Society as Ecosystem

Assessing the Metaphors of Human Social Organization

Introduction

Since human beings have been living in civilizations, we have used metaphors in attempts to capture something essential about complex society. Civilizations are not, after all, merely agglomerations of people. They have special functional properties, decomposable relationships and internal dynamics – all of which can be described as ordered, albeit ineffable. It is in such ineffability that we require the aid of metaphor at all. In this paper, we will consider the dominant metaphors for civilization and gauge their verisimilitude; at least, we will test each metaphor's power to unpack the essential features of complex society.

What sort of test might we use? Happily, we can turn to linguistic philosophy for a starting point. In particular, we can look at the nature of metaphor itself and apply the work of philosopher Max Black—specifically his insights into metaphors and models as unique modes of understanding. Black's work will serve as a guide for breaking down the content of our competing metaphors, parsing the relevant aspects and arriving at some judgment about each as it confers (or fails to confer) understanding about complex society.

Despite any difficulties one might have undertaking a project determining, in some sense, the "best" metaphor for society, we should take care to mention that this project is *not* meant primarily as a normative exercise. While it is difficult for anyone engaged in the human sciences to operate free of normative baggage, I am concerned more with limning the world as we find it, rather than holding said world up to a more idealized counterfactual template.

In short, a better understanding of society's form and function is possible and the successful metaphor will reveal certain truths about complex society. In this paper, we will consider what I believe to be the four dominant metaphors[1] of society:

1. Society as family;
2. Society as hive;

3. Society as machine;
4. Society as ecosystem.

We will argue Number 4 – 'society as ecosystem' – is the most truth-conducive. 1-3, we argue, are insufficient for yielding key insights into complex society. Before discussing the relevant aspects of the ecosystem metaphor at length, we will first treat the other metaphors and explain why they fail. Once we have explored the most important aspects of the ecosystem metaphor and considered the shortcomings of the runners-up, we will close by setting the stage for a research program that more consciously nourishes itself on the fruit that 'society as ecosystem' bears.

Whatever truths a metaphor reveals about complex society, these truths will be points from which any utopia-builders must begin (or choose not to begin, at all). Too many, "better worlds" have been conceived in a vacuum – a context-less place in which theories gestate only to be stillborn (or worse). A solid, thoroughly tested metaphor for society can help us avoid some of the pitfalls that come with dreaming up better possible worlds, particularly as we attempt to implement them.

Models, Metaphors and Methodology

The philosophical work of Max Black was certainly carried out on the shoulders of giants. But Black offered us a novel way of looking at metaphor and, more importantly, offered metaphor as a new way of looking at the world. Rigidly analytic philosophers and literary scholars of the past once believed that metaphors are but shortcuts, comparisons or substitutions for what can be communicated in mostly literal language. Black upended this view by showing that metaphors give us cognitive powers beyond mere shortcuts. Indeed, some since Black have argued that metaphors are a fundamental and inescapable aspect of human cognition and language.[2] In short, metaphors are not mere literary window-dressing. They are extremely powerful cognitive instruments without which we might have been lost as a species and without which our understanding of complex society would surely suffer.

Consider the "interaction" view of metaphor put forth by Black: "In the simplest formulation, when we use a metaphor we have two thoughts of different things active together and supported by a single word, or phrase, whose meaning is a resultant of their interaction."

Under the substitution view of metaphor, however, "a metaphorical expression is used in place of some equivalent *literal* expression." Under the interaction view, however, the two thoughts – primary and secondary domains – tap complex associations in mutually reinforcing systems. These systems are alive with conscious and subconscious cognitive content, where one domain can be used as a lens for regarding the other. Black's 'battle-as-chess' example illustrates the power of metaphor as lens, as opposed to a simple, reducible expression whose reduction depends solely on the literal:

> The enforced choice of the chess vocabulary will lead some aspects of the battle to be emphasized, others to be neglected, and all to be organized in a way that would cause much more strain in other modes of description. The chess vocabulary *filters* and *transforms*: it not only selects, it brings forward aspects of the battle that might not be seen at all through another medium.[3] (Emphasis added.)

Black is not embarrassed to suggest that metaphor is a filter, for he realizes that the filter-metaphor picks out something vital in the functional aspects of metaphor as a medium of emphasis, de-emphasis, or transformation. Lest we get bogged down in the playful and recursive aspects of metaphors for metaphor, let us take a moment to enumerate the seven nested concepts of the interaction view:

1. Metaphors have two distinct domains of interaction—a "principle" and a "subsidiary" domain.
2. The domains should be regarded as systems (of associations), rather than things.
3. The metaphor works by applying to the principle domain a system of "associated implications" characteristic of the subsidiary domain.
4. Such implications usually consist of "commonplaces" about the subsidiary domain.
5. The metaphor "selects, emphasizes, suppresses, and organizes" aspects of the principal domain by implying statements about it that normally apply to the subsidiary domain.
6. "This involves shifts in meaning of words belonging to the same family or system as the metaphorical expression; and some of these shifts, though not all, may be metaphorical transfers."
7. "There is, in general, no simple 'ground' for the necessary shifts of meaning—no blanket reason why some metaphors work and others fail."

Before borrowing a couple of additional insights from Max Black, let us detour briefly to explain why we should trouble ourselves with questions about the nature of metaphor at all.

One might reasonably ask why not just argue for the most suitable metaphor on its own merits. But a number of reasons for treating the methodology of metaphor come to mind:

a) There may be some readers who are skeptical that metaphorical language is much more than literary window-dressing, never mind a unique mode of understanding as powerful as any available to us.

b) The interaction view offers us a way of evaluating our "society as x" metaphors without falling into old habits of simple figurative-to-literal reduction. Particularly, "society as x" will have a robustness and vitality independent of literal interpretations, nested metaphors, or theoretical treatments (although we busy ourselves with all of these here).

c) It is important that "society as x" select, emphasize, suppress, and organize the most salient structural functional aspects.

d) Thinking of metaphors also as models offers us more theoretical leverage, particularly in this context—as models pick out the structural and functional properties of a system.

Setting out the methodology of metaphor is important in its own right. After all, if metaphor is a unique human capacity forged in the fires of our Paleolithic past, we would be remiss simply to accept it as some sort of rhetorical given. We have at least to provide justification that metaphor is at the center of language and thus the central methodological tool in our arguments about the nature of human society.

As we begin to unpack the metaphors for society, we should be warned:

> Suppose we try to state the cognitive content of an interaction metaphor in "plain language." Up to a point, we may succeed in stating a number of the relevant relations between the two subjects (though in view of the extension of meaning accompanying the shift in the subsidiary subject's implication system, too much must not be expected of the literal paraphrase). But the set of literal statements so obtained will not have the same power to inform and enlighten as the original. For one thing, the implications, previously left for a suitable reader to educe for himself, with a nice feeling for their relative priorities and degrees of importance, are now presented explicitly as though having equal weight … One of the points I most wish to stress is that the loss in such cases is a loss in cognitive content; the relevant weakness of the literal paraphrases is not that it may be tiresomely prolix or boringly explicit (or deficient in qualities of style); it fails to be a translation because it fails to give the insight that the metaphor did. (p. 46)"

Likewise, our investigation here cannot serve as a replacement of "equal weight" for the associations brought on within us by the metaphor itself, because these excitations will work in unarticulated ways that are the core of a trope's potency. Still, Black leaves us plenty of room for our investigation:

> But 'explication,' or elaboration of the metaphor's grounds, if not regarded as an adequate cognitive substitute for the original, may be extremely valuable. A powerful metaphor will no more be harmed by such probing than a musical masterpiece by analysis of its harmonic and melodic

> structure. No doubt metaphors are dangerous—and perhaps especially so in philosophy. But a prohibition against their use would be a willful and harmful restriction upon our powers of inquiry.[4]

The power of metaphor cuts both ways. And that is precisely why we are taking so much care to dispel some of the metaphors that have captivated us for so long. They have failed in being a proper discovery mechanism. We must probe them deeply, even if we at times employ the stodgy old technique of unpacking them in literal terms. But to unpack is not to reduce. To unpack is to evaluate—to gauge truth-conduciveness.

Before returning to our evaluation of dominant societal metaphors, we'll also be served by looking at *models* as metaphors, or – more specifically – models as a species of metaphor that allows us to draw out functional similarities – *isomorphisms* – aspects common to both the principle and subsidiary domains. In so doing, we will be able to highlight societal metaphors in functional terms—terms which could help us point the way to something deeper, perhaps the very laws of human organization. Returning to Black,

> We have seen that the successful model must be isomorphic with its domain of application. So there is a rational basis for using the model. In stretching the language by which the model is described in such a way as to fit the new domain, we pin our hopes upon the existence of a common structure in both fields. If the hope is fulfilled, there will have been an objective ground for the analogical transfer. For we call a mode of investigation rational when it has a rationale, that is to say, when we can find reasons which justify what we do and that allow for articulate appraisal and criticism. The putative isomorphism between model and field of application provides such a rationale and yields such standards of critical judgment. We can determine the validity of a given model by checking the extent of its isomorphism with its intended application. In appraising models as good or bad, we need not rely on the sheerly pragmatic test of fruitfulness in discovery; we can, in principle at least, determine the "goodness" of their "fit."[5]

Because our societal metaphors function as both metaphors and models, where the latter is a species of the former, we will refer to them henceforth as model-metaphors. Of our model-metaphors, 'society-as-ecosystem' evokes the richest and greatest number of functional-structural isomorphs. While no model-metaphor can yield perfect one-to-one correspondence between domains, the one that yields the most fruit is the one most appropriate for steering any social science whose object of inquiry is human civilization.

In rounding out our discussion of model-metaphor, allow me to be more direct than I have up to this point: Bad metaphors for society have driven a lot of bad policy. In order to migrate to more effective, pragmatic and just policies, it is time we adopted better figures of speech. And that means shaking free

of those metaphors that lead us astray and finding the ones that help us live better lives in accordance with the parameters of human organization.

Failed Metaphors

Now that we have established a meaningful context in which to discuss 'society-as-x' metaphors, there are three dominant model-metaphors that demand treatment: society as family; society as hive; and society as machine. Let us take them in turn.

Society as Family

Families are, in certain respects, natural hierarchies. Children depend on their parents for survival and care, so must yield to parents' guidance, direction and punishment. Grandparents often enjoy a certain degree of reverence due to their experience and wisdom. While familial hierarchies can be tighter or looser depending on a family's culture, context and size, the basic idea is of a natural set of subordinates and superiors, where decision-making power lies with elders who hold sway over younger, less experienced members of the kinship group.

Broadly speaking, the model-metaphor "society as family" has deep roots in both our language and culture, so must be taken seriously. One need only think of the Russian motherland, the German *Vaterland,* or less obvious terms such as "patriot"[6] which comes from the latin *patria,* or male lineage. Society as family can be particularly powerful in certain contexts. Family has all the connotations of closeness, care, protection, warmth and altruism. Even though some of us have families that are more dysfunctional than others, most of us can agree on the concept of family is a close-knit unit of people willing to make sacrifices for one another, based largely on genetic ("blood") relations, extended kinship ties, or marital connections.

For many people, this model-metaphor is meaningful in a number of normative senses. For example, we hear claims to the effect that one has duties to his less fortunate brethren. The biblical injunction "you are your brother's keeper" has arguably mutated into a set of opinions about how government should relate to citizens. We are also expected to comply with rules intended to mitigate risks to health

and safety, or protect us from ourselves—e.g. mandatory seatbelt laws, laws against the recreational drug use, or laws against smoking in public or in private establishments like restaurants. These laws are referred to as "paternalistic" from the Latin *pater,* or father. In such cases, the paternalistic power or government elite can be viewed as a wise father figure, or a controlling nanny, depending on one's perspective. There is more than a little chauvinism in the suggestion that some people in society are naturally parents and others children and this sentiment should challenge the sensibilities of even the most reflexive egalitarian (though so often it does not). Second, while aspects of human caring and fellow-feeling are present in the family metaphor, it is not clear that the implicit hierarchical connotations map very well onto complex society, nor are they necessary to the end of preserving those altruistic dimensions we may intuitively feel are vital to human coexistence. In other words, state authority implementing the scaled-up equivalent of 'share those cookies with your sister' carries less normative force than one would hope given that the redistribution of wealth requires considerable coercion. But I digress. In an effort to avoid controversies about paternalism, I'm going to claim that "society as family" fails in a number of important ways that have little to do with paternalism as a doctrine. (We're concerned primarily with the structural and functional aspects of each metaphor.)

The neural circuitry of human beings was not designed to solve modern-day problems, but to solve the problems of our Paleolithic ancestors. Those ancestors were largely family groups. As evolutionary anthropologists Leda Cosmides and John Tooby write in their primer on evolutionary psychology:

> Natural selection, the process that designed our brain, takes a long time to design a circuit of any complexity. The time it takes to build circuits that are suited to a given environment is so slow it is hard to even imagine—it's like a stone being sculpted by wind-blown sand. Even relatively simple changes can take tens of thousands of years.

The environment in which humans—and, therefore, human minds—evolved was very different from our modern milieu. Our ancestors spent well over 99 percent of the species' evolutionary history roving in hunter-gatherer societies. That means that our forebears lived in small, nomadic bands of a few dozen individuals who got all of their food each day by gathering plants or by hunting animals. Each of our ancestors was, in effect, on a camping trip that lasted a lifetime, and this way of life endured for most of the last 10 million years.[7]

The lessons to be gained from this insight are manifold. First, consider that *if* 99 percent of our ancestors' time was spent on the African steppe, we would not have spent very much time in large-scale

civilizations or even small city-states. So, our ancestors would not have experienced as many problems with what we may refer to as altruism's inability to scale.[8] Or, perhaps more appropriately, would-be ancestors attempting to scale altruistic systems would not have survived to enjoy the ancestor designation. People have only limited time and resources they can devote to others in a family group before risking their own prospects for survival. Perhaps that is why altruism is so powerful when kinship ties are present, for if resources are scarce, sharing with kin makes evolutionary sense. People are *far more likely* to behave altruistically towards people they know and love – especially family – than they are to do selfless things for perfect strangers.

Sharing among communal groups is known in anthropological (and biological) circles as "reciprocal altruism." The very idea of reciprocal altruism – both as an organizing principle of human societies, as well as from the standpoint of the individual – has a component of enlightened self-interest, or at least clan-interest, built into it. That is, such arrangements operate only if there is an expectation someone will eventually give something back to you at some stage. While benefit to you may be on the giver's terms, the arrangement can work well – particularly within small kinship groups with a relatively stark division of labor.

Suppose we accept most of the Cosmides-Tooby thesis that we are evolved *specifically* for Paleolithic life, but are living in modern societies. Three major claims emerge, which are relevant to our family model-metaphor : a) we ran around in small families and clans in the Stone Age; b) acts of sharing and other apparently selfless behaviors can be beneficial in the context of small community as a whole; and c) altruistic acts may or may *not* tend to bring measurable returns to the group once said group scales beyond the level of a clan.[9] We need not rely on evolutionary psychology for anything but an explanation about the origins of certain propensities to behave based on clan dynamics, including the affective dimension to which we'll return. But in looking at claim c) - *altruistic acts may or may not tend to bring measurable returns to the group once said group scales beyond the level of a clan* – we can appeal to the dynamics of both anthropology and economics.

Economist Richard Stroup and political scientist John Baden provide an interesting case study of contemporary small-scale communal groups in the Spring 1972 edition of the journal *Public Choice.*

Stroup and Baden believe communal Hutterite colonies offer insights into the scalability (or lack thereof) of communal life:

> "In a relatively small colony, the proportional contribution of each member is greater. Likewise, surveillance of him by each of the others is more complete and an informal accounting of contribution is feasible. In a colony, there are no elaborate systems of formal controls over a person's contribution. Thus, in general, the incentive and surveillance structures of a small or medium-size colony are more effective than those of a large colony and shirking is lessened."

North American Hutterite colonies offer us a clearer picture of the kind of circumstances Paleolithic peoples may have had to face. And it is for the reasons cited above that Hutterites generally divide and create a new colony elsewhere once the original colony has reached a certain population threshold.

Colonies reach critical mass due not only to problems of accounting for each member's contribution, but more generally to altruism's inability to scale due to an absence of direct trade. Stroup and Baden's work shows *how* common resources can meaningfully be conserved and distributed within the commune, as the behaviors of fewer than a hundred or so people are relatively transparent to any given member of the group. But as groups grow larger, shirking means free-rider problems infect the labor pool. These inefficiencies can cause breakdown in a form of organization with slim margins—in a people for whom failure means famine. Breakdown occurs not only because altruistic behavior becomes less productive as the group increases in size, but the information and incentive structures upon which reciprocal arrangements depend break down, as well. In short, in order to get from small-scale communal cooperation to large-scale transactional cooperation, you have first to change the underlying rule-sets concerning property; second, embrace enlightened self-interest culminating in more direct exchange behavior; and third, specialize.[10]

Another lesson we can take from the idea that our neural circuitry is designed for small Stone Age communities is that human beings are hardwired to varying degrees with what one might refer to as the "Stone Age Trinity." This tripartite cluster of emotional responses seems perfectly appropriate in the context of a roving Paleolithic clan bound together by extended family relationships. In small hunter-gatherer communities, foraged fruit and hunted animals had the shelf life of about a day or two, depending on the weather. With few means of food preservation, hoarding not only made little sense, but would have been detrimental to the clan from an evolutionary standpoint—detrimental both to sharing relationships that ensured tighter ties and mutually protective associations, as well as to the more direct concerns, such as keeping the group fed. In the Stone Age context, therefore, it made sense

to share more and hoard less. And we have evolved emotional propensities that track this state of affairs. Around these emotional propensities, however, we are too often tempted to craft grander normative theories, like the following by philosopher Virginia Held: "the focus of the ethics of care is on the compelling moral salience of attending to and meeting the needs of the particular others for whom we take responsibility."[11] We haven't the space to provide an adequate treatment of Held's theory, but, far from functioning as a province of the clan, Held's ethics of care is meant as a moral-political doctrine with global application.[12]

Emotional responses that track well with the conditions of Stone Age clans are what the philosopher Robert Nozick identified as "guilt" and "envy." I would add to these "indignation."

- When Ogg compares his economic station to that of another in his clan who has *less,* he feels guilt.
- When Ogg compares his economic station to that of another in his clan who has *more,* he feels envy.
- When Ogg compares another person (who has more) with another person (who has less)*,* he feels indignation.

Our egalitarian instincts are in large measure an evolutionary throwback, an epiphenomenon. That is, in the context of a small Stone Age community – where guilt, envy or indignation might have meant the difference between life and death to a clan – we can say such emotions tended to confer survival advantage on the group. But it is not altogether clear these emotions are always (or even often) appropriate for complex society. After all, complex society relies on a set of institutions for success[13] that run counter to some of our more egalitarian affective responses. These institutions include: private property, savings and investment (hoarding), and trading relationships rooted more in enlightened self-interest than in communal reciprocity.

All this is not to argue that guilt, envy, and indignation are simply Stone Age emotions we'd be better off without. It is to suggest the Trinity is *very often* the set of Stone Age emotions appropriate to very narrow circumstances—circumstances that rarely, if ever, include human political institutions at the level of the nation-state. This is primarily a pragmatic claim, rather than a normative one. But if we are

right, it is unfortunate that the Stone Age Trinity shows up so often in the political zigzag of our time.

In curbing some of the errant affective responses that arise in complex society as result of the Stone Age Trinity, we can embrace the benefits of specialization and trade identified by Ricardo and Smith, and touted by economists today. In fact, the way we cooperate without being altruistic is to transact. And yet *homo economicus* – economic man – is one of the most reviled terms ever to appear in an academic journal. Nevertheless, a limited species of Economic Man is an apt description of an abstract actor in complex society. Notwithstanding the work of scholars ranging from Marx to contemporary communitarians like Virginia Held, *homo economicus* is a useful model for human beings as members of large-scale civilization because *homo economicus* can be no family man. He is rather a consumer, a trader and a creator of value within an expansive and complex web of interdependency. Scalable, cooperative arrangements require some of the "rational indifference" and "utility maximization" that the Economic Man characterization entails. For example, one need not know who boxed her cereal or picked her coffee beans, and yet both parties are better off than they would otherwise have been in the absence of exchange.

Of course, real families operate nested within large-scale society every day as functioning subsystems. This apparent paradox is one that can be resolved simply by looking at how families function within the extended order, rather than attempting to see the extended order as a family. We need not get bogged down in critiques of rational choice theory or of idealized economic models with presumptions about perfect information in order to move asymptotically towards *homo economicus.* By accepting a wartier version, say Trading Man, as society scales up and impersonal transaction replaces reciprocal altruism, we can hold a model of the human in our minds that doesn't give up what it means to be human. But before we accept the Trading Man characterization without further reflection, we should unpack it some. In doing so, it may come to sit a little better with us.

Another assumption about variations of *homo economicus* is that these actors have an affect largely of indifference toward one another outside of their kinship groups. In our discussion of altruism's inability to scale, we pointed to reasons why mutual indifference is the rule on large scales of human organization. Because we are limited in our ability to be altruistic members of some global clan, however, doesn't mean we can't be transactional actors, i.e. traders, cooperators, contributors, and

collaborators. Corporate and community arrangements alike require a mien of cooperation and trust; indeed, trust is the bedrock. While altruistic forms of behavior may seem nobler than cooperative behaviors in which cooperators receive mutual benefit, questions about nobleness (intensions) depend on moralistic presuppositions that are likely to terminate in the Stone Age Trinity. In bald consequentialist terms, cooperative behaviors built on mutual benefit are far more productive than communal behaviors, because – while both behavioral types have opportunity costs – cooperative behaviors are the basis of market arrangements.

Why should we care about market arrangements? The problem of altruism's inability to scale might more aptly be described as a zero-sum phenomenon. At whatever scale on which altruism successfully operates, we have a situation in which an actor's gain (or loss) is balanced by the losses (or gains) of the other actors. When one adds up the total gains of the actors, then subtract the total losses, one gets zero in these situations. More simply: in order for someone to win, someone else has to lose. Altruism is zero-sum because, once Ogg has given a resource to someone, Ogg no longer has it.

"Ah," the astute observer will reply, "but the beauty of a family/commune is that there is reciprocity. People share and share alike. So is it really zero-sum?" Yes and no. At the point of sharing, the answer is yes. Though when your comrade returns some act of sharing, there can be a positive-sum outcome—either with respect to you, or with respect to the group taken as a whole. But then again, isn't reciprocal sharing-behavior just an inefficient form of exchange stretched out over time? That is, if you have the expectation that value will be returned to you later in exchange for what you are giving now, don't you have a trading relationship with higher hopes and fewer guarantees (or increased risk and higher transaction costs, in the parlance of the economist)? Such is why reciprocal behaviors in families and smaller communities can be successful, as inter-personal forces, social pressures (informal institutions) and the economic realities of the family ensure these less efficient, less productive transactions take place. But for productivity to be rewarded, the transactional arrangements must evolve towards more direct forms of exchange grounded in different institutional rules.

To reiterate: in order to make a complexity transition[14] from a small commune to a networked economy, we have no choice but to accept the both the behavioral forms and institutional rules that establish the bases of exchange. In other words, caring is not enough. What we need are basically self-interested actors working cooperatively in the service of diverse ends. To wear a well-worn quote: "It is not from

the benevolence of the butcher, the brewer, or the baker, that we can expect our dinner, but from their regard to their own interest." With that famous line, Adam Smith was able to show how the welfare of many people could be served by mutually cooperative arrangements that terminate in acts by mostly self-centered individuals. These arrangement help people escape the problem of altruism's inability to scale. So-called "positive-sum" outcomes between individual and group traders make it possible for groups larger than communes to flourish.

Affective ties with family or friends are limited on a number of dimensions: proximity, frequency of contact, the limits to remembering faces and names, the quality or depth of relationships and the amount of time we can spend fostering said relationships, and the extent to which we carry evolved biases toward family or established biases toward friends. Intuitively, we can see how more egalitarian cooperative behaviors such as gifts and reciprocity are easier to sustain in contexts where interpersonal bonds are strong and groups are smaller. Trust and social capital are more likely to be plentiful in familial and peer networks.

The Stone Age Trinity that once helped human beings maintain strong relationships among family and friends can be powerful even today. It is perhaps only natural to believe that behaviors appropriate in small groups should be applied in any context. That is why we often project our affect onto large-scale society. So we must take caution. Our altruistic predilections – along with our evolved ability to conceptualize and to abstract – cloud our judgment in limiting our more egalitarian behaviors to the practicable.

Knowledge of people suffering around the globe, for example, can arouse long-distance sympathies. Mass media and global communications become a double-edged sword, as access to information across great distances means images of people suffering on other continents sometimes make us feel compelled to act. While mass media and human abstraction allow us to extend our compassion to real people in distant geographies, the harsh reality of scarcity places limits on our ability to convert *our* altruistic acts into *their* prosperity. Such is not to argue that technology and wealth creation does not allow us to share with more people over greater distances. It does. I would argue, rather, that for there to be an aggregate positive-sum outcome to any cooperative arrangement, exchange must be the norm, respectful indifference the overriding sentiment, and private property the rule. Making oneself marginally poorer here to make someone marginally richer far away is no recipe for economic prosperity

anywhere. Growth depends on productivity increases, which depends on trade, which depends on institutional change. Technological advancements that lower transaction costs and bridge greater distances allow us to exchange goods and services with peoples worldwide. So paradoxically, the failure of foreign aid, for example, has been a failure to see that international wealth redistribution may actually be little more than an incentive to dependence, where lower trade barriers would be an incentive to increase productivity. But let us not digress.

Markets thus function phenomenally well in the relative absence of the community's trappings of highly concentrated trust and social capital (i.e. the degree of trust required to facilitate reciprocal altruism). The interpersonal attitudes that go along with market exchanges can be flat, and usually require indifference for both parties to maximize benefit to themselves—however a given party defines benefit. On aggregate, Ricardian processes of comparative advantage, as well as Adam Smith's "invisible hand," are almost always at play. Such is not to say that sometimes market actors won't ever choose unwisely upon reflection or that the processes of generating positive-sum outcomes never involve transition costs. It is simply to say that – by and large – exchange is the only way to achieve prosperity in the broader context of society.

To many, all this may sound as if we are attempting to slip a normative claim into the discussion via some anthropological sleight of hand. Indeed, philosophical utilitarians in the mold of Bentham and Mill may be happy about the conclusions we've reached here. But we should stay away from either hedonic calculi or attempts to make "the good" into an objective, reducible phenomenon (never mind, for that matter, deontological claims to knowledge of any right or moral law). Our business here, though philosophical, is mostly non-normative.

Suffice it to say that human nature and economic reality present us with a set of facts with which we must deal, to get along and to get by. As philosopher David Gauthier writes:

> Scarcity is the humanly necessary evil. Faced with scarcity, choice as a device that, in selecting some activities, rejects others, is necessary, and the rule of rational choice is maximally to fulfill one's preferences. The supposition that to conceive a human being as a maximizer of expected utility is to conceive him in a limited way, determined by the particular conditions of our own Western society, but neither generally applicable or ideally appropriate, is mistaken. Utopia, in which maximization would not be expressive of human rationality, is illusory; only a god, of whom we can have no conception, could inhabit such a realm.[15]

Indeed. Utopia is the realm of scaled-up altruism.

The broad characterization, thus far, is that human beings are can be successful caregivers in the context of small social networks, and can be successful market traders in the context of large-scale society. The peer-to-peer altruism of family and clan – at least that altruism that does not require the coercive apparatus of the state – is constrained by scarcity. Given our discussion up to this point, it may seem as if human actors described in terms like *homo economicus* become reduced to dots in some organizational schematic. But if we hold up a spyglass, what we should find are not just "actors" or "market actors," but real people with very real conceptions of what happiness and the good are. David Gauthier again:

> A just society is neither a Utopia, nor a society of economic men. It provides a framework for community but is not communal. The socialization that it affords its members promotes the realization of their autonomy. The division of labor that it embraces broadens individual opportunity, and encourages the realization of a wide range of complimentary human potentialities. It is a society of liberal individuals, free to establish their own goals and to choose their own affective ties with their fellows.[16]

It is with Gauthier's quote that I now betray a little of my normative baggage. But before stepping into this territory, we will do well to continue discussing metaphor-models for society that don't make the cut. To close this section then, we will suspend discussion of how we understand the human being in philosophical terms and conclude that society as family fails.

Society as Hive

Society as hive is the least obvious of the model-metaphors and has enjoyed, perhaps, the least fanfare. But that means neither that it is innocuous, nor that it lacks the potential to capture our imaginations again. For many, society as hive still lurks in the subconscious, for better or worse. Albert Einstein once wrote in his essay "Why Socialism?": "It is evident, therefore, that the dependence of the individual upon society is a fact of nature which cannot be abolished – just as in the case of ants and bees." There is little to disagree with in Einstein's statement on its face. Individuals are, indeed, interdependent – which is nearly a tautology as we go about discussing society. But those for whom society-as-hive is meaningful make at least one of three primary errors in embracing this model-metaphor, linking it as they do to the fact of human interdependency: 1) the fact of interdependence somehow gets transmuted into a moral value (intended to justify hierarchy and/or forced redistribution by the state);

2) that cooperation must be non-voluntary and/or non-transactional; and 3) slip into their metaphor a concept of hive insects that is old and inaccurate, involving hive hierarchies as largely an interpolation of feudal/hierarchical human social structures. Let's consider each error.

First, how does a fact of human interdependence get turned into a moral value? For that matter, we can take up the Humean question of 'is' versus 'ought' and ask how any fact gets turned into any value. In short, the world as we find it does little to confer moral duties upon us. A fact has no normative content. So if we find interdependency among humans (never mind how loosely or tightly we may define interdependency), it is not clear from the discovery of such facts that more interdependency is better, or that forced interdependency is an emergent moral value. Sliding from fact to value is referred to as the "naturalistic fallacy" and it infests hive metaphors.

Second, we can agree that ants cooperate. What we may not agree on is the nature of their cooperation. An interpretation of Aesop's The Ant and the Grasshopper fable by a young socialist is a good illustration on how such disagreements about the nature of cooperation arise:

> The "Traditional Version" shows the failure of Free Enterprise Capitalism. The individualist Grasshopper, a libertarian living only for himself, is devastated by economic realities. While the socialistic Ant, living as he does in a cooperative nest where all workers contribute to the well-being of the whole, prospers and survives.[17]

Apart from putting forward a caricature of both libertarians and socialists, this young socialist unwittingly makes an unfortunate, but common, slide between voluntary cooperation and non-voluntary cooperation, the latter of which socialism exemplifies. (I'll pass over the fact that in the original fable, the ant leaves the Grasshopper, who has chosen not only *not* to cooperate, but to shirk, to starve—which is hardly socialist.) The question of whether or not ant cooperation is voluntary makes little sense, however. In the context of creatures to which serious questions about autonomy (political or cognitive) simply don't apply, comparisons between human communities and anthills miss something very serious, indeed. The fact of human cognition and consciousness with its attendant demand for rights and freedoms is nothing to be taken lightly. It is as much a mistake to attribute self-concept to ants a la Aesop, as to attribute to human minds the simple program of an agent in a hive.

This leads us to a final error that we might refer to as 'thinking of hives too much as hierarchies.' *New York Times* columnist Nicholas Wade writes of biologist E. O. Wilson: "He is preparing a treatise on the forces of social evolution, which seems likely to apply to people the lessons evident in ant colonies." Will these be lessons about decentralization and cooperation, or lessons about government control over economic life? Let's hope the former. For if anyone knows, E. O. Wilson ought to know that ant colony cooperation is a complex adaptive system (which we'll return to later). But if history is a guide, Wilson has betrayed a penchant for drawing fallacious conclusions from his entomology, according to Daniel C. Dennett:

> The same defects can be seen in the attempt at ethics by another Harvard professor, E. O. Wilson, one of the world's great entomologists and the coiner of the term "sociobiology" (1975). In his ethical treatise *On Human Nature* (1978), Wilson (pp. 196, 198) faces the problem of identifying the *summum bonum* or "cardinal value," and comes up with two coequals: "In the beginning the new ethicists will want to ponder the cardinal value of the survival of human genes in the form of a common pool over generations…. I believe that a correct application of evolutionary theory also favors diversity in the gene pool as a cardinal value." Then (p. 199) he adds a third, universal human rights, but suggests that it must be demythologized. A "rational ant" would find the idea of human rights "biologically unsound and the very concept of individual freedom intrinsically evil."[18]

Witness the is-ought two-step. Second-year students of philosophy would read this passage and join Dennett in calling out Wilson for committing the naturalistic fallacy. And they would be right. One might plausibly derive comparisons between the domains of society and ant colony, but one cannot contrive ant ethics based in the findings of any entomological investigations. As we have suggested, the question of whether ant colonies are worth emulating is first a practical (i.e. structural/functional) question. But the difficulties don't stop there.

Ants and bees are much more decentralized animals that we give them credit for. The terms "queen" and "worker," for example, allow the language of human hierarchy to bleed into our descriptions of these creatures. That means our own anthropological baggage had been packaged into to a crude understanding of hives and is now bleeding back into our metaphors of ourselves! With such anthropomorphism, we are in a roundabout way using transitional form of human society (feudalism) to describe contemporary society, which is not altogether

enlightening. So what, then, is the correct view of ant colonies? How do they function?

Consider this gestalt shift from Camille Ricketts writing in the *Stanford Daily*:

> Ants use their antennae to detect and react to chemical information from their environment and from one another. They can sense volatile chemicals in the air, such as alarm pheromones that can warn the colony of approaching danger. Antennae can also be used to collect information about other ants they come into contact with.

Essentially the ants are like software programs responding to signals, which function as kinds of rules. But rules are not commands:

> There is no central force telling each ant what to do in a harvester ant colony... Instead, each worker makes decisions about what activity to perform based on a set of simple rules. These decisions are largely based on the detection of local information that somehow reflects the global needs of the colony. Overall these individual decisions determine colony behavior.

In essence, the colony is an emergent order of fundamentally simpler rules. But let us not get ahead of ourselves. For the moment, suffice it to say that hierarchical hives are not really found in nature the way some imagine. And if insect biologists are right about ant-, bee- and other hives as a function of rule-based distributed networks, complex society may, indeed, be like a hive in this respect. But society as "real" hive may be a subset of a broader metaphor to which we'll later turn.

We have already discussed the Hutterites and their scalability issues. We should find it interesting, then, to run across this passage by Eliot Sober and David Sloan Wilson cited further in Dennett's *Darwin's Dangerous Idea*:

> Like a honey bee colony, Hutterite brotherhoods split when they attain a large size, with one half remaining in the original site and the other half moving to a new site that has been preselected and prepared. In preparation for the split, the colony is divided into two groups that are equal with respect to number, age, skills and personal compatibility. The entire colony packs its belongings and one of the lists is drawn by lottery on the day of the split. The similarity to the genetic rules of meiosis could hardly be more complete.

But Dennett rightly wards off the "genetic" fallacy (so to speak), arguing that, while Sober and Wilson are "right to present the Hutterite ideals as the essence of organismic organization, … the big difference is that for people – unlike cells in our bodies, or bees in a colony – there is always the option of opting out. And that, I would think, is the last thing we want to destroy in our social engineering."[19]

Before closing this section, it bears elaborating on the point that human hierarchies (such as feudal societies) may have been an intermediate step in the development of human societies from hunter-gatherer clans to complex civilizations. As mathematician Yaneer Bar-Yam reminds us, complexity transitions occur "when the collective complexity exceeds the maximum complexity of an individual. Then, filtering of information on the way up, and elaboration of directives on the way down, are ineffective."[20] Rigid hierarchies are thus, like norms of altruism, not scalable. It is thus curious that we can find agreement with the socialist Einstein, who says:

> It is evident, therefore, that the dependence of the individual upon society is a fact of nature which cannot be abolished—just as in the case of ants and bees. However, while the whole life process of ants and bees is fixed down to the smallest detail by rigid, hereditary instincts, the social pattern and interrelationships of human beings are very variable and susceptible to change. Memory, the capacity to make new combinations, the gift of oral communication have made possible developments among human being which are not dictated by biological necessities. Such developments manifest themselves in traditions, institutions, and organizations; in literature; in scientific and engineering accomplishments; in works of art. This explains how it happens that, in a certain sense, man can influence his life through his own conduct, and that in this process conscious thinking and wanting can play a part.

Where Einstein and we part ways is in following where such observations take us. For Einstein, it leads to socialism. But we need not be concerned too much about the differences between human beings and bees, particularly in the range of options available to each species respectively (due, for example, to our cognitive powers and conscious awareness). The common thread is the rule from which emerges an order that no mind, committee or byzantine bureaucracy can plan, much less direct. As Hayek reminds us, such an order precludes socialism.

Society as Machine

Society as machine is the consummate model-metaphor. Physical or "scale" models, after all, are very often meant to duplicate the causal-physical isomorphs of something larger. That larger thing is often a machine. If the processes and relational properties in one are represented in the other in one-to-one correspondence, the model is also a machine.

That is, perhaps, one reason why society as machine is the most stubborn of the false model-metaphors. Machines, since they are both designed and manufactured by human minds are effable and knowable, and thus potentially understood in a manner consistent with a discrete, deterministic system (i.e. closed cause-and-effect system). If we can pin our hopes on such a knowable system, societies (economies) become knowable, too, however complicated they may be.

To see just how deep this metaphor has been over economic history, one need only consider examples like the following, from *the Guardian* newspaper:

> A sensation when it was unveiled at the London School of Economics in 1949, the Phillips machine used hydraulics to model the workings of the British economy but now looks, at first glance, like the brainchild of a nutty professor. Where the Bank's [of England] team of in-house economists are equipped with state-of- the-art digital computers, the profession's first stab at modelling was very much a do-it-yourself affair with a whiff of the Heath Robinson about it.
>
> The prototype was an odd assortment of tanks, pipes, sluices and valves, with water pumped around the machine by a motor cannibalised from the windscreen wiper of a Lancaster bomber. Bits of filed-down Perspex and fishing line were used to channel the coloured dyes that mimicked the flow of income round the economy into consumer spending, taxes, investment and exports. Phillips and Walter Newlyn, who helped piece the machine together at the end of the 1940s, experimented with treacle and methylated spirits before deciding that coloured water was the best way of displaying the way money circulates around the economy.[21]

John Maynard Keynes, the grand old man of the machine metaphor, would have been either delighted or incensed by such a contraption: delighted by the idea that economic inputs and outputs could be rendered in tubing and Easter egg dye; incensed, perhaps, that the various functional elements were not represented as faithfully as they could have been by a more enlightened economist.

All of this is not to mock Keynes, but rather to express that those under the spell of the machine metaphor truly believe that the economy can be designed, controlled and fully understood – so long as the right sort of intellectuals are manning the rheostats. Keynes, of course, fancied himself as just that sort of fellow. But this is no less true of the central banker, the politician, or Keynesian *New York Times* columnist of today.

Consider these examples, which are variations on the machine metaphor-model:

- J. M. Keynes and F.D.R. – The economy is a "pump" that needs to be "primed."
- Paul Krugman – "What's interesting about [the Bush Administration] is that there's no sign that anybody's actually thinking about 'well, how do we *run* this economy?'"
- Jeff Madrick, writing in *The Nation* – "The American economy is *broken.* And it's not likely that the Democrats, even if they do as well as expected in the 2008 elections, are going to *fix it.*" (Emphases mine.)

So what is wrong with the machine metaphor? Why would Czech President Vaclav Klaus say "the market is indivisible; it cannot be an instrument at the hands of central planners"?

Three embedded assumptions of 'society as machine' lie at the heart of this machine metaphor's failure:

- First, if an economy behaves according to certain laws, it is deterministic;
- Second, if the economy is deterministic, the intricacies of its complex relations are, in principle, knowable; and
- Third, if its intricacies are knowable, the economy is manipulable—where manipulation can be carried out for the sake of someone's ideal social outcome.

Call these three false assumptions the problem of "Intelligent Design" (ID).

Let's take these in turn.

It is true that economies, like machines, tend to behave according to certain laws. But the fact of nomic regularity does not determinism make. Indeed, we can distinguish between two forms of non-determinism: epistemic and systemic. At least one of these forms is relevant to the economy of a

complex society.

Economies can be said to be epistemically non-deterministic in that, whether or not the underlying pattern of relationships is *in principle* knowable (say, by some omniscient being), we mere mortals are unable fully to understand them or make adequate predictions about the system *in practice* (as opposed to in principle). In short, there are limitations to our knowledge. A mind (or even a group of minds) simply doesn't have the processing power to reckon with the complexity of the extended order. This is referred to by those familiar with the work of F.A. Hayek as the "knowledge problem."[22] Austrian economists are at least correct in cautioning us about the knowledge problem due to our epistemic inadequacies, i.e. our inability to limn the full nature of an economic system and our inability to anticipate unintended consequences that follow from attempts to intervene in economic affairs. But the question of epistemic determinism hinges mostly on human beings' cognitive limitations—limitations that require us to embrace the ongoing discovery processes of markets, prices and competition (in lieu of macroeconomic data and planning). So, while the emphasis for Austrian economists rests mostly on the epistemic question, the question of systemic (ontological) determinism is perhaps moot by their lights.

For a few in the tradition of Mises and Hayek, however, the system can, *itself,* be said to be non-deterministic—hence, *systemically* non-deterministic. It is thus not merely that the system is too complex for any one person fully to comprehend (including the relevant causes, effects and patterns of relationships), it is that causal irregularity is a property that *inheres* in the system itself—whatever the purported knowledge of the knower. Some fictional omniscient observer would find that a system is non-deterministic at root, which is to say that the pattern of relationships is not even, in principle, knowable to said observer. For even if one had perfect information about the inputs and outputs of a system, it makes no sense to say that one could have perfect information about millions of subjective values (immune as they are to transmutation into data), much less the instantiations of millions of means-ends processes flowing from said values—flowing not in two-dimensional time-slices, but in a fluid, multidimensional time series where probabilities are the norm. One can argue that economies are also non-deterministic based on considerations of complexity science, a consideration we'll return to later.[23] Suffice it to say for now that economic systems are at least epistemically non-deterministic (unknowable due to limitations of the human mind), if not also systemically non-deterministic (unknowable due to systemic unpredictability). And in this way, socio-economic systems are wholly

unlike machines, at least the kind of machines that are artifacts of knowing, designing minds.

As the first two assumptions of the machine metaphor fall, the third – that of manipulability – also falls. The idea that a person or group of people can manipulate an economy to some ideal social outcome depends to a significant degree on epistemic determinism, which is, to repeat, the idea that we can have complete, or at least near-complete, knowledge of the causal processes in society. Of course, the very idea of an ideal social outcome is also fraught with difficulties and is another reason that subjective valuation is central to the whole enterprise of economics. Welfare economists and practitioners in related fields tend to neglect subjective valuation, perhaps because they are tempted by the idea that happiness, welfare or the good is calculable from on high, and/or that the economy is manipulable due to its apparent predictability. They do so at our peril.

But let us not go too far afield with talk of subjective value. Suffice it to say the notion that value lies in the breast of the subject forces us to embrace a certain degree of humility with respect to any discussion of aggregate human behavior. Such is not to argue that economics ought to do away with measurement and data, but rather it is to stand humbly before the vast, ineffable network of associations, means-ends processes and shifting human desires and admit that we have no God's-eye view, nor insight into the ultimate preferences of the many (much less the whole). Once we make such an admission, the project of economic manipulation becomes baseless and futile. Society as machine stutters, then stalls.

Hence, the "intelligent design" problem. We should find it ironic that so many intellectuals who scoff at advocates of ID as response to evolution find the central Darwinian insights so difficult to apply in economic matters. At the risk of getting ahead of ourselves, those who are right about evolution unwittingly borrow from the errors of Intelligent Design (ID). ID is the hypothesis that some Cosmic Tweaker is needed in the interstices where evolution-based explanations are purportedly incomplete—whether due to gaps in the fossil record, or to the nascence of genetics. A species of the "God of the Gaps" fallacy, ID gets a hard time from academics who point out that, upon further reflection, natural selection (and sexual selection) no more needs a Designer to fill gaps or set things in motion than evolution has an ideal end-point up-to-which the Designer will work, then call it a day. Crudely put, life on earth is what it is. It may be beautiful, mysterious, diverse, and plural, but it is not an artifact of any intelligence at all. Rather life on earth is the complex outcome of nature's stuff plus nature's regularities

blending, meshing and transforming in a startling array that is unknowable by a single human mind.

Arguments made by interventionists, progressives and pump-priming politicians take on a number of parallels. “Market failures,” like explanatory gaps, should be fixed by government bureaucrats and regulators, they believe. But at least the Creationist’s Designer is omniscient. Interventionists forget that governments, too, are human organizations subject to systemic failure; never mind the personal failure, cognitive limitations and venality of those who comprise a bureaucracy. Indeed, the most serious conceit of the interventionist is that even the most intelligent, well-intentioned bureaucrat has the knowledge, wherewithal, and perspicacity to design an economy and anticipate all of the distortions and unintended consequences that, inevitably, will follow. Again, government is analogous to God – except, in the case of an economy, the Intelligent Designer is not omniscient. Even if a bureaucrat is responsible for regulating only some small aspect of an economy, he almost always suffers under the delusion that the industry he is responsible for designing in His image is something meant to be – or is capable of being – designed. And that is the problem. No central organizer can possibly reckon with the complex networks and incentive systems that cascade through the extended order on a continuous basis. The Government of the Gaps is as naïve to the Austrian as the ad hoc Intelligent Designer is to the enthusiast of Darwin.

We haven’t the space here to belabor the problems of what Hayek calls “scientism,” but Hayek has done most of the necessary work. Consider this tidy summary from his Nobel lecture.

> It seems to me that this failure of the economists to guide policy more successfully is closely connected with their propensity to imitate as closely as possible the procedures of the brilliantly successful physical sciences - an attempt which in our field may lead to outright error. It is an approach which has come to be described as the "scientistic" attitude - an attitude which, as I defined it some thirty years ago, “is decidedly unscientific in the true sense of the word, since it involves a *mechanical* and uncritical application of habits of thought to fields different from those in which they have been formed.”[24] (Emphasis mine.)

Most Austrian economists believe one of these counter-productive habits of thought is the machine model-metaphor, which so often carries one to the practice of economic ID.

Maybe the most lamentable aspect of the economic ID is *not* the obvious planning failures such as the Soviet State, East German Trabant, higher food prices due to biofuel mandates, or the eventual business-cycle bust after a pump-priming. What is more regrettable is the unseen costs: the value never created due to intervention. What innovations were stifled? What value-creating enterprise was never

born (because, for example, a rent-seeking corporation colluded with a politician to raise the barriers to entry for an upstart in his sector—all in the name of "consumer protection")? What wealth might have been created? The cost of regulation is, a la Bastiat, largely invisible. The purported "protections," whether or not they jibe with any libertarian sense of non-harm or reasoned appraisal of risk, are carried out through the Rube Goldberg apparatus of state as opposed to less centralized means such as the Common Law. That we should have all this handwringing over the counterfactual worlds of unseen costs is, perhaps, puzzling to some. But unseen cost is unrealized value.

In order really to appreciate the failure of the machine metaphor, we must argue by way of contrast. Therefore, let's turn now to the metaphor I believe to be most truth-conducive: society as ecosystem.

Society as Ecosystem

Many of the lessons above – about the inability of altruism to scale, networks masquerading as hierarchies, or the limitations of knowledge – are probably not new to the classical liberal of Austrian bent. Within this community, such lessons are in perpetual refrain. But we seem unable to penetrate the walls of our own sanctuary. And that is why we can no longer afford merely to stand athwart history and yell "it's the economics, stupid." We must change our metaphors.

What metaphor shall we embrace, then? Some say Darwin borrowed from Adam Smith when he formulated the theory of evolution. As the late naturalist Stephen Jay Gould writes, "the theory of natural selection is a creative transfer to biology of Adam Smith's basic argument for a rational economy: the balance and order of nature does not arise from a higher, external (divine) control, or from the existence of laws operating directly upon the whole, but from struggle among individuals for their own benefits."[25] As one who looks for invisible hands in the socio-economic order, I believe we will do well to borrow something back from Darwin. Consider the following from Daniel Dennett:

> Here, then, is Darwin's dangerous idea: the algorithmic level is the level that best accounts for the speed of the antelope, the wing of the eagle, the shape of the orchid, the diversity of species, and all the other occasions for wonder in the world of nature. It is hard to believe that something as mindless and mechanical as an algorithm could produce such wonderful things. No matter how impressive the process of an algorithm, the underling process always consists of a set of individually mindless steps succeeding each other without the help of any supervision; they are "automatic" by definition: the workings of an automaton. They feed on each other, or on blind chance—coin flips, if you like—and on nothing else. Most algorithms we are familiar with have rather modest products:

> they do long division or alphabetize lists or figure out the income of the Average Taxpayer. Fancier algorithms produce the dazzling computer-animated graphics we see every day on television, transforming faces, creating herds of imaginary ice-skating polar bears, simulating whole virtual worlds of entities never seen or imagined before. But the actual biosphere is much fancier still, by many orders of magnitude. Can it really be the outcome of nothing but a cascade of algorithmic processes feeding on chance? And if so, who designed that cascade? Nobody.[26]

One might read Dennett's description of the Darwinian process and share his sense of wonder. But we must go further. We should begin to look for parallels in the socio-economic order. So, we follow Dennett and Darwin when we say of complex society that it is an ecosystem.

Embracing this metaphor is not to make the normative two-step of one Herbert Spencer who, with his social Darwinism, also commits a version of the naturalistic fallacy. It is, rather, to acknowledge something like this (Dennett again):

> Little did I realize… I would encounter an idea – Darwin's idea – bearing an unmistakable likeness to universal acid: it eats through just every traditional concept, and leaves in its wake a revolutionized world-view, with most of the old landmarks still recognizable, but transformed in fundamental ways.

Society as ecosystem captures a series of nested concepts that, apart or together, possess tremendous explanatory power. Evidently, we are not alone in this belief. Michael Rothschild shares our affinity for *society as ecosystem:*

> Spectacularly complex and often swept by turbulent change, the human economy could hardly be more different than the stately model Newton created to predict planetary orbits. But, for lack of a convincing alternative, economists stuck to the familiar.
>
> …Bolstered by stunning breakthroughs in cellular biology, molecular biology, paleontology, and ecology, biology moved to the front rank of science by the 1970s. For the first time, it was possible to completely rethink economics, using the new discoveries of biology as a guide. The paradigm of the "economy as a cyclical machine" at last could be discarded. In its place, one could imagine the "economy as an evolving ecosystem."[27]

Geoff Mulgan joins this chorus:

> The useful metaphors that guide [organizational] design are more likely to be biological ones, concerned with adaptation, and existence far from equilibrium, rather than mechanical ones. The structures they need to develop are more likely to be parallel than linear, where decisions are taken in a cascade of interdependence, with each element simultaneously reacting to the others rather than to a single line of command.[28]

To see a company as an organism or a society as an ecosystem has a cognitive power that includes the aesthetic dimension. And this power is, in part, due to the nature of metaphor as set out by Max Black.

But let us not linger on those powers, for to do so may attenuate their potency. Instead, we should let the magic of the ecosystem metaphor work in subconscious ways as we busy ourselves with the causal, the functional and the structural aspects we have promised to unpack. It is a good time, then, to enumerate ten nested concepts. With these I intend to isolate some of the structural-functional isomorphs of the ecosystem model-metaphor in such a way that allows us, a la Max Black, to gauge the "goodness of [the model-metaphor's] fit."[29]

Ten Isomorphs of Society and Ecosystem

1. Undesigned, yet ordered

It is difficult for most people to understand how order can be accomplished without design. Indeed, history is littered with attempts to design society, as if there is some monolithic human end to which the state could carry us, trundling along, with the right person designing the engine and the right person manning the engine car. Such visions have justified all sorts of 'mediation' (or whatever is the latest euphemism for government-sanctioned threats, coercion and interference in people's lives). But as agents in a system follow simple rules of a certain kind, complex order emerges organically. The order cannot be the product of a single designer. It is, rather, the product of both circumstantial clustering at one level of description and cooperative interdependency at another—any instance of which is contingent. Consider that we're here as organisms at all: from simple constituents behaving according to simple laws… the constituents coalescing into four primary nucleotides, to a seemingly unfathomable weaving of proteins that form the stuff of a sentient being regarding this very text. The order is as unmistakable as the complexity. Even if one is not convinced that man or the natural order extended from Darwin's algorithm but from God, he can still admit that what coordinates minds and behaviors in an economy is not some Coordinator at all, but something as insipid as a stoplight, a price tag, or a deed.

2. Unknowable in its totality

Bearing in mind our discussion of epistemic non-determinism above, we should do well to point out what ought to be a fairly obvious point—*ought to be,* because what is salient in one domain may not be in another. Ecosystems cannot be known in their totalities. The sheer complexity of an ecosystem contains enough data to overload the wetware of the most intelligent biologist, which is precisely why

scientists specialize. The generalist may be relegated to the classroom and the specialist to the lab, but one who spends his life understanding the protein coats of viruses will likely be able to tell you little about the effects of removing wolves from Yellowstone National Park. Likewise, one who understands natural predators may be able to tell you about overwhelming elk populations after a wolf-ban, but will not likely be terribly conversant on the pupal stage of the Andean termite, much less his secretions, his preferred woods, or his natural predators. These examples should remind us that any field of inquiry requires distributed knowledge at multiple levels of description. The socio-economy, with its interwoven chains of means-ends behaviors, exchanges, and values coming into and out of existence, are just as unknowable, if not more so. Again, while our hubris can cause us to think otherwise, we must stand before any complex order with humility.

3. Complex, non-deterministic

Ecosystems are complex adaptive systems (CAS). But how do we know a CAS when we see one? There are a few indicators:

a) *Nested subsystems.* Systems within systems, sometimes indicate a CAS. Often, the nodes or "agents" within a system are themselves complex systems. A gazelle, for example, is made up of organs, which are made up of cells, all of which are systems—even complex ones. Sometimes nested subsystems in nature will be recursive. For example, fractal geometries found In leaves, lungs or nautilus shells are indicative of a CAS.

b) *Open.* There are no fixed boundaries to the system. If the system is regularly importing and exporting energy or information across its borders, then the system is probably complex. Also, such boundaries will be subject to constant change and flux. Another way of saying this is: the system is both dynamic and continuous with its environment, as the environment – through various feedback loops – changes the system, and the system changes its environment, too. (Even the earth's ecosystem, taken as a whole, is not self-contained. Extra-terrestrial factors such as lunar gravity, sunspots or meteors can mean profound changes to which earth's ecosystem must adapt or die.)

c) *Holistic.* Nodes and/or subsystems within a system are interconnected in some dynamic way. Evidence of nodes interacting with many other nodes in relative autonomy and with varying degrees of

unpredictability indicates complexity.

d) *Non-deterministic.* Relations among nodes and/or subsystems are non-linear. Causal relationships among the nodes in a complex system are arranged in such a way that it is difficult to trace single, discrete causal pathways back in time. Similarly, when attempting to make predictions about a system's future, one will find that random or "stochastic" processes predominate, which means future events are non-deterministic and future states may be reached, instead, by probabilistic processes.

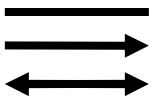
e) *Self-organizing.* This property is a restatement of the "undesigned, yet ordered" isomorphism (1), above. Self-organization is a process of attraction, repulsion or rule-guided behavior in which the internal organization of a system increases in complexity without being guided or managed by an outside source. These systems typically display "emergent" properties, which is to say the complex properties or behaviors of the system arise from a substrate in which simpler behaviors are performed with regularity (i.e. often guided by rules).

f) *Emergent.* The whole system has properties that, while they dependent on constituent elements, are distinct in their combined effects. The system's interaction with its environment can also produce effects greater than the "sum of parts."

4. Characterized more by networks than hierarchies

A useful distinction here is between *hierarchies* and *networks.* With hierarchies we can imagine large, extended organizational charts (say of a military command structure) with sets, subsets, and sub-subsets organized like a pyramid. Likewise, when we imagine a network, we can think of a complicated web of interconnections. But we need not imagine our systems this way yet. We can start with a system so simple it has only two agents as elements. Consider this system:

Let us call these two elements *nodes.* Now, a line will indicate some kind of interaction between the nodes, while arrows tell us something about the nature of that interaction.



If only one of the nodes has a super-ordinate role in the system, then the other will have a subordinate role by definition. That means one node issues commands while the other node carries them out (and report relevant information back to the super-ordinate node). Such a relationship would look like this:

We have represented a basic hierarchy. One the other hand, if both nodes are autonomous, then the interaction between them may be one more of interdependence, exchange and/or cooperation. We call this a network:

The biggest difference between hierarchies and networks, then, is the degree of autonomy possessed by any given node to interact with any other node in the system. Or better: is the node regularized by commands or by rules? The greater the degree of interaction among nodes, the more "networked" the system is said to be. We can imagine a sliding scale hierarchical/networked as poles. Many systems lie in the middle of the sliding scale, which is to say they are hybrids.

In an ecosystem, nodes are largely devoid of agency in the strictly human[30] sense. Issuing commands or carrying them out depends on this sense of agency. So the very notion of a command-and-control system within an ecosystem may seem dubious on its face. But the relevant analogy here lies not in the agency of nodes, but in relationships among the nodes. It is enough to establish that, by in large, nature is not abundant with slaves and masters, generals and GIs, lords and vassals. Apart from human beings, apes, and a few other mammalian species, hierarchies are largely systems that are internal to an organism (e.g. in more advanced brains, such systems are probably best characterized as hierarchy-network hybrids).

5. Rule-based, Emergent Order

Stoplights? Price tags? Deeds? Above, we indicated that ecosystems are emergent, undesigned orders. That is, higher-order properties emerge from lower-order properties, elements or subsystems. But in order for such emergence to take place, there must be rules or, in nature, nomic (law-like) regularities. A meta-rule of rules in society is that agents be able to reckon with them. In the literature of Austrian economics, complex "spontaneous" orders arise from simple, non-teleological rules. The rules confer regularity and predictability upon agents within a system so that the likelihood of cooperation increases while transaction costs go down. In nature, however, rule-following is more a given – a more distinctly deterministic process – than a capacity to reckon with rules, as in the case of human beings and their institutions. That is because nature's rule-sets are an outgrowth either of a) so-called "natural laws", or b) patterns of instinct, or both. Let's discuss this distinction briefly, bearing in mind and these concepts are not exclusive, but rather different levels of description that are intimate.

Natural laws may include something as simple as Stuart Kaufman's chirality or "handedness," i.e. tendencies of the most basic primordial molecules to coalesce in increasingly complex arrangements (autocatalysis); or the macro-algorithm of natural selection in which the process results in the success of some genetic material to pass inter-generationally, yielding the diversity of life on earth. A pattern of instinct includes, for example: the habit of salmon to travel upstream in order to spawn; a pack of wolves hunting together in order to increase the likelihood of a kill; a flock of birds in a synchronous procession of Vs; or ants behaving in certain ways to collect food (where the complex, emergent order is the colony). In all of these examples, natural law and instinct patterns work in tandem. For example, law-like patterns of chemical impulses *signal* ants to make certain, decentralized operations bringing about a holistic result, just as neuro-chemistry determines how wolves will behave when confronted with an opportunity to kill. In any case, parsing these aspects at various levels of description is meant to illustrate the senses in which ecosystems are *rule-governed* systems (as opposed to agent-governed systems).

Despite the fact that large-scale human institutions are social constructions requiring a higher level of cognitive ability both to contrive and to comply with (which is not the case for organisms within ecosystems), the common isomorphism is that both ecosystems and complex society depend on, and emerge from, underlying rulesets. It is from these rulesets that a distributed system of tremendous diversity is possible.

6. Locally purposive, globally non-purposive

Recall from your study of ancient philosophy the term *telos,* Greek for 'end' or 'purpose.' The rulesets underlying rule-governed systems are said to be *non-teleological* or non-purposive, even though specific, local agents will be purposive (teleological) in their behaviors. Whereas a command or regulation specifies some end, rules merely regularize action. Consider, for example, a traffic law that instructs one to drive on the right. Absent such a rule, drivers would be subjected to relative chaos, as in the era of the Model-T. But traffic laws confer predictability and stability upon an otherwise chaotic system. Such rules lead to a pluralism of ends in both ecosystems and complex society, which means the system, taken as a whole, can have no purpose. The effect of rules is a series of cascading means-ends activities each of which is contingent, but ordered; diverse, but unified. The rules enable the system to achieve a "sweet spot"[31] between order and chaos.

7. Result of iterative processes

With evolution in the natural order, as with economies, development occurs due to a process of attempts, successes and failures in the context of some changing environment. In an ecosystem, success can be defined simply as survival and failure as death. In complex society, failure can, of course, result in death. But in an economic sense, failure is the inability to create value—which is to say a failure to engage in some productive activity that others both find desirable enough to exchange something else of lesser value. If success is, in some sense, creating value for others in exchange for something more valuable, then the whole system is iterative at root – binary (either success or failure) – and the extended system of interdependency generates prosperity and diversity in so far as people do a good job of fulfilling the desires of other people in mutual benefit. A system of prices, profits and loss is a measure of this success and failure. Profit is an indicator that value has been created. Loss is an indicator that value has been lost or destroyed. At the system level, the entire edifice of successful means-ends behaviors can result in tremendous dynamism and human flourishing.

8. Structured around scarcity

We are all slaves to scarcity. Darwin, writing of scarcity in *On the Origin of Species,* reminds us that:

> [t]wo canine animals in a time of dearth may be truly said to struggle with each other which shall get food and live. But a plant on the edge of a desert is said to struggle for life against the drought, though more properly it should be said to be dependent on the moisture. A plant which annually produces a thousand seeds, of which on an average only one comes to maturity, may be more truly said to struggle with the plants of the same and other kinds which already clothe the ground.

Thomas Malthus, whose failure to appreciate some of the more counter-intuitive (positive-sum) lessons of economics lead him to predict humanity's immiseration and death, did appreciate scarcity at a more basic level. At least, Malthus was right in acknowledging we must respond to scarcity in order to survive. Both Darwin and Malthus understood that, in a world of scarcity, all creatures must make trade-offs. Opportunity costs abound. The natural order is structured around scarcity in such a way that resource allocation is more likely to be efficient than wasteful, for wastefulness can be deadly. Plants in the desert manage to survive off of little water. Plants in a rainforest, though they may have plenty of water, must evolve strategies to snatch the tiniest splashes of sunlight from a greedy canopy of mahogany. In either case, scarcity is the prime environmental factor. The manner in which systems adapt to scarcity will determine whether there is flourishing, mere subsistence, or death. But ultimately, scarcity is a "solemn and severe master."[32]

9. Marked by specialization and adaptation

The isomorphism specialization/adaptation is perhaps the most salient of our ten. Mises reminds us that the "principle of the division of labor is one of the great basic principles of cosmic becoming and evolutionary change. The biologists were right in borrowing the concept of the division of labor from social philosophy and in adapting it to their field of investigation. There is division of labor between the various parts of any living organism."[33] (Society as ecosystem is not novel, apparently, relegated as it has been to the relatively esoteric fields of Austrian economics and complex systems theory, or at least its predecessor cybernetics.) But we should add an additional thought about specialization, building on both Mises's and Hayek's insights—that specialization at one level of description is a functional transition away from hierarchy, but at another level of description is the way a system reckons with increased information. Understanding information (or knowledge) as central to of the whole process of specialization, moves us firmly away, in a certain sense, from that most damnable god's-eye view of society to the level of local instantiation and distributed interdependency. (Yet paradoxically, it seems we can understand this process holistically, albeit in the abstract, as "cosmic".) On the information-centric view, adaptation is no afterthought. It is rather like the negative space of specialization. Ever-

changing circumstances mean new information becomes available and must be processed for successful change. Adaptation, construed this way, becomes information processing plus action, in a continuous dynamic of change within a changing environment.

10. Organic Unity

On its face, organic unity seems like yet another version of "the whole greater than the sum of its parts" idea. But the vitality of the concepts comes not only in elaborating on the phenomenon of holism, but in its conceptual economy and its power as a heuristic. As far as we can tell, the origins of the idea come from aesthetic theory. As such, organic unity becomes a litmus test for judging an artwork, for example, by determining whether the work possesses the quality of *unifying diverse aspects.* In fact, the *balance* of unity and diversity is the hallmark of the 'interesting,' 'beautiful,' or 'compelling' art under this theory.

Robert Nozick, in his *Philosophical Explanations,* recommends the notion of organic unity as a theory of value. While a subjectivist Austrian can no more commit to objective value in economics as he can in art, there is much of interest in Nozick's account. Think of it as an indicator of a dynamically functioning system. As such, Nozick defines organic unity as a condition of "unifying diverse and apparently unrelated (or not so tightly related) material" and goes on to cite examples of how such considerations can also be helpful in evaluating a scientific theory, for example, insofar as the theory is able to explain sundry, apparently unrelated phenomena. For example, Newton's laws explained both planetary motion and ballistics, providing a well-ordered system for calculation and prediction in a number of areas. The "beauty" of the theory comes in these characteristics.

Nozick elaborates by asking us to imagine a simple graph:

> Can we draw a curve of degree of organic unity with the two axes being degree of diversity and degree of unifiedness (where maximum degree of unifiedness possible is constrained by the degree of diversity, in the absence of new and creative modes of unification)?[34]

The diversity axis will constrain the unity axis and vice versa so that both remain in balance. The beauty of Nozick's graph, apart from its elegance, is its appeal to our intuitive sense that there is a middle ground between pluralism and monism, anarchic chaos and rigid order, dynamism and stasis. (*E pluribus unum*. Or should we say *E unus pluribum?*)

Where Society as Ecosystem Ends

No model-metaphor is perfect. Indeed, only in a relationship of identity would one-to-one correspondence between domains obtain. So where does society-as-ecosystem reach a limit? And where the parallels and isomorphs end, can we find something instructive in the places of non-overlap? Mises shines a light in these interstices:

> But one must never forget that the characteristic feature of human society is purposeful cooperation; society is an outcome of human action, i.e., of a conscious aiming at the attainment of ends. No such element is present, as far as we can ascertain in the processes which have resulted in the emergence of the structure-function systems of plant and animal bodies and in the operation of the societies of ants, bees, and hornets. Human society is an intellectual and spiritual phenomenon. It is the outcome of a purposeful utilization of a universal law determining cosmic becoming, viz., the higher productivity of the division of labor. As with every instance of action, the recognition of the laws of nature is put into the service of man's efforts to improve his conditions.[35]

What rises up above the ecosystem metaphor to glow distinctly about human society is human subjectivity itself, with all its unmet desires and Sisyphean searches for happiness. It is in the teaming associations among millions of subjectivities in search of an ever-changing pluralism of human values that we find something unique to human society, something not fully captured in any of our metaphors. As we attempt to limn something like the laws and limits of human organization, we must be struck by the understanding that something so lifeless as a rule can animate a holistic system of seekers, strivers and their subjectivities. As Hobbes teaches and Mises channels, inter-subjective agreement on these lifeless rules makes for the bases of society, and such agreement, too, is contingent:

> Not every interhuman relation is a social relation. When groups of men rush upon one another in a war of outright extermination, when men fight against men as mercilessly as they crush pernicious animals and plants, there is, between the fighting parties, reciprocal effect and mutual relation, but no society. Society is joint action and cooperation in which each participant sees the other partner's success as a means for the attainment of his own.[36]

Internal to our species, we must seek peace through free association, or more specifically, the *rules* of free association.

In the human ecosystem, however, one finds all the mystery, beauty, prosperity and happiness that institutions make possible. Whereas natural institutions rely as much on predation and parasitism as mutualism, human ecosystems flourish where predation and parasitism are in decline. When informal

norms of mutual respect and trust are built atop those formal rules, an invisible scaffolding of toleration gets built into our culture, too. In other words, we don't simply obey the rules, we internalize them. And the more we internalize them, the less we have need for those enforcement apparatuses that can so quickly be captured by those for whom power is an end.

Society as Ecosystem: A Research Agenda

In conclusion, we have argued that society as family, society as hive, and society as machine all fail to capture those structural-functional aspects that allow us to grasp something essential about human civilization. My hope is that in this paper, I have identified what the best and most powerful model-metaphor for complex society. With the society as ecosystem, we can move forward consciously with a research agenda that builds on the isomorphs we enumerated, while constraining our ethics, politics and philosophy with tentative answers to the question of whether there might be laws of human organization.

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[1] The metaphors here are presented as similes. While some grammarians treat them as two separate and distinct figures of speech, I treat the latter as a subset of the former.

[2] See the work of George Lakoff, (e.g. Lakoff and Johnson, *Metaphors We Live By*, University of Chicago Press, 1983) and Steven Pinker, (e.g. Pinker, *The Stuff of Thought: Language as a Window into Human Nature*). Pinker and Lakoff have had interesting debates into the nature of metaphor, which will take us too far afield here.

[3] Black, Max. *Models & Metaphors.* Cornell University Press. Ithaca, 1962.

[4] Black, Max. *Models & Metaphors.* Cornell University Press. Ithaca, 1962, p. 46.

[5] Black, Max. *Models & Metaphors.* Cornell University Press. Ithaca, 1962, p. 238.

[6] While patriotism can involve an aspect of the clannishness and/or group identification we experience with family bonds, it can become increasingly unhealthy by degree – regressing, as it will, into blood and soil jingoism. To have the requisite national unity, it is probably not necessary to view society as being like a family.

[7] Cosmides, L. and Tooby J. "Evolutionary Psychology: A Primer" http://www.psych.ucsb.edu/research/cep/primer.html

[8] Note: stricter definitions of altruism in biology involve threatening one's own immediate survival for the sake of others, but our definition is somewhat looser—i.e. devoting resources to others with no expectation of immediate reciprocity.

[9] The Magic Number 150 is often cited as the limit to which an organization can be successful, for both evolutionary reasons, as well as resource allocation and collective action problems.

[10] This is a grossly simplified version of institutional economics. For a much richer and more detailed treatment, see the work of Douglass North, e.g. *Structure and Change in Economic History,* New York, 1981. The emphasis on changing the institutional

rules rooted in Coasean "transaction costs" is the thrust of my argument here, while North's microeconomic lens for viewing history goes much deeper in its explanatory power.

[11] Virginia Held, *The Ethics of Care: Personal, Political, Global*, Oxford University Press, 2006.

[12] See also the work of Onora O'Neill.

[13] "Success" I realize is a philosophical moving target, but can be defined roughly as the high likelihood that a given individual will survive and thrive.

[14] Complexity transition is the term used by Bar-Yam to describe the development towards networked human organizational structures and away from hierarchical ones.

[15] Gauthier, David. *Morals by Agreement.* Oxford University Press, 1986, p. 335.

[16] Gauthier, David. *Morals by Agreement.* Oxford University Press, 1986, p. 335.

[17] http://torgprom.blogspot.com/2007/12/ant-hero-of-socialism-live-like-him.html

[18] Dennett, *Darwin's Dangerous Idea,* 1996, pg. 469.

[19] Dennett, Daniel. *Darwin's Dangerous Idea,* p. 474.

[20] Bar Yam, Yaneer. *Dynamics of Complex Systems.* Perseus Book; 1997, p. 812.

[21] Elliot, Larry. "The Computer Model that Once Explained the British Economy," *The Guardian,* May 2008.

[22] Hayek, F.A. von, "The Use of Knowledge in Society" Edition: *American Economic Review,* XXXV, No. 4; September, 1945, pp. 519-30.

[23] I'm suspicious of this latter possibility, as I'd like to think of economies as fundamentally deterministic. But just because I can't wrap my mind around economy indeterminism doesn't mean it ain't so. This issue of knowledge-versus-issue-of-the-world when it comes to chaotic phenomena is one that, I believe, escapes most people—even those who are fairly well-versed in the subject of complex systems. Again, we'll leave it to the philosophers.

[24] http://nobelprize.org/nobel_prizes/economics/laureates/1974/hayek-lecture.html

[25] "Darwin's Middle Road," appearing in Gould's 1980 collection, *The Panda's Thumb*. Thanks to Don Boudreaux for this reference.

[26] Dennett, *Darwin's Dangerous Idea,* 1996.

[27] Rothschild, Michael L. *Bionomics: Economy As Ecosystem.* New York: Owl Books, 1992. p. 335.

[28] Mulgan, Geoff. *Connexity: How to Live in a Connected World.* Harvard Business School Press, 1998, p. 161.

[29] Black, Max. *Models & Metaphors.* Cornell University Press. Ithaca, 1962.

[30] Debatable and deeply philosophical. I leave aside questions about determinism versus free will.

[31] I borrow the term "sweet spot" from John Henry Clippinger III who used the phrase in his book *The Biology of Business.*

[32] Gauthier, David. *Morals by Agreement.* Oxford University Press, 1986, p. 335.

[33] Mises, Ludwig von. *Human Action,* Yale University Press; New Haven, pg. 145.

[34] Nozick, Robert. *Philosophical Explanations* Harvard Belknap Press; 1983, p. 416.

[35] Mises, Ludwig von. *Human Action,* Yale University Press; New Haven, pg 145.

[36] Mises, Ludwig von. *Human Action,* Yale University Press; New Haven, pg 169.