The Imperative of Complexity

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In *The Tyranny of the Ideal,* Gerald Gaus constructs a deep, wide ranging argument in favor of a diverse, open, adaptive society and against the necessity of a social ideal as a guidepost. He hangs much of his argument on mathematical models, constructing formal assumptions and working through a logical progression that improves upon the blurry conceptualizations and logical leaps of others. The book provokes, challenges, and inspires. I am privileged to have the opportunity to offer commentary.

I restrict my thoughts to the part of his analysis that frames the processes of identifying and attaining just social worlds as problem solving. I devote particular attention to his analyses of the contributions and limits of diversity in complex domains. This confined engagement stems in part from the centrality of problem solving to his argument, and in part from my lack of depth in philosophy. Gaus would surely applaud my self-imposed confinement as it respects his claim of conjectural and evaluative myopia, i.e. the idea that we can only imagine and understand social arrangements near to our own.

Gaus's core argument relies on the following sequence of logical claims. First, there exists an enormous, incomprehensible number of possible arrangements of our world. By this he means feasible collections of laws, organizational structures, and institutions. Second, the features of that world interact in symbiotic and conflicting ways to produce a *rugged landscape* with many local optima. The ruggedness of the landscape creates mirroring paradoxes: locally improving the social world could move society further from the ideal arrangement, and moving toward the ideal arrangement could come at an immediate cost to our well-being.

Third, we have at best local knowledge of the landscape. That limitation combined with the landscape's ruggedness can undermine the possibility of knowing the ideal.

Fourth, diverse perspectives appear to offer a fix by smoothing the landscape. However, diversity only takes us so far, because as we approach what we thought we wanted, we learn about ourselves and our world and alter our conception of the ideal. Thus, he warns against positioning our rudder and setting sail.

In sum, Gaus argues that to conceive of the ideal and apply it as a polestar doubly tyrannizes. We may move away from a certain improvement. And we may head toward an incompletely considered ideal.

THE HONG-PAGE FRAMEWORK

To build his argument, Gaus constructs a formal model that elaborates on the Hong-Page framework for problem solving (Hong and Page 2001). The Hong-Page framework assumes a value function defined over a set of possibilities along with problem solvers who possess *perspectives*: representations of the set of possibilities, and *heuristics:* algorithms or methods for maneuvering within their representations.

The framework formalizes computational optimization in which a problem domain is encoded in a formal language and algorithms find improvements. The traveling salesperson of finding the shortest route between a collection of cities is a canonical example of such a problem. To find a solution, a problem solver must first develop a representation for all possible routes. The natural encoding (a Hong-Page perspective) would be an ordered list of cities. Heuristics then manipulate that ordering to find shorter routes.

Common heuristics include switching adjacent pairs of cities and switching cites separated by a city.

The parsimony of the Hong-Page framework allows it to be applied across any number of domains: finding a molecule that cures hepatitis C, designing a car engine, selecting a location for a movie shoot, or writing a national health care plan. Within each, we can define a value function and a domain of alternatives. We can also imagine multiple representations of the possible solutions (*perspectives*) and various ways to search among them (*heuristics*).

Applying a single stark framework across such vast disciplinary boundaries allows for transdisciplinary. As an analogy, applying a basic network model of contagion to study the spread of disease, information, fads, and technologies allows one to derive general insights for how the degree distribution of the network, the contact rate, and the probability of transmission combine to determine the likelihood of contagion.

At the same time, any one size fits all approach glosses over details. Some assumptions do not apply; square pegs get forced into round holes. To return to the contagion example, as we take deeper dives into the various domains, we discover the limits of lumping the measles, hybrid corn, Lady Gaga, and fax machines in the same conceptual bucket. We find that the differences in network structures across the domains matter. A person can give the measles to at most a few people at a time. By tweeting, President Trump can reach tens of millions.

Further, we see that while disease transmission occurs over an undirected network—I can give my wife the flu, and she can spread the flu to me—social influence occurs through a directed network, as does information. I may wear the same shoes as LeBron, but so far as I know, Lebron cares not a whit about my choice of kicks.

A FRAMEWORK FOR EVALUATING THE IDEAL

When Gaus applies the Hong-Page framework to the problem of creating an ideal society, he lumps. In doing so, he can invoke a general insight—that diversity leads to better solutions. The unavoidable misfits oblige him to refine the model to better fit his domain of interest. That refinement elucidates gaps and opens new possibilities for analysis.

To prove the general point, he must reinterpret the Hong-Page assumptions. Gaus first defines a set of possible social worlds {X}, an analog to the set of possible solutions in the Hong-Page framework. We can think of these social worlds as possible arrangements of society. As an analog of the outcome function, he assumes a *social realizations condition,* T, that assigns either a value or ranking to each alternative in {X}. An alternative's ranking corresponds to its level of justice.

Gaus also defines a social ideal, denoted by u. If we assume that {X} is finite and that T admits no ties, a unique ideal necessarily exists. To this, Gaus adds an *orientation condition* that captures the proximity between the ideal, u, and some alternative arrangement, x. This added feature of the model plays a key role. In the cases where T scores justice as a real value, {X} acts as the domain of the function T, and the social justice levels can be thought of as the range of T.

Proximity operates as a distance measure applied to the domain of T. Similarly, justice levels can be used to determine distances in the range of T. Conflict between these two distance measures causes the first problem with the ideal. We can move closer to the ideal according to one measure and further from the ideal in another.

THE {MARKET, BUREAUCRACY, DEMOCRACY} MODEL

To unpack Gaus's argument, I introduce a stark model that emphasizes the role of institutions in creating the ideal (Rawls 1999). Within the model, I can define proximity and show how interdependencies produce rugged landscapes.

In the model, a society must allocate resources and opportunities across a set of domains. Within each domain, the society chooses among three pure institutional types: a market (M), a bureaucratic organization (B), or a democratic mechanism (D).

For example, to select a construction firm to build roads, a society could hold an auction among qualified firms (M), it could construct a bureaucracy that develops criteria for selecting a firm (B), or it could hold a vote among elected representatives for the winner (D).

If there exist ten such domains, then the set {X} consists of all vectors of length ten whose entries belong to the set {M,B,D}. Though a simplified characterization of the world, the model allows for a combinatorial explosion of social arrangements—59,049 distinct possibilities to be precise.

Assume that the ideal arrangement from this set, MMMBBBDDDD, is known. As a benchmark, set its social justice value equal to 100. Consider the following two alternative arrangements with their respective social justice values:

Alternative x: MMMBBBDDMB Social Justice Value 80
Alternative y: MMDMMMBBBB Social Justice Value 90

Let the proximity between two alternatives equal the number of institutions on which they disagree. Given this convention, a lower proximity score corresponds to a nearer alternative. The proximity between x and the ideal equals 8, and the proximity between y and the ideal equals 2. Alternative x is more proximate than y to the ideal, but it produces lower social justice than y.

When this occurs, when the nearby alternative that most increases social justice has lower proximity to the ideal, society faces what Gaus calls *The Choice*. Does society increase justice or does it move in the direction of the ideal? In more mathematical terms, do we move vertically toward the ideal (by pursuing better outcomes) or horizontally (by following our moral compass)?

The first question we must address is how *The Choice* could arise. It could be that more proximate social worlds(i.e. movements in the direction of the ideal) always increase social justice. In that case, the social justice function creates a single peaked, Mt Fuji landscape. As we move toward the ideal, social justice values increase. And as we move away, values decline. On a Mt Fuji landscape, society avoids having to make *The Choice*. It can reach the ideal by climbing the social justice gradient.

The Choice only arises when less proximate social worlds have higher values. This property holds whenever there exist non-ideal alternatives with the property that all nearby alternatives have lower values. Metaphorically, these local optima can be thought of as peaks on a rugged landscape. Thus, rugged landscapes imply *The Choice*. This is an important insight.

The Choice imposes only temporary losses if we know the position and value of the social ideal. We must endure the path through the Sierras to reach the gold of California.

Here is where Gaus's assumption of myopia enters. In the Hong-Page model, the landscape values are knowable, by that I mean that given an element of the domain, we know or can determine its value. For instance, if we plug in a route for the traveling salesperson to follow, we can compute its distance using algebra. Gaus finds this assumption problematic in his context. We cannot toss out a novel reconfiguration of society and know its value. I agree.

To make the myopia assumption formal, Gaus elaborates on the Hong-Page framework as follows: He adds a set of *evaluative standards* (ES), a set of relevant *world features* (WF), a *mapping* that applies the evaluative standards to the world features (MP), and a *similarity ordering* (SO) along with a corresponding *distance measure* (DM) over the possible social worlds.

This more detailed construction enables him to introduce the concept of a *neighboring social world*. In the toy, institutional model introduced earlier, the *neighbors* of a collection of institutional choices might consist of all choices that differ by a single institution.

Figure 1 shows all twenty-seven possible institutional arrangements in a three-domain world.

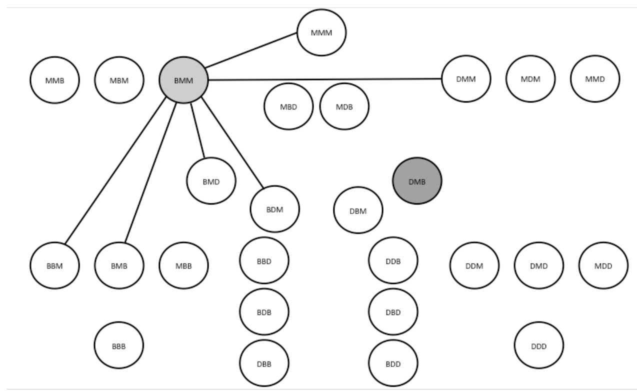

Figure 1: A Three Domain World

In the figure, the ideal arrangement, DMB, is shaded dark grey. The status quo arrangement, BMM, is shaded lighter grey. The lines extended from BMM connect to its six neighbors none of which is the ideal arrangement.

Three possibilities exist. First, there could be a neighboring alternative, say DMM, that improves on BMM. If so, given that DMB is a neighbor of DMM, climbing the gradient would lead to the ideal. *The Choice* would not occur. Moving up would also move toward. Second, it might be that a more distant alternative BBM is the best choice among the neighbors. Moving to BBM would improve social justice but be less proximate to the ideal. That would imply a rugged landscape and *The Choice*.

Finally, the status quo BMM could be a *local optimum*. This would involve a weak form of *The Choice*. Society could move toward the ideal and receive lower social value or stay put.

The key insight, which bears repeating, concerns conflicts between the two measures of distance: an arrangement can be closer to the social ideal but result in less justice, or be further from the social ideal yet increase justice. Both correspond to ruggedness on the landscape.

Gaus does not delve into the micro-foundations of ruggedness. I do so here given the logical necessity of landscape ruggedness for his argument. Establishing micro-foundations requires greater realism. Any number of examples could be constructed. Here, I consider here the {M,B,D} construction applied to the following three university resource allocation problems: assigning professors to classes, allocating revenue among professors for salaries, and registering students to the class offerings. Thus, the arrangement DMB corresponds to a world in which professors vote on teaching assignments, salaries are determined by the market, and students choose classes by fixed bureaucratic rules.

If making the institutional choice associated with the ideal improved any arrangement, then the landscape would be equivalent to a Mt Fuji. Landscape ruggedness requires that in some cases making the "ideal" choice on one of the domains lowers the value of the outcome

Here I describe how information synergies could cause ruggedness. By that I mean, information produced by one institution could benefit another institution. Suppose, for example, that DMB is the ideal social arrangement, and that we start from the arrangement BMM. In that arrangement, teaching assignments are made by fixed bureaucratic rules, salaries are determined by an external market, and students bid for classes using fixed budgets of university created currency.

In BMM, the market for classes among students produces a market clearing price for each faculty class pairing. These prices reveal information about student satisfaction with professorial assignments

DMM assigns teachers to classes democratically, endowing each faculty member with equal power and input. Democratic institutions do not always make optimal choices. They can produce voting blocs and vote trading.

Given that in the current arrangement, BMM, the bureaucracy can exploit the information revealed by the prices created by students in the classroom market, a bureaucracy might make more efficient assignments than a democracy. In other words, given a market for classes, a "non-ideal" choice of institution for allocating teachers may be more just. The informational synergy means that BMM, though less proximate to the ideal than DMM, could produce higher social value.

If instead, the students do not compete in a market for classes, then they no longer produce the information the bureaucracy needs to make efficient allocations. Absent that information, the bureaucracy likely makes poor decisions, and democracy, warts and all, becomes the better alternative. Thus, the information created by one institution creates a synergy with another, producing ruggedness.

Information is not the only possible cause of ruggedness. Behavioral synergies across institutional pairings can also produce local peaks and create conditions for *The Choice*. If individuals interact primarily in market mechanisms, they may develop repertoires of behaviors well suited to markets in other domains (Bednar et al 2007, 2015, 2018).

Those behaviors may both give some market institutions a leg up and hinder the performance of other institutions. For instance, self-interested behaviors that lead to good outcomes in a market may perform poorly in a bureaucracy.

To take this logic to its extreme, self-reinforcing behavior could make all three homogenous institutional arrangements DDD, MMM, and BBB local optima (Greif and Laitin 2004). That would mean that landscape would have at least three peaks, creating multiple instantiations of *The Choice*.

Third, collections of institutions that function as ensembles can create ruggedness. This is true within a federal system, where institutions have overlapping jurisdictions. In robust federations, institutions complement one another by providing safeguards against transgressions and overreach (Bednar 2009). Thus, the optimal design of any one institution depends on the designs of others. Those interdependencies would also result in a rugged landscape. Of course, capturing this type of ruggedness would require a more elaborate model than the stark {M,B,D} framework.

KAUFFMAN'S NK MODEL

The institutional model that I have just described bears a strong resemblance to Kauffman's NK rugged landscape model based on binary strings (Kauffman and Weinberger 1989). In the NK model, the parameter N corresponds to the number of binary attributes, and the K corresponds to the number of interactions between each attribute and others. The value of a binary string equals the sum of the contributions of the attributes. The contribution of an attribute, in turn, depends on the state of the attribute (either on or off) as well as the states of K other randomly chosen attributes.

We can use the NK model to link interactions to ruggedness. If K=0, each attribute contributes independently. The landscape forms an N dimensional Mt Fuji. Climbing locates the ideal. As K increases, it makes the landscape rugged. In the extreme case where K=N-1, on average one out of every N alternatives will be a local optimum. We can therefore think of the parameter K as a ruggedness dial. The analog of K within the institutional model would be the number of institutional interactions resulting from informational spillovers, behavioral spillovers, or institutional complementarities.

We can now connect two dots. Kauffman showed that increasing these interactions adds ruggedness. Gaus shows that ruggedness creates difficulties for the pursuit of the ideal. Interactions therefore cause the tyranny of the ideal.

We might then think that we should eradicate these interactions as they make optimization difficult for Kauffman and result in *The Choice* for Gaus. That would be a mistake. Interactions are a desirable feature of our social world. Without interactions, the whole cannot exceed the parts. In Kauffman's model the value of the ideal, the peak on the landscape, occurs at an intermediate value of K. In Bednar's model, interactions produce robustness. As a rule, interactions create the potential for great things. Of course, we may not be able to find that best among them. On a rugged landscape, we could get stuck on a local peak.

THE DIVERSITY SOLUTION

Hong and Page propose a solution. They show how a collection of problem solvers with different perspectives and heuristics can smooth a rugged landscape by reducing the set of local optima. Landemore (2013) interprets and extends their model within the context of political philosophy.

To see how this can happen we need to return to figure 1. This perspective encodes the alternatives as triples of institutional choices. The proximity between two alternatives corresponds to the number of different institutional choices. The lines from BMM define the set of neighbors of proximity one. We can equivalently think of these as the alternatives located by the heuristic: *search all neighbors within proximity one.*

Figure 2 represents the alternatives using the same features—triples of institutional choices—but arranges them based on the number of bureaucratic institutions. This is a different perspective. The alternatives now belong to different neighborhoods. In this perspective, the neighborhood of BMM includes the social ideal BDM because each alternative includes a single bureaucratic institution.

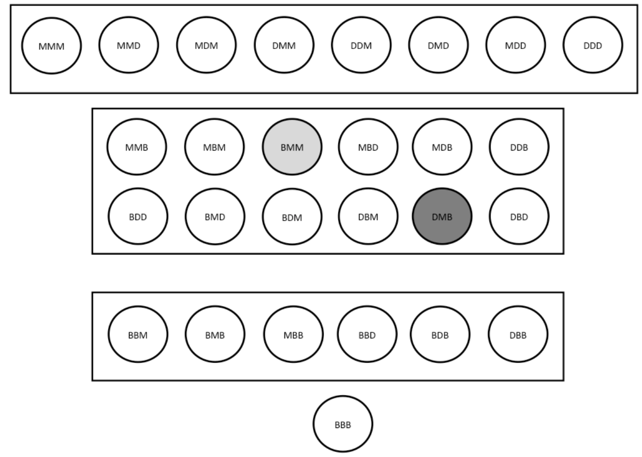

Figure 2. An Alternative Perspective on the Three Domain World

Different perspectives (and heuristics) produce different neighborhoods and therefore need not agree on their local optima. For instance, though the alternative BMM could be a local optimum in the first perspective, it cannot be in the second because the social ideal lies in BMM's neighborhood.

Given a group of people, their set of local optima equals the intersection of the individuals' sets of local optima. Herein lies the power of diversity. Hong and Page derive the following conclusion: *A sufficiently diverse group of people only sees the social ideal as a local optimum.* Any other alternative will not be a local optimum for some person. The logic is straightforward, for a solution to be a group local optimum, it must be a local optimum for every person.

We can show this logic using the two perspectives developed so far. Figure 3 shows sets of local optima for each perspective with grey shading. The intersection of the local optima for both perspectives are drawn thicker boundaries.

As we add new and diverse perspectives, we will eventually add one in which MDM lies in the neighborhood of BMD, the social ideal. Expanding on that insight, it follows that with sufficient diversity, at some point only the social ideal will be a local optimum for everyone. Through diversity, the landscape is made smooth. Society lands on the social ideal.

Gaus challenges that panglossian view by taking the position that if a proposed alternative lies a great distance from the status quo within someone's perspective, then that alternative will be difficult for the person to evaluate.

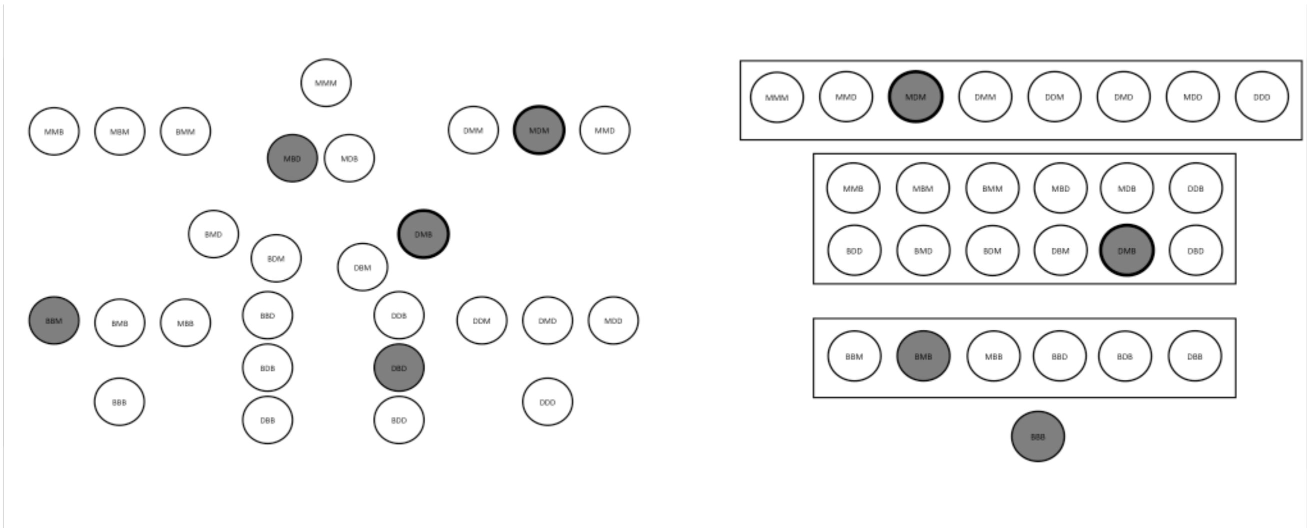

Figure 3.

Gaus formalizes this idea as the *Neighborhood Diversity Dilemma*: as the diversity of perspectives increases so too does the number of neighboring alternatives. An alternative viewed through any one perspective has a small number of neighbors. Thus, the large collective neighborhood necessarily includes difficult to evaluate, non proximate alternatives. We might rephrase the dilemma as follows: my friend's neighbor (in her perspective) need not be my neighbor (in my perspective).

WHAT DIVERSITY GIVETH IT TAKETH AWAY (PARTIALLY)

To appreciate Gaus's argument, we must first reinterpret the core insight of the Hong-Page model as follows: diverse perspectives allow a short step by one person to be a giant leap for another. In the perspective shown in Figure 2, DBD, and MMB belong to the same neighborhood: each arrangement includes a single bureaucracy. The movement between those two alternatives is a short step in that perspective. In the first perspective shown in figure 1, DBD and MMB differ on all three choices. They are not proximate.

Gaus argues that long distances preclude accurate evaluations of arrangements. In the example of the university, DBD corresponds to a world with democratically assigned classes, salaries determined by a bureaucracy, and students who vote among themselves to determine who can take which classes. If DBD represents the status quo, we can imagine that people within that university community would develop beliefs, behaviors, norms, and social networks suited to those institutional choices. For people operating in that environment, BMM, a world consisting of a bureaucratic process that allocates students to classes and market mechanisms that assign professors to classes and determine salaries would be difficult to imagine, let alone evaluate.

Hong and Page are not unaware of this potential problem. At least four workarounds have been proposed (Page 2007). As we work through them, we see that none overcome Gaus's critique.

First, there could exist an oracle that determines the value of any proposed alternative. The alternative, regardless of how far away it is, can be presented to the oracle, and the oracle will calculate its value. For a team writing computer code, designing an airfoil, or performing chemical reactions, oracles, or at least near oracles exist. For a society choosing among a collection of institutions, it surely does not.

Second, even without an oracle, if individuals can make accurate and independent pairwise comparisons, then by the logic of the Condorcet Jury Theorem, with a sufficiently large group, uphill can be distinguished from downhill. Given a choice between DBD and MBD, a diverse group would land on the correct answer most of the time.

Third, if each member of the group makes a crude evaluation of the social justice value of a proposed alternative, so long as the ways by which people make evaluations differ, i.e. if people rely on diverse predictive models, then by the *Diversity Prediction Theorem*, the crowd will be accurate.

In fact, even granting Gaus's claim that those people for whom the alternative lies a long way away will make inaccurate assessments, collective accuracy could be achieved by placing assigning weights on predictions that negatively correlate with distance from the status quo. That is, the prediction of someone for whom a proposed alternative is close will receive more weight than the prediction of someone for whom the alternative lies a long way away.

Fourth, no correlation between perspective proximity and ability to estimate value need hold. Imagine a Hollywood production team selecting a city in which to film a new sitcom. The original script penciled in Boston as a placeholder. The team now must make a choice.

One natural perspective for the set of US cities would be to represent each by its latitude and longitude. Given Boston, a person using this perspective might toss out Providence or Portland, Maine as alternatives. A second, equally natural perspective would be to arrange the cities in alphabetical order. A portion using alphabetic ordering might propose Boulder, Colorado or Berkeley, California. From the geographic perspective, these alternatives lie way outside the box. Though not proximate, neither would be difficult to evaluate.

This last example reveals a key distinction. To evaluate an alternative a person needs to know the mapping from attributes, what Gaus calls features, to the value. Boulder, Colorado could be an unexpected, out of the box proposal to someone, but it could still be evaluated accurately. Its lack of proximity causes no evaluative difficulties.

In contrast, consider the mapping from DNA to phenotype for some species. If we were to manipulate one or two genes with well-known functions, we might be able to predict the effects. If we were to do wholesale manipulations of large sections of the genome, we may have no idea what to expect.

Gaus's claim is that the problem of finding the social ideal is more like the mapping from DNA to phenotype. He has a strong case. We have little to no idea of how large scale reorganizations of society would play out. Given that, he is also correct on his second point. Unless we reside in a place darn close to the best of all possible worlds, we should be reluctant to move toward that ideal.

DIVERSE MODELS AND STEP SIZE

Gaus's offers a second best solution: an open, adaptive, diverse world that explores locally and abandons the ideal. Though pragmatic, his solution begs the question of how we achieve the appropriate diversity: How do we look far enough to avoid getting stuck but not so far as to head to a false ideal?

To clarify the problem, I again rely on the DMB institutional model. Here, I expand the number of domains to twenty creating roughly 3.5 billion institutional arrangements. Each of these arrangements has some social justice value determined by a function V, that is unknown.

Any function V can be assigned a *step size* that corresponds to the number of choices that must be coordinated during search to locate the social ideal.[1] If V has a step size of one, then it is a Mt Fuji problem. If the step size equals two, then the landscape has more than one peak, but any non-ideal peak can be escaped by changing two institutional choices simultaneously.

A value function's step size differs from its K value in Kauffman's NK model. Kauffman's K measures the size of interactions built into the function V. Step size measures the number of coordinated actions that must be taken to reach the ideal. A function could have a small K yet have a large step size. Alternatively, a function could have a large K, but if all interactions were positive, the landscape would be a Mt Fuji.

To see why step size matters, consider two scenarios. In scenario one, V has a step size of two. That means that to find the ideal, society must have the capability of accurately assessing alternatives of proximity two. With twenty domains, an alternative has twenty choose two, or 190 neighbors of proximity two. For society to ensure the ideal, it needs the capacity to think through that relatively large set of neighbors. That requires diversity of thought—people must be able to imagine all 190 alternatives. And it requires the capability to make accurate assessments of each.

In scenario two, V has a step size of four. That means there exists some institutional arrangement that requires four changes to escape. The number of possible changes of size four equals twenty choose four, or 4845. To ensure escaping local optima in that world requires greater diversity and more evaluative expertise.

Evolutionary systems solve this problem by relying on populations to search the space of possibilities. Ideally, exploration and exploitation find a balance appropriate to the problem's step size. On a Mt Fuji landscape, uphill changes in DNA quickly spread. On a more rugged landscape, a successful mutation for one string of DNA may not be for another. Thus, diversity will be maintained.

This tuning of search breadth to problem difficulty also occurs within simulated annealing algorithms which adjust the neighborhood size to ruggedness. Optimal annealing algorithms search broad neighborhoods on rugged landscapes and narrow neighborhoods on smoother landscape.

Gaus's open society offers no such guarantee. What clues or signals might society get to adjust the breadth of exploration? Even more troubling, on more rugged landscapes, society needs to evaluate longer leaps. In practice, the opposite should be true: the smoother the landscape the easier to extrapolate multiple changes.

Gaus offers no escape from the ruggedness dilemma—the fact that more rugged problems require the ability to understand a larger neighborhood (Gaus's *Diversity Dilemma)*, which, given the increased ruggedness, will be more difficult to do.

Though I have only described the ruggedness dilemma within the institutional model, it also arises when constructing a social contract. Iterative improvements in the social contract demand new, diverse ways of thinking.

If we imagine those iterations as requiring a bargain *and* if we allow for a diversity of categories, then Muldoon (2017) offers a possible solution. He assumes people see projections of a higher dimensional world. The result of the bargain would be the union of their proposed emendations. The union of three steps of size two that intersect on a single change creates a step of size four.[2] Once again, diversity, along with a large dose of tolerance, comes to the rescue.

THE IMPERATIVE OF COMPLEXITY

My analysis so far has considered a fixed value function. That assumes that the world in which we must construct a social contract or develop an ensemble of ideal institutions remains unchanged. Advances in science and technology along with population growth, the emergence of new nation states, and climatic changes deny that assumption.

The landscape does not remain fixed. It dances. It shifts under our feet. Yesterday's ideal may well lie in tomorrow's trough. If the dancing landscape maintains the same ruggedness, that is if we imagine that the step size stays the same, then we can adjust once and for all our levels of diversity and openness and hope to keep climbing even as the sand shifts under our feet.

All evidence suggests that our world is becoming more complex. I mean that not in some metaphorical way but measurably. Our world is more diverse, more connected, more adaptive, and more interdependent (Page 2015). The landscape is dancing and adding new peaks with each twirl.

Gaus implicitly promotes diversity and sophistication as the imperatives of complexity, that we must become more open, more expansive in what we think possible and we must develop the capacity evaluate novel proposals. Muldoon would argue that we must be tolerant, more willing to bargain, and to cede changes that others demand that we fail to understand. Neither can derive much value from the ideal.

Their critiques of the ideal assume the landscape to be fixed. When the landscape dances, the ideal becomes even less relevant. I am inclined to agree. Rather than pursue an ever moving target, we should devote our efforts to developing diverse ways of discovering near improvements.

NOTES

1 What I call step size here, I call *cover size in P*age (1994)

2 One person wishes to change A and B, a second to change A and C, and a third to change A and D. The bargain results in A,B,C, and D all being changed. Given their diverse categorizations, each person only sees their own changes.

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