERENCES

- Acemoglu, Daron, and Robinson, James. 2012. *Why Nations Fail: The Origins of Power, Prosperity and Poverty*. New York, NY: Crown Business.
- Allen, Douglas W., and Yoram Barzel. 2011. "The Evolution of Criminal Law and Police during the Pre-Modern Era." *Journal of Law Economics and Organization* 27, no. 3: 540–567.
- Anderson, Terry L., and Peter J. Hill. 2004. *The Not So Wild, Wild West: Property Rights on the Frontier*. Stanford, CA: Stanford University Press.
- Barry, Norman. 1982. "The Tradition of Spontaneous Order." *Literature of Liberty* 5, no. 2: 7–58.
- Barry, Norman. 2008. "Spontaneous Order." In *The Encyclopedia of Libertarianism*, edited by Ronald Hamowy, 485–488. Thousand Oaks, CA: Sage.
- Beckers, R., O. E. Holland, and J. L. Deneubourg. 1994. "From Local Actions to Global Tasks: Stigmergy and Collective Robotics." In *Artificial Life IV*, edited by Rodney A. Brooks and Pattie Maes, 181–189. Cambridge, MA: MIT Press.
- Beinhocker, Eric. 2007. *The Origin of Wealth: The Radical Remaking of Economics and What It Means for Business and Society*. Cambridge, MA: Harvard Business Review Press.
- Benson, Bruce. 1989a. "Enforcement of Private Property Rights in Primitive Societies: Law without Government." *Journal of Libertarian Studies* 9, no. 1: 1–26.
- Benson, Bruce. 1989b. "The Spontaneous Evolution of Commercial Law." *Southern Economic Journal* 55: 644–61.
- Benson, Bruce. 1990. *The Enterprise of Law: Justice without the State*. San Francisco, CA: Pacific Research Institute for Public Policy.
- Benson, Bruce. 1992. "The Development of Criminal Law and Its Enforcement: Public Interest or Political Transfers?" *Journal des économistes et des études humaines* 3, no. 1: 79–108.
- Bladel, John. 2005. "Against Polanyi-Centrism: Hayek and the Re-emergence of 'Spontaneous Order.'" *Quarterly Journal of Austrian Economics* 8, no. 4: 15–30.
- Block, Walter. 1976. *Defending the Undefendable: The Pimp, Prostitute, Scab, Slumlord, Libeler, Moneylender, and Other Scapegoats in the Rogue's Gallery of American Society*. New York, NY: Fleet Press.
- Boettke, Peter J. 1990. "The Theory of Spontaneous Order and Culture Evolution in the Social Theory of F. A. Hayek." *Cultural Dynamics* 3, no. 1: 61–83.
- Boettke, Peter J. 1997. "Where Did Economics Go Wrong: Modern Economics as a Flight from Reality." *Critical Review* 11, no. 1: 11–64.
- Boettke, Peter J., Zachary, Caceras, and Adam, Martin. 2013. "Error Is Obvious, Coordination Is the Puzzle." In *Hayek and Behavioral Economics*, edited by R. Frantz and R. Leeson, 90–110. New York: Palgrave Macmillan.
- Bonabeau, Eric. 1999. "Editor's Introduction: Stigmergy." *Artificial Life on Stigmergy* 5, no. 2: 95–96.
- Buchanan, James M. 1965. "An Economic Theory of Clubs." *Economica* 32, no. 125: 1–14.
- Buchanan, James M. 1982. "A Note Stimulated by Reading Norman Barry, 'The Tradition of Spontaneous Order.'" *Literature of Liberty* 5: 7–58.
- Caldwell, Bruce. 2004. *Hayek's Challenge: An Intellectual Biography of F. A. Hayek*. Chicago: University of Chicago Press.
- Carlyle, Alexander. 1910. *The Autobiography of Dr. Alexander Carlyle of Inveresk*. London: W. Blackwood.
- Christensen, Lars. 2007. "Practices of Stigmergy in Architectural Work." *Proceedings of the 2007 International ACM Conference on Supporting Group Work*: 11–20. New York.

- Christensen, Lars. 2008. "The Logic of Practices of Stigmergy: Representational Artifacts in Architectural Design." *Proceedings of the 2008 ADM Conference on Computer Supported Cooperative Work*: 559–568. New York.
- Coase, Ronald. 1937. "The Nature of the Firm." *Economica* 4, no. 16: 386–405.
- Collins, Harry. 2010. *Tacit and Explicit Knowledge*. Chicago: University of Chicago Press.
- Cowen, Tyler. 1992. "Law as a Public Good: The Economics of Anarchy." *Economics and Philosophy* 8: 249–267.
- Cronk, Lee. 1988. "Spontaneous Order Analysis and Anthropology." *Cultural Dynamics* 1: 282–308.
- Cubeddu, Raimondo. 1993. *The Philosophy of the Austrian School*. London: Routledge.
- D'Amico, Daniel. 2010. "The Prison in Economics: Private and Public Incarceration in Ancient Greece." *Public Choice* 145, nos. 3–4: 461–482.
- Demsetz, Harold. 1967. "Toward a Theory of Property Rights." *American Economic Review* 57: 347–359.
- De Waal, Frans. 1990. *Peacemaking among Primates*. Cambridge, MA: Harvard University Press.
- Dixit, Avinash. 2004. *Lawlessness and Economics: Alternative Modes of Governance*. Princeton, NJ: Princeton University Press.
- DiZerega, Gus. 2008. "New Directions in Emergent Order Research." *Studies in Emergent Order* 1: 1–23.
- Encyclopaedia Britannica. 2015. (editors) "Emergence." Available online: <http://www.britannica.com/EBchecked/topic/185731/emergence>.
- Ellickson, Robert. 1991. *Order without Law: How Neighbors Settle Disputes*. Cambridge, MA: Harvard University Press.
- Elliott, Mark. 2006. "Stigmergic Collaboration: The Evolution of Group Work." *MC Journal* 9, no. 2: 1–19.
- Ferguson, Adam. (1767) 2001. *An Essay on the History of Civil Society*. Cambridge: Cambridge University Press.
- Forbes, Duncan. 1954. "'Scientific' Whiggism: Adam Smith and John Millar." *Cambridge Journal* 7: 643–670.
- Forsyth, Adrian, and Ken, Miyata. 1987. *Tropical Nature: Life and Death in the Rain Forests of Central and South America*. New York, NY: Touchstone.
- Friedman, David. 1979. "Private Creation and Enforcement of Law—A Historical Case." *Journal of Legal Studies* 8, no. 2: 399–415.
- Gambetta, Diego. 1993. *The Sicilian Mafia: The Business of Private Protection*. Cambridge, MA: Harvard University Press.
- Grasse, Pierre-Paul. (1982–1986). *Termitologia*, Vols. 1–3. Paris: Masson.
- Gray, John. 1986. *Hayek on Liberty*, 2nd ed. Oxford: Blackwell.
- Greif, Avner. 2002. "Institutions and Impersonal Exchange: From Communal to Individual Responsibility." *Journal of Institutional and Theoretical Economics* 158: 168–204.
- Hamowy, Ronald. 1968. "Adam Smith, Adam Ferguson, and the Division of Labour." *Economica* 35: 249–259.
- Hamowy, Ronald. 1986. "Progress and Commerce in Anglo-American Thought: The Social Philosophy of Adam Ferguson." *Interpretation* 14, no. 1: 61–87.
- Hamowy, Ronald. 1987. "The Scottish Enlightenment and the Theory of Spontaneous Order." *Journal of the History of Philosophy Monographs*. Carbondale, IL: Southern Illinois University Press.

- Harper, David, and Paul. Lewis. 2012. "New Perspectives on Emergence in Economics." *Journal of Economic Behavior and Organization* 82, nos. 2–3: 329–566.
- Hayek, Friedrich A. 1936. "Economics and Knowledge" *Economica* 4: 33–54.
- Hayek, Friedrich A. (1941) 1980. *Counter Revolution of Science: Studies on the Abuse of Reason*. Indianapolis, IN Liberty Fund.
- Hayek, Friedrich A. 1945. "The Use of Knowledge in Society." *American Economic Review* 35, no. 4: 519–530.
- Hayek, Friedrich A. 1949a. *Individualism and Economic Order* Chicago: University of Chicago Press.
- Hayek, Friedrich A. 1949b. "The Intellectuals and Socialism." *University of Chicago Law Review* 16, no. 3: 417–433.
- Hayek, Friedrich A. 1960. *The Constitution of Liberty*. Chicago: University of Chicago Press.
- Hayek, Friedrich A. 1967. *Studies in Philosophy, Politics and Economics*. Chicago: University of Chicago Press.
- Hayek, Friedrich A. 1973. *Law, Legislation and Liberty*. Vol. 1, *Rules and Order*. Chicago: University of Chicago Press.
- Hayek, Friedrich A. 1988. *The Fatal Conceit: The Errors of Socialism*. London: Routledge.
- Heylighen, Francis. 2007. "Why Is Open Access Development So Successful? Stigmergic Organization and the Economics of Information." In *Open Source Jahrbuch 2007*, edited by B. Lutterbeck, M. Baerwolff, and R. Gehring, 165–180. Berlin: Lehmanns Media.
- Hoebel, Adamson. 1954. *The Law of Primitive Man: A Study in Comparative Legal Dynamics*. Cambridge, MA: Harvard University Press.
- Holland, John. 1992. "Complex Adaptive Systems." *Daedalus* 121, no. 1: 17–30.
- Huemer, Michael. 2012. "In Praise of Passivity." *Studia Humana* 1, no. 2: 12–28.
- Hunt, Louis, and Peter, McNamara, eds. 2007. *Liberalism, Conservatism, and Hayek's Idea of Spontaneous Order*. New York: Palgrave Macmillan.
- Jacobs, Struan. 1997. "Michael Polanyi and Spontaneous Order, 1941–1951." *Tradition and Discovery* 24, no. 2: 14–28.
- Jacobs, Struan. 1999. "Michael Polanyi's Theory of Spontaneous Orders." *Review of Austrian Economics* 11: 111–127.
- Jacobs, Struan. 2000. "Spontaneous Order: Michael Polanyi and Friedrich Hayek." *Critical Review of International Social and Political Philosophy* 3, no. 4: 49–67.
- Kaminski, Marek. 2004. *Games Prisoners Play: The Tragicomic Worlds of Polish Prison*. Princeton, NJ: Princeton University Press.
- Kettler, David. 1965. *The Social and Political Thought of Adam Ferguson*. Columbus: Ohio State University Press.
- Kimbrough, Erik, Vernon, Smith, and Bart, Wilson. 2010. "Exchange, Theft, and the Social Formation of Property." *Journal of Economic Behavior and Organization* 74: 206–229.
- Klein, Daniel, and Brandon, Lucas. 2011. "In a Word or Two Placed in the Middle: The Invisible Hand in Smith's Tomes." *Economic Affairs* 31, no. 1: 43–52.
- Klein, Daniel, and Aaron, Osborn. 2009. "Concatenate Coordination and Mutual Coordination." *Journal of Economic Behavior and Organization* 72: 176–187.
- Koch, Charles. 2007. *The Science of Success: How Market-Based Management Built the World's Largest Private Company*. New York: Wiley.
- Lam, Alice. 2000. "Tacit Knowledge, Organizational Learning and Societal Institutions: An Integrated Framework." *Organization Studies* 21, no. 3: 487–513.
- Landa, Janet. 1994. *Trust, Ethnicity, and Identity*. Ann Arbor: University of Michigan Press.

- Landes, William, and Richard, Posner. 1975. "The Private Enforcement of Law." *Journal of Legal Studies* 1, no. 4: 1–46.
- Lavoie, Don. 1985. *National Economic Planning: What Is Left?* Cambridge, MA: Ballinger.
- Leeson, Peter. 2008a. "An-arrgh-chy: The Law and Economics of Pirate Organization." *Journal of Political Economy* 115, no. 6: 1049–1094.
- Leeson, Peter. 2008b. "Social Distance and Self-Enforcing Exchange." *Journal of Legal Studies* 37: 161–188.
- Leeson, Peter. 2009. "The Laws of Lawlessness." *Journal of Legal Studies* 38: 471–503.
- Leeson, Peter. 2014. *Anarchy Unbound: Why Self-Governance Works Better Than You Think*. Cambridge: Cambridge University Press.
- Leeson, Peter, and David, Skarbek. 2010. "Criminal Constitutions." *Global Crime* 11, no. 3: 279–298.
- Letwin, Shirley. 1977. "The Achievement of Friedrich A. Hayek," In *Essays on Hayek*, edited by F. Machlup, 147–170. Hillsdale, MI: Hillsdale College Press.
- Lewis, Paul. 2011. "Varieties of Emergence: Minds, Markets, and Novelty." *Studies in Emergent Order* 4: 170–192.
- Macfie, Alec. 1971. "The Invisible Hand of Jupiter." *Journal of the History of Ideas* 31: 595–599.
- Mandeville, Bernard. (1714) 1992. *The Fable of the Bees: or Private Vices, Public Benefits*. Indianapolis, IN: Liberty Fund.
- Marsh, Leslie, and Christian, Onof. 2007. "Stigmergic Epistemology, Stigmergic Cognition." *Cognitive Systems Research* 9, no. 1–2: 126–149.
- Martin, Nona, and Virgil, Storr. 2008. "On Perverse Emergent Orders." *Studies in Emergent Order* 1: 73–91.
- McKenzie, Richard, and Gordon, Tullock. (1975) 2006. "The Economic Aspects of Crime." In *The Selected Works of Gordon Tullock*. Vol. 10, *Economics without Frontiers*, 56–72. Indianapolis, IN: Liberty Fund.
- Menger, Carl. (1883) 1985. *Investigations into the Method of the Social Sciences with Special Reference to Economics*. New York: New York University Press.
- Menger, C. 1892. "On the Origins of Money." *Economic Journal* 2: 239–255.
- Merriam-Webster. 2015. "Spontaneous." Dictionary. An Encyclopedia Company. Available online: <http://www.merriam-webster.com/dictionary/spontaneous>.
- Merriam-Webster. 2015. "Emergence." Dictionary. An Encyclopedia Company. Available online: <http://www.merriam-webster.com/dictionary/emergence>.
- Merton, Robert. 1936. "The Unanticipated Consequences of Purposive Social Action." *American Sociological Review* 1: 894.
- Mirowski, Philip. 2002. *Machine Dreams: Economics Becomes a Cyborg Science*. Cambridge: Cambridge University Press.
- Mises, Ludwig, von. (1912) 1953. *The Theory of Money and Credit*. New Haven, CT: Yale University Press.
- Mises, Ludwig, von. (1933) 1978. *Epistemological Problems of Economics*. New York: New York University Press.
- Moldofsky, Naomi. 1989. "The Problems Reconsidered, 1920–1989." In *Order—With or without Design*. London: Center for Research into Post-Communist Economies.
- Nagel, Ernest. 1961. *The Structure of Science: Problems in the Logic of Scientific Explanation*. Indianapolis, IN: Hackett.
- Neumann, J. von. 1951. "The General and Logical Theory of Automata." In *John von Neumann Collected Works*. Vol. 5, *Design of Computers, Theory of Automata, and Numerical Analysis*, edited by A. H. Taub, 289–326. Oxford: Pergamon.



- North, Douglass, John, Wallis, and Barry, Weingast. 2009. *Violence and Social Orders: A Conceptual Framework for Interpreting Recorded Human History*. Cambridge: Cambridge University Press.
- Nozick, Robert. 1974. *Anarchy, State and Utopia*. New York: Basic Books.
- O'Brien, Denis. 1994. "Hayek as an Intellectual Historian." In *Hayek, Co-ordination and Evolution*, edited by Jack Birner and Rudy Van Zijp, 343–374. London: Routledge.
- Oguz, Fuat. 2010. "Hayek on Tacit Knowledge." *Journal of Institutional Economics* 6, no. 2: 145–165.
- Oncken, August. 1909. "Adam Smith and Adam Ferguson." *Zeitschrift fur Socialwissenschaft* 12, no. 1: 129–137.
- Oppenheimer, Franz. (1908) 2012. *The State*. New York, NY: B. W. Huersch.
- Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.
- Ostrom, Vincent. 2007. *The Intellectual Crisis in American Public Administration*. Tuscaloosa: University of Alabama Press.
- Otteson, James. 2008. "Unintended Order Explanations in Adam Smith and the Scottish Enlightenment." In *Liberalism, Conservatism, and Hayek's Idea of Spontaneous Order*, edited by L. Hunt and P. McNamara, 21–42. New York: Palgrave Macmillan.
- Petsoulas, Christina. 2001. *Hayek's Liberalism and its Origins*. London: Routledge.
- Polanyi, Michael. 1941. "The Growth of Thought in Society." *Economica* 8: 428–456.
- Polanyi, Michael. 1951. *The Logic of Liberty*. Chicago: University of Chicago Press.
- Polanyi, Michael. 1958. *Personal Knowledge: Towards a Post-Critical Philosophy*. Chicago: University of Chicago Press.
- Polanyi, Michael. 1962. "The Republic of Science: Its Political and Economic Theory." *Minerva* 1: 54–74.
- Polanyi, Michael. 1966. *The Tacit Dimension*. London: Routledge.
- Polanyi, Michael. 1975. *Meaning*. Chicago: University of Chicago Press.
- Rae, John. 1895. *Life of Adam Smith*. London: Macmillan.
- Read, Leonard. 1958. *I, Pencil*. New York, NY: Foundation for Economic Education.
- Resnick, Mitchel. 1994. *Turtles, Termites and Traffic Jams: Explorations in Massively Parallel Microworlds*. Cambridge, MA: MIT Press.
- Roche, George. 1976. "The Relevance of Friedrich Hayek." In *Essays on Hayek*, edited by F. Machlup, 1–12. Hillsdale, MI: Hillsdale College Press.
- Ropke, Wilhelm. (1937) 1963. *Economics of the Free Society*. Chicago: Henry Regnery.
- Ross, Ashby. 1947. "Principles of the Self-Organizing Dynamic System." *Journal of General Psychology* 37, no. 2: 125–128.
- Ross, Ian. 1987. "Foreword." In *The Scottish Enlightenment and the Theory of Spontaneous Order*, edited by R. Hamowy, 3. Carbondale: Southern Illinois University Press.
- Samuelson, Paul. 1964. *Economics: An Introductory Analysis*. XXX: Robinson.
- Schneider, Louis. 1967. "Introduction." In *The Scottish Moralists on Human Nature and Society*, edited by L. Schneider, xi–lxxvii. Chicago: University of Chicago Press.
- Seabright, Paul. 2004. *The Company of Strangers: A Natural History of Economic Life*. Princeton, NJ: Princeton University Press.
- Skarbek, David. 2010. "Putting the 'Con' into Constitutions: The Economics of Prison Gangs." *Journal of Law, Economics and Organization* 26, no. 2: 183–211.
- Skarbek, David. 2011. "Governance and Prison Gangs." *American Political Science Review* 105, no. 4: 702–716.

AQ: Please  
give city.

- Skarbek, David. 2012. "Prison Gangs, Norms, and Organizations." *Journal of Economic Behavior and Organization* 82, no. 1: 96–109.
- Smith, Adam. (1759) 1790. *The Theory of Moral Sentiments*. Indianapolis, IN: Liberty Fund.
- Smith, Adam. (1776) 1904. *An Inquiry into the Nature and Causes of the Wealth of Nations*. Indianapolis, IN: Liberty Fund.
- Smith, Adam. (1795) 1982. "The History of Astronomy." In *Essays on Philosophical Subjects*. Indianapolis, IN: Liberty Fund.
- Smith, Craig. 2006. *Adam Smith's Political Philosophy: The Invisible Hand and Spontaneous Order*. London: Routledge.
- Tullock, Gordon. 1994. *The Economics of Non-Human Societies*. Tucson, AZ: Pallas.
- Ullman-Margalit, Edna. 1978. "Invisible-Hand Explanations." *Synthese* 39, no. 2: 263–291.
- Von Bertalanffy, Ludwig. (1952). *Problems of Life: An Evaluation of Modern Biological Thought*. New York: Harper & Row.
- Wagner, Richard. 2010. *Mind, Society and Human Action: Time and Knowledge in a Theory of Social Economy*. London: Routledge.
- Wagner, Richard. 2011. "Spontaneous Order, Liberty, and Austrian Economics." *Studies in Emergent Order* 4: 209–223.
- Williamson, Oliver. 1981. "The Economics of Organization: The Transaction Cost Approach." *American Journal of Sociology* 87, no. 3: 548–577.
- Williamson, Oliver. 2002. "The Theory of the Firm as Governance Structure: From Choice to Contract." *Journal of Economic Perspectives* 16, no. 3: 171–195.
- Zerbe, Richard, and C. Leigh Anderson. 2001. "Culture and Fairness in the Development of Institutions in the California Gold Fields." *Journal of Economic History* 61: 114–143.