PROTOCOL DESIGN AS GOVERNANCE
PROTOCOL SCHOOL
STANDARDS, NETWORKS,
COMPLEXITY & UNCERTAINTY, CONSTITUTIVE CHOICE

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STANDARDS READINGS

- *Concept*: Murphy, C.N., and J. Yates. "Introduction," in Engineering Rules: Global Standard Setting since 1880. Johns Hopkins University Press, 2019.

- *Exemplar*: Lang, D. "Standards Make the World." Summer of Protocols, 2023.

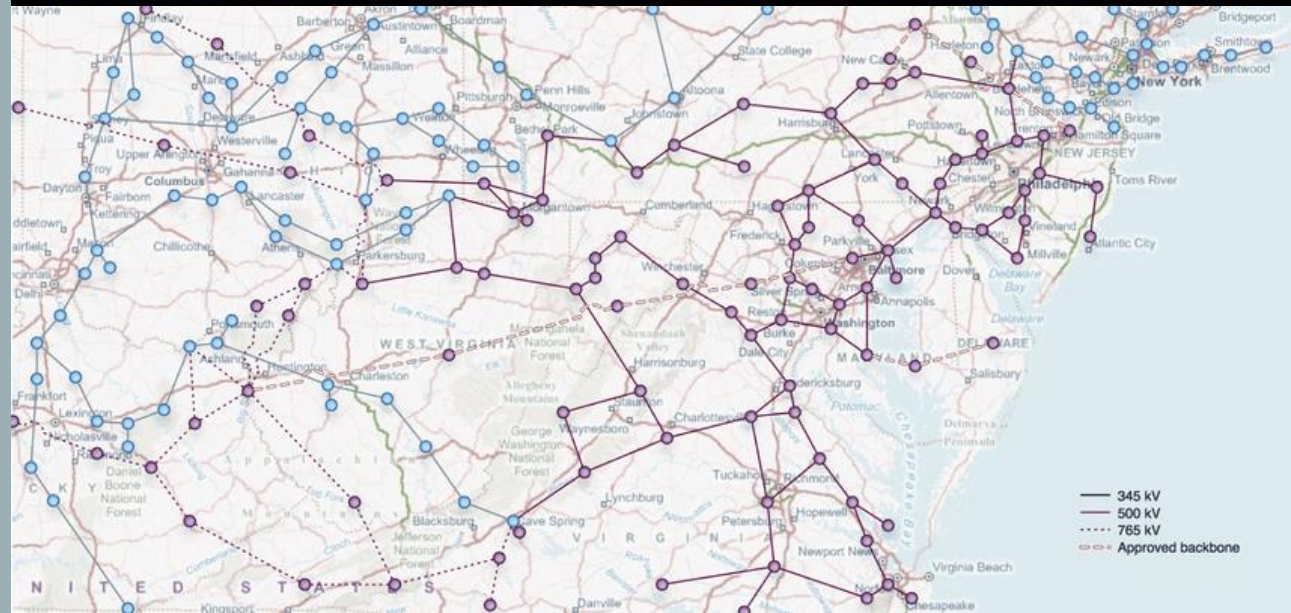
- *Frontier*: Henderson, D. "The Case Against Compulsory Universal Standards." Econlib, 2022.

THE INEVITABLE STANDARDS

- “If you are reading this text in book form, the page in front of you is likely to be of a standard size that was determined almost a century ago by a committee of German engineers.”
- “If you are reading this on a screen, the specific set of electrical impulses that creates the characters that appear before you was standardized by a more recent international committee of engineers, as were the software languages that make it possible for your e-reader to generate this text.”
- “This kind of private standardization has come to provide a critical infrastructure for the global economy.”
- “There are similar standards for almost every other object we use and every built space we inhabit. These standards have shaped the course of industrial development by fixing the technological platforms on which further innovation occurs”

THE STANDARD BEARERS

- "Without such standards the power grids, water and sewer systems, and networks for communication that we rely on every day would not exist in the same form they do now." (and would they exist at all absent SOME standard?)
- "This book is a history of the engineers and organizations that develop and operate the vast yet inconspicuous global infrastructure of private, consensus-based standard setting, a process with an astonishingly pervasive, if rarely noticed, impact on all our lives."
- "We might call this process, these people, and these organizations 'standards bearers.' Often, they steered toward a vision of a world united through private, voluntary standardization."
- Integration of people, processes or systems at scale probably requires a standard, at a minimum for interoperability (more on this in Lang)



ISN'T THIS JUST GOVERNMENT AND LAW?

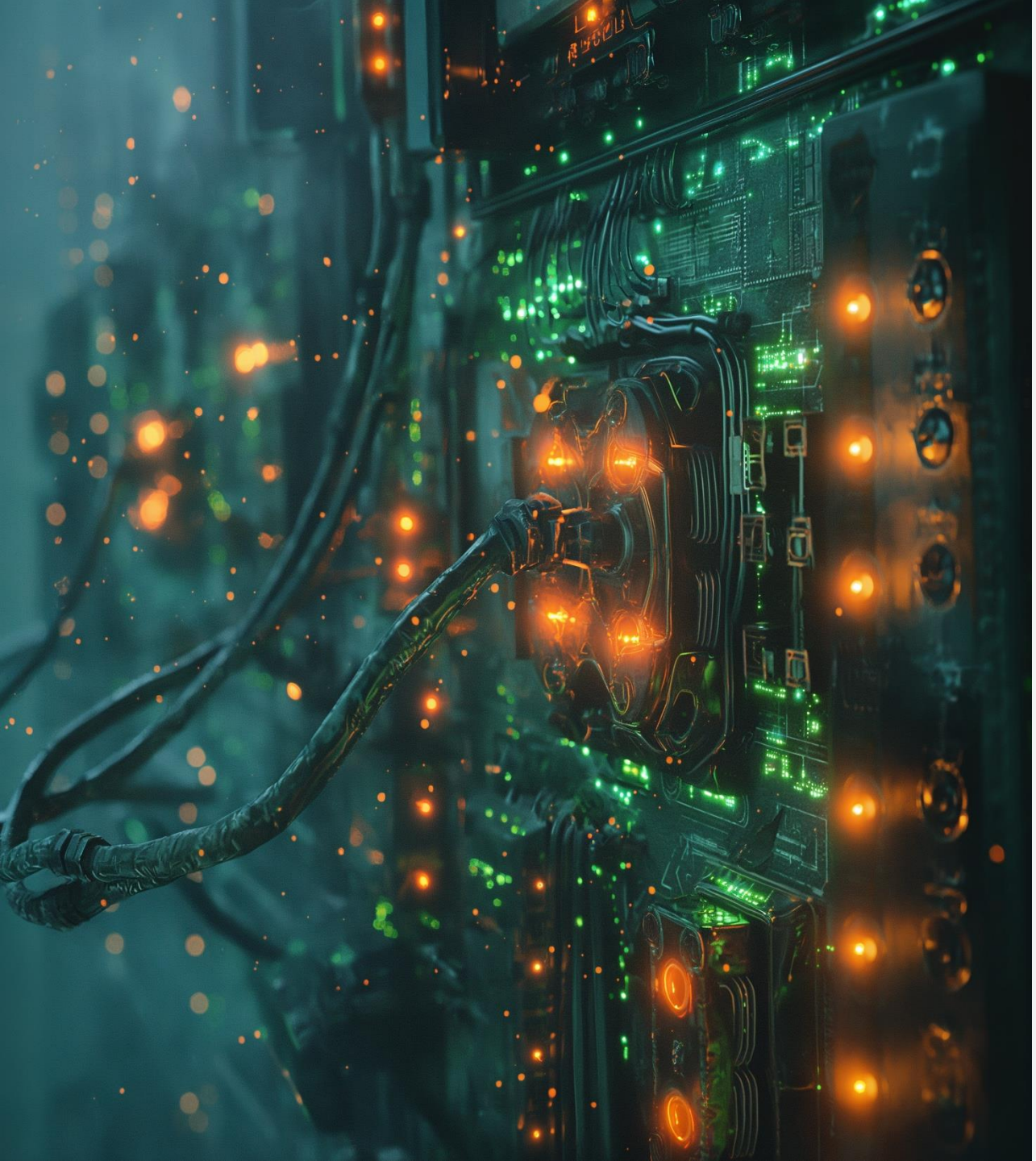
- "In the real world, you might ask, aren't governments the ones responsible for assuring that 'materials, products, processes and services are fit for their purpose'. Perhaps they should be, but, since the late eighteenth century, national governments have been slow to take on the task."
- "More generally, when any governmental or intergovernmental body sets standards and makes them compulsory, the new standards tend to create costs for, or take some advantage away from, deeply committed groups with the power to resist or even block legislation or enforcement."
- "Many private actors have long had more consistent and compelling interests in setting common standards."
- "Economists call the [emergent?] result 'standardization by committee' and argue that there are theoretical reasons for considering it superior to standardization by government or through the market. Under the reasonable assumptions that they make, standardization through the committee process outperformed the market."

TECHNICAL QUESTIONS REQUIRE SPECIALISTS

- "Markets tend to maintain competing standards for a long time, leading to a great deal of unnecessary cost and frustration. Both [electrical plugs and mobile phone connectors] are the result of market failures that private standard setting has been unable to change."
- "Standards wars have sometimes undermined, and sometimes spurred, the voluntary, consensus-based process."
- "In a recent history Mark Mazower calls ISO 'perhaps the most influential private organization in the contemporary world, with a vast and largely invisible influence over most aspects of how we live.'"
- "ISO is a different, confusing sort of beast, an organization made up of organizations, the national standard-setting bodies in more than 160 countries."
- "Requirements for balanced representation of stakeholders and for what we might call due process (e.g., considering every negative vote and responding to each objection in writing) were intended to prevent any committee member or set of members from railroading a particular standard."
- "From the inside, the decision-making process in standard-setting committees has looked a lot like deliberative democracy. From the outside, a technocracy."

A STANDARD BEARER SPEAKS!

- "Standards are everywhere. These nearly invisible rules establish trust between engineers and give rise to commerce, industry, and possibilities."
- "Even now, just by reading these words, you are relying on dozens, if not hundreds, of guiding technical standards. Some of them might be familiar, like the World Wide Web (WWW) or the Internet Protocol (IP) that delivers packets of information to your device."
- "The term protocol is also diluted from overuse... I'm mostly referring to protocols in the way that computer scientists use the term: a specific set of rules and instructions for handling and exchanging information on digital networks – standardized protocols. In that sense, protocols are a specific subgenre of standards."



WHY ARE WE DOING THIS?

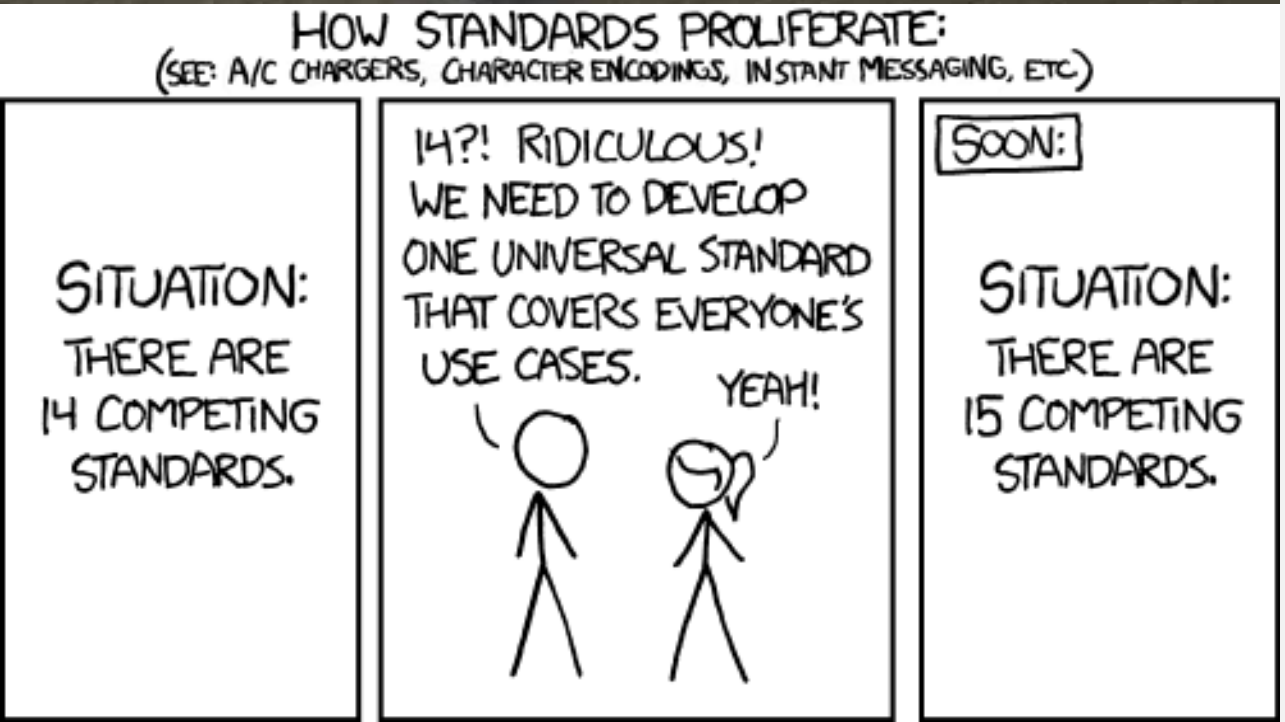
- "The idea of a taxonomy is a good start—a useful start. It sets up the first important question in standards-making: What's the goal? Safety, interoperability, or performance?"
- "The categorization of standards is relevant for many major challenges facing society. Take the debate and discussion around AI regulation and alignment, which is fundamentally a question about missing safety standards."
- "Standards problems often manifest as a failure of the commons to materialize in the first place."
- "Tesla raced ahead to fill the market need, earning the right to set the spec, and now even their most ardent competitors are falling in line. It's classic de facto standards-making."
- "On the other end of the spectrum are the scrappy upstarts. I call the process 'disruptive standards-making' - outsiders break through with fast-improving technology."

LURKING IN THE OCEAN DEPTHS…

- “The Bristlemouth project gave us another chance to rethink ocean technology. We learned ocean technology is being hindered by the lack of interoperability standards.”
- “There was no plug-and-play connectivity between sensors and platforms. Modular components and a simple, universal interface would be a better situation. The industry hasn’t settled on any one design.”
- “The underwater connectors that do exist are too valuable for any of the private manufacturers to consider sharing.”
- “We had rightly identified the bottleneck that was holding everyone back: connectors, pressure-tested to full ocean depth.”
- “The first Bristlemouth development kits are on their way out the door as of 2023 and the ultimate destiny of the protocol will be seen... People needed to gain some comfort that these standards are going to be around for a while.”

CRITICIZE BY CREATING

- “I have argued that innovation in network standards is a form of critique; these innovations do not merely challenge what is, they take productive action and make what could be.”
- “There are no promises of riches or even success, but there is a sense of personal power that comes from shaping the tool that shapes the tools [that] quietly determines the direction of technology and civilization. Standards-making is foundational work—an unlikely source of hope for all the unfinished revolutions.”
- “Technical standards form the foundation of our built environment. If they’re well designed and effectively implemented by engineers on the front lines, standards can become enabling technologies: the Internet, shipping containers, time...”



COMPULSORY STANDARDS?

- "Requiring that all charging cables comply with the same standard is a really bad idea... a few Democratic Senators (Including Senators Elizabeth Warren and Bernie Sanders, of course) are pushing to have the government enforce a universal charging cable standard."
- "First, having a legally mandated standard for charging cables is a surefire way to stifle innovation... Second, using older standards is a common cost saving mechanism for budget devices. Not only would universal standards slow down the rate at which we'd get new technologies, but also they would limit the ability of tech companies to use older standards to offer lower cost options to consumers who have tighter budgets."
- "Looking back, I can't see any point in the past where it would have been a good idea for the state to come in and point to a specific technological development and say, 'This right here – this is where all companies and consumers need to be, all at once, going forward.' It's easy to see why that would have been a bad idea in the past, because here in the present we also know of all the successive improvements that have been made since then that might have been thwarted by such a move."

NETWORKS READINGS

- *Concept*: Rao, V., T. Beiko, D. Ryan, J. Stark, T. Van Epps, and B. Aue. "The Unreasonable Sufficiency of Protocols." Summer of Protocols, 2023.

- *Exemplar*: Hart, C. "Addressable Space." Summer of Protocols, 2023.

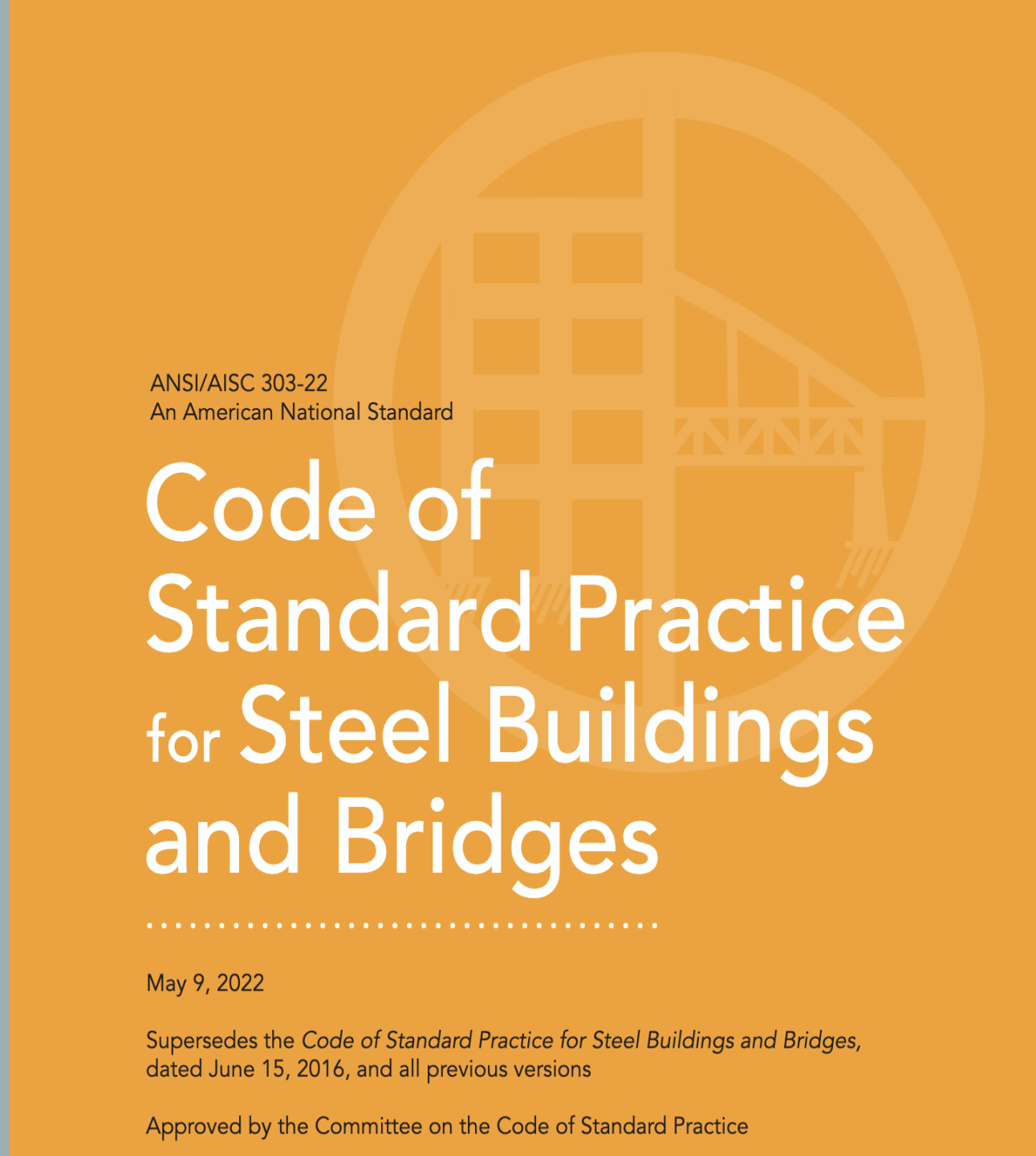
- *Frontier*: Stark, J. "Atoms, Institutions, Blockchains." Stark.mirror.xyz, 2024.

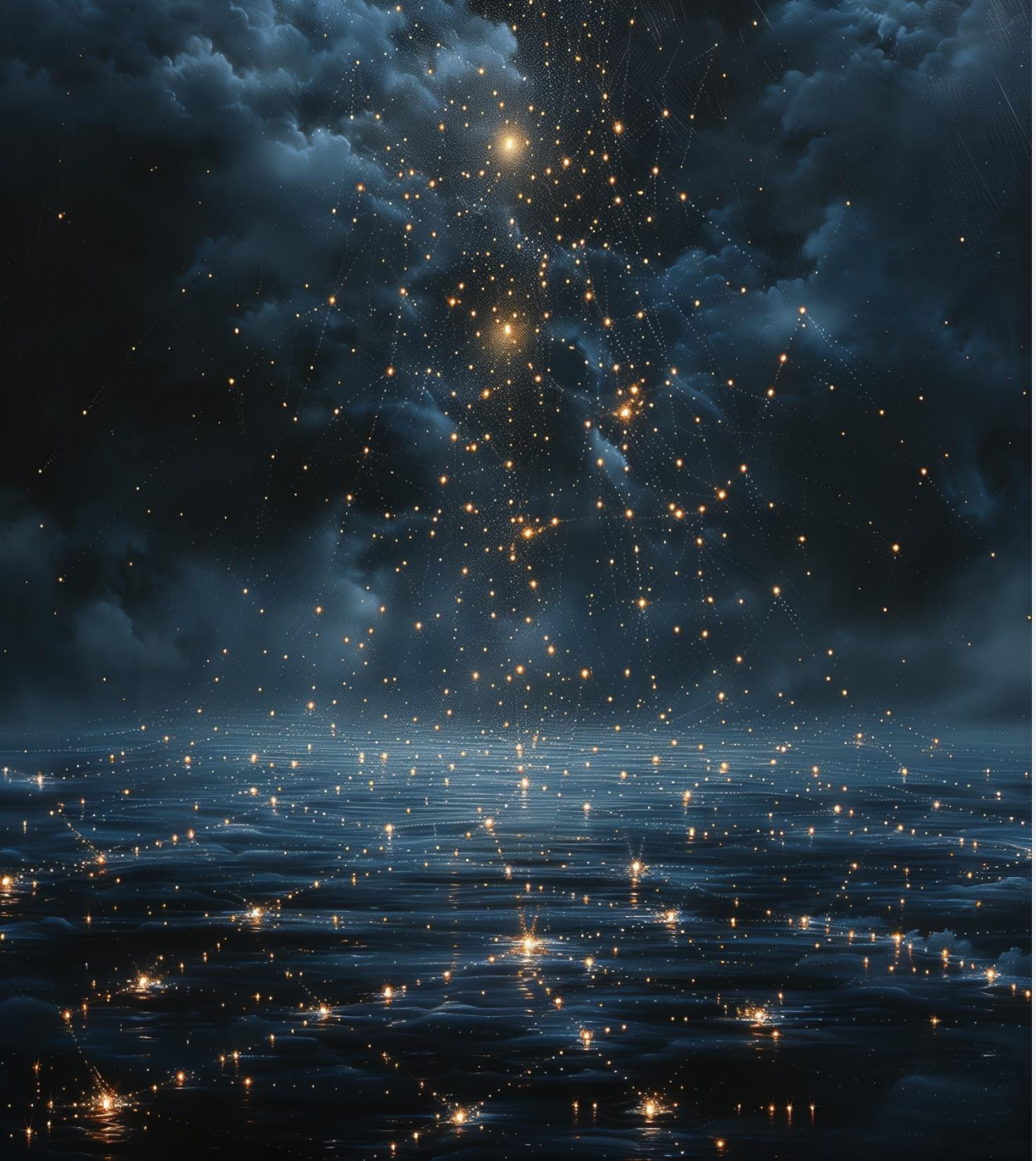
WHAT IS A PROTOCOL?

- "A protocol is a relatively simple and codified set of behaviors, rules, and conventions for interacting, that is easy to learn and do, and enables some meaningful value-creating capabilities in a particular domain."
- "Examples include: rules of the road that govern traffic, grading rubrics in schools, rituals in religious institutions, standing orders in hospitals, procedures for handling emergency situations like fires and earthquakes, accounting standards, and technical standards for interoperability and data exchange."
- Protocols "often represent the best, and sometimes the only, viable class of solution" for large-scale coordination problems.
- What first came to mind when you encountered the term in this class/context?

HOW STUFF GETS DONE AT SCALE

- "A protocol is a stratum of codified behavioral regimes that can be learned and executed with limited and fallible intelligence. The odd term stratum captures the idea that protocols not only enable behaviors, but regulate the speed and direction of evolution at higher layers layered above them."
- "Despite their association with computers, protocols are not limited to computing. The rules of the road are a social protocol. Engineering standards are technical protocols. Legal procedures are institutional protocols."
- The goal is "to articulate a working definition, surface general design principles, and explore governance and lifecycle questions."



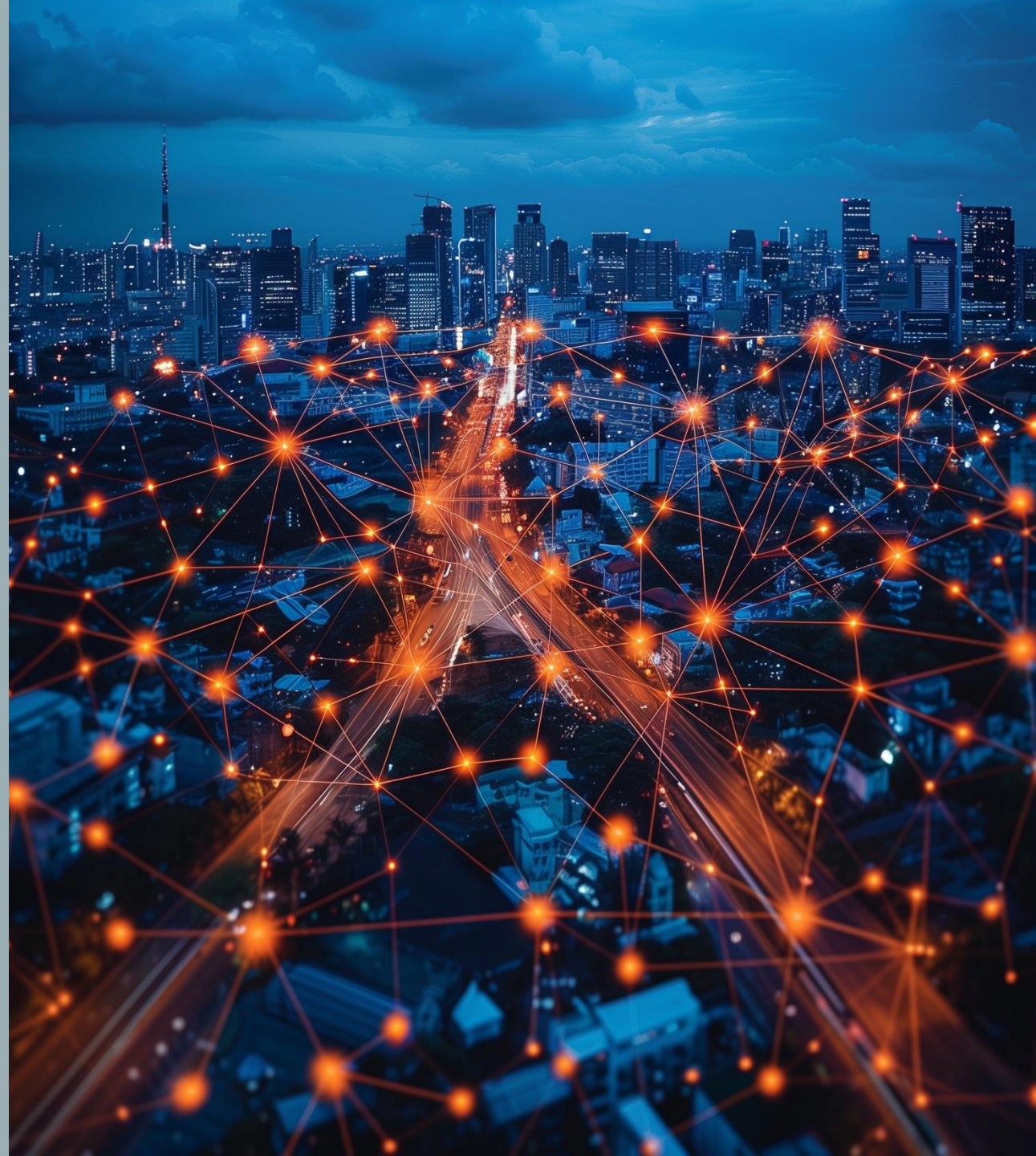


A LATENT INFRASTRUCTURE…

- "Generativity must be complemented by constraints; effective stewardship maintains a yin-yang balance between enabling innovation and curbing excesses."
- "Protocols that are too permissive devolve into chaos; those that are too restrictive stifle evolution."
- "[G]ood protocols make it profitable for the wrong people to do the right thing," and "herd collective problem-solving behaviors away from tragedies of commons into regimes of serendipity."
- Failure tends to reveal protocols: "they turn into invisible backdrops when they work, and become visible only when they fail."

ADAPTIVE PROTOCOLS FOR ADAPTIVE SYSTEMS

- "Good protocols do not just treat solutions to problems as works-in-progress, but the specifications of the problems as works-in-progress as well. Good protocols learn, grow, and mature in ways that catalyze thoughtful stewardship and sustained generativity."
- "While highly adaptive bad protocols do exist, and can persist long enough to do lasting damage—there is a case to be made that protocols are natural engines of progress."
- Protocol governance entails continuous problem-reframing and improvement, not one-off design.
- Protocols govern and require ongoing governance – more on this in the complexity/uncertainty day coming up!



IS PROTOCOL DOMINANCE EPHEMERAL?

- "Sufficiently evolvable: Protocols mutate and evolve. On larger time scales, protocols co-evolve with technological capabilities. The TCP/IP protocol eventually emerged as the one apex protocol that ruled the rest. But its continued dominance is by no means guaranteed."
- Protocol evolution "admits deliberate exploratory design," allowing "better possibilities deliberately chosen through social-choice processes." The challenge is whether evolution is fast enough to keep pace with problem evolution.
- "Email, in theory open and decentralized, has become heavily centralized due to spam-driven concentration effects."
- Does a larger scale of protocol face greater costs to evolving due to the greater number of interests that have coordinated around the status quo?

ADDRESSES AS PROTOCOL

- Hidden Floors! “One Burrard Place was described as a 60-story building, but it contains only 54 physical floors. Developers skipped past floors ending in four and omitted 13.”
- “In New York, a proposed tower contained nearly twenty nonexistent floors using mechanical voids to alter perceived height. Whether nonexistent or inaccessible, they are presented as spaces concealed by information - buttons enumerate floors as discrete standalone units, akin to digital information, taking on an indirect relation to physical reality, like a website URL address.”
- “Like computers, where software programs use pointers to indirectly access data in physical memory, floors and apartments subject to abstract addressing schemes become randomly accessible. When we navigate physical space through digital abstractions, we see the world in the same geographically neutral way that a computer might.”

HOW ARE DIGITAL SPACES DIFFERENT?

- "House address numbers allowed the interior of the house to become 'transparent' to the state. Corridors aligned office and classroom doors in relatively equal relationships exerting an equalizing social influence."
- Victorian domesticity moved toward "enclosed rooms," yielding "binary spatial conditions" of allowed/not allowed—"by virtue of this binary nature metaphorically described as digital."
- "For virtual worlds, the computer's loading logic becomes the protocol that governs contiguity and movement."
- Decentraland is fundamentally virtual, but mirrors many of the addressability conventions of physical spaces, which could suggest that the way we conceive of spatial demarcation and enumeration is shaped by our prior addressing protocols.

THE FEEDBACK RUNS IN BOTH DIRECTIONS

- "As our physical spaces start to mirror facets of digital worlds, including abstraction, random-access convenience, and arbitrary barriers, methods of navigating these physical spaces increasingly resemble those we use for accessing despatialized digital information."
- "Interface-heavy cars and buildings show reverse skeuomorphism, where physical control surfaces emulate digital UI conventions, reflecting addressable, protocolized navigation across built environments."
- Dorms, classrooms, what else?
- Have any of you been in an elevator without buttons yet? Talk about fully protocolized access – your key to enter the elevator is access, instruction, and constraint, all at once!

ATOMS, INSTITUTIONS, OR BLOCKCHAINS?

- “Blockchains will not replace institutions but they will compete with and complement them”
- “For the first time, there is a market for hardness. We will debate not only which systems to use, but also what sources of hardness should be used to construct those systems.”
- “The internet’s institutional hardness is “fragile,” “balkanized,” and “opaque,” while blockchains offer programmable hardness for global coordination without central gatekeepers.”
- “If law, money, and government are the infrastructure of our civilization, then Atoms, Institutions, and Blockchains are some of the raw materials this infrastructure is built with.”
- “It is becoming increasingly obvious that Atoms and Institutions alone cannot support the global digital civilization we strive towards. This is the problem that blockchains solve - a suitable complement to address the limitations of Atoms and Institutions. The question becomes ‘What do we want our civilization to be made out of?’”

COMPLEXITY & UNCERTAINTY READINGS

- *Concept*: Alston, E. Norms, institutions, and digital veils of uncertainty—Do network protocols need trust anyway?. Regulation & Governance, 2024.

- *Exemplar*: Langlois, R. "Imprisoning Complexity within Modules," in Handbook on Institutions and Complexity. Edward Elgar Publishing. 2025.

- *Frontier*: Alston, E., S. Killian and G. David. Killswitch Protocols. Summer of Protocols, 2024.

NORMS V. INSTITUTIONS

- Norms are not institutions (*take the traditional distinction between informal and formal institutions if this makes you uncomfortable).
- Athletic socks to financial law firm interview example
- Norms are an external constraint on individual behavior that emerges from the (semi)random aggregation of individual preferences for others' behavior within social groups one intends to act within.
- Institutions are the deliberately articulated rules that emanate from constituted organizations.

DISTINCT VEILS OF UNCERTAINTY

- Norms' application is sufficiently certain in expectation that people conduct their behavior taking norms as a constraint.
- Institutions' application is uncertain, and is conditional on the presence of an enforcement officer.
- Norms apply to predictable and unpredictable behavior alike – there are plenty of things I could do right now that would trigger a normative response in this audience that none of you could have predicted last night.
- Institutions, because of the necessity of defining the behavior ex-ante that is subject to proscription/prescription and third-party enforcement, cannot (perfectly) govern that which cannot be predicted ex-ante.

OVERLAPPING ROLES IN GOVERNANCE

- Norms cover behavior institutional foresight never can! – these distinct classes of social rules are like complements in many (if not most?) cases of governance of impersonal groups at scale.
- Norms are like a blanket, while institutions are like a spotlight.
- Norms will be the input in truly unanticipated circumstances for an organization, because institutions cannot fully govern the unanticipated.
- For resilient governance in a non-ergodic world, mechanism design isn't enough.
- The norms of a community constituted into a given organization will be the source of governance in the face of unknown unknowns.

ARE INSTITUTIONS REALLY THIS RIGID?

No!

We've long developed means to make institutions *approach* the comparative flexibility of norms.

- Default rules (call options, escrow, threat of third-party contract enforcement generally)
- Ex-post adjudication following enforcement (inc. appeals)
- Substantive and procedural checks
- Relational bonds within a more formal institutional shell (relational contracting!)

THE PUNCH LINE?

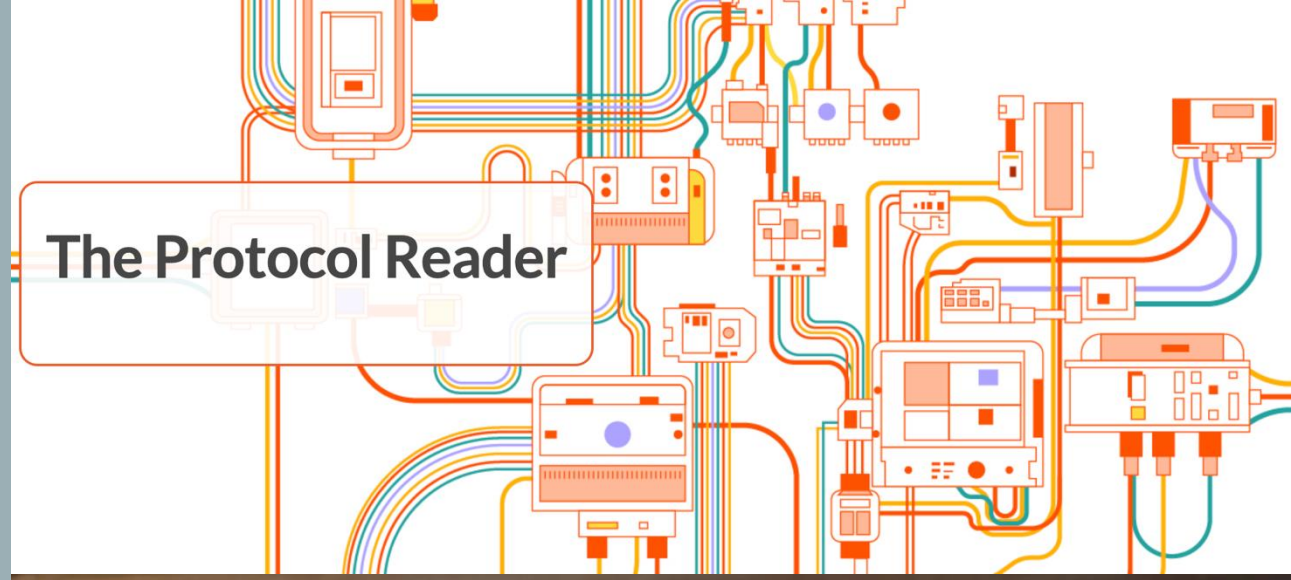
- "Protocol-based governance is, like all human governance, incomplete in the face of changing circumstances, especially the unanticipable. The often enviable precision of digital interaction mediated by rigid protocols displays a more important structural feature of institutions as compared to norms."
- "Most of the benefits of protocol design surround the way in which it can provide network members confidence as to the specific action space of other network members."
- "But can protocol aspire to more than the confidence wrought from institutional specificity? Can digital governance provide the kind of trust that emerges among individuals governed by a sufficiently shared set of norms?"
- "This makes the way in which institutions mimic the relative adaptability and context-specificity of norms of direct relevance to protocol designers… Among the most common digital institutional mechanisms that provide increased generality is the discretionary enforcement of a more general standard, such as Facebook's Oversight Board."
- "The institution of relational contracting involves the use of a wider relationship to underpin the relatively imprecise terms of a given contract."

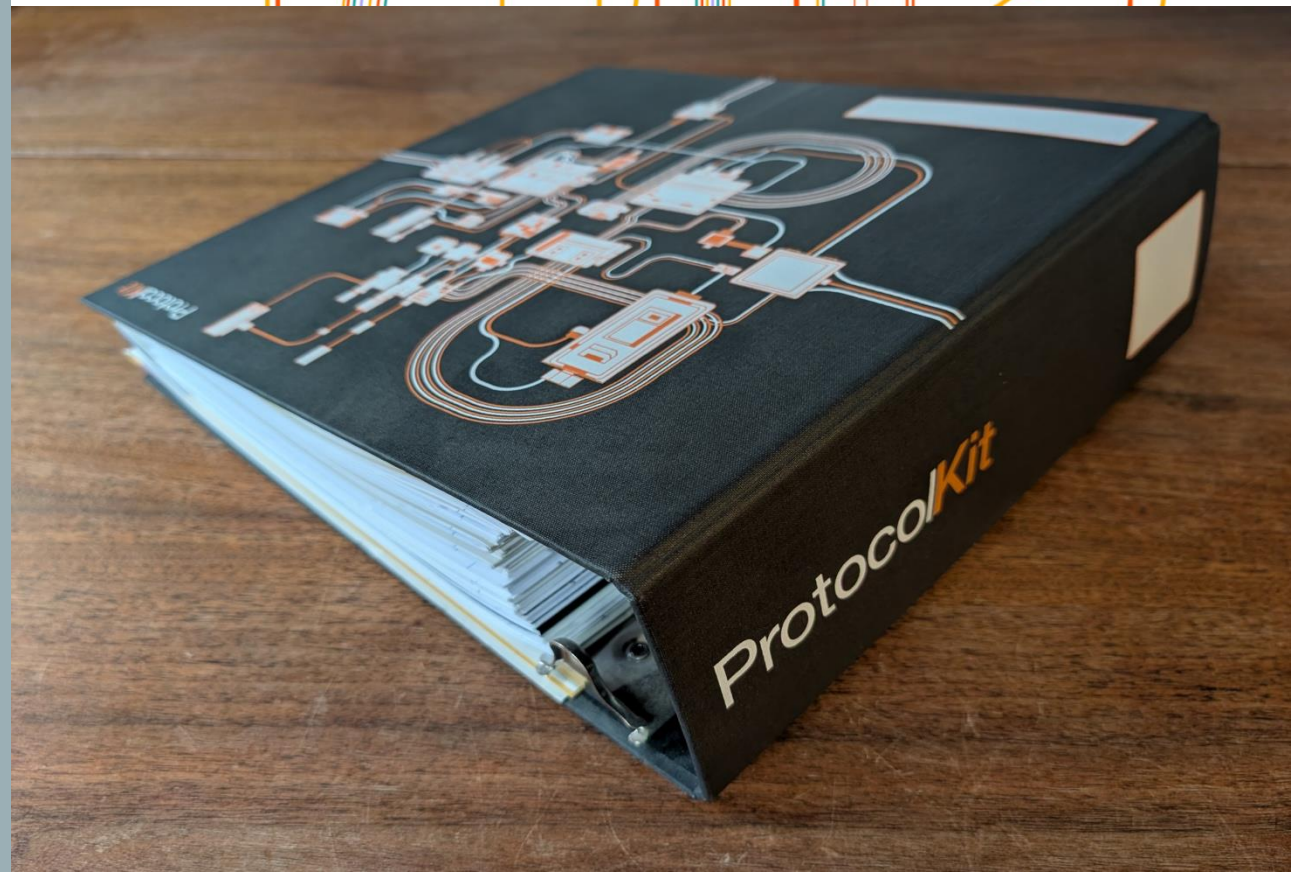
MODULAR PRISONS

- "In a modular system, complexity is effectively imprisoned within subsystems, thus mitigating the propagation of influences to distant parts of the larger system."
- "Modularity shines in the realm of innovation, which is driven by the recombination of knowledge."
- "The concepts of encapsulation and information hiding in the theory of modular systems turn out to be analogous… to the principles of constitutional design articulated in constitutional political economy."
- How many modular systems can you perceive at this moment? (probably more than you think!)

MODULARITY EVERYWHERE!

- “IBM transformed to the design of a single stable architecture – the System 360 – that could be adapted through standardized software and by mixing and matching standardized subassemblies.”
- “Controlling the complexities demanded an operating system.”
- ”The manager insisted on documenting every aspect of the system but ‘The workbook was about five feet thick!’ It was obvious that this approach was entirely unworkable.”
- “Parnas is the inventor of the notion of information hiding. Genuine modularity requires more. If knowledge is hidden or encapsulated within a module, that knowledge cannot affect other parts of a system.”
- “Every module is characterized by its knowledge of a design decision which it hides from all others. Its interface or definition was chosen to reveal as little as possible about its inner workings.”
(resilience v. interoperability)



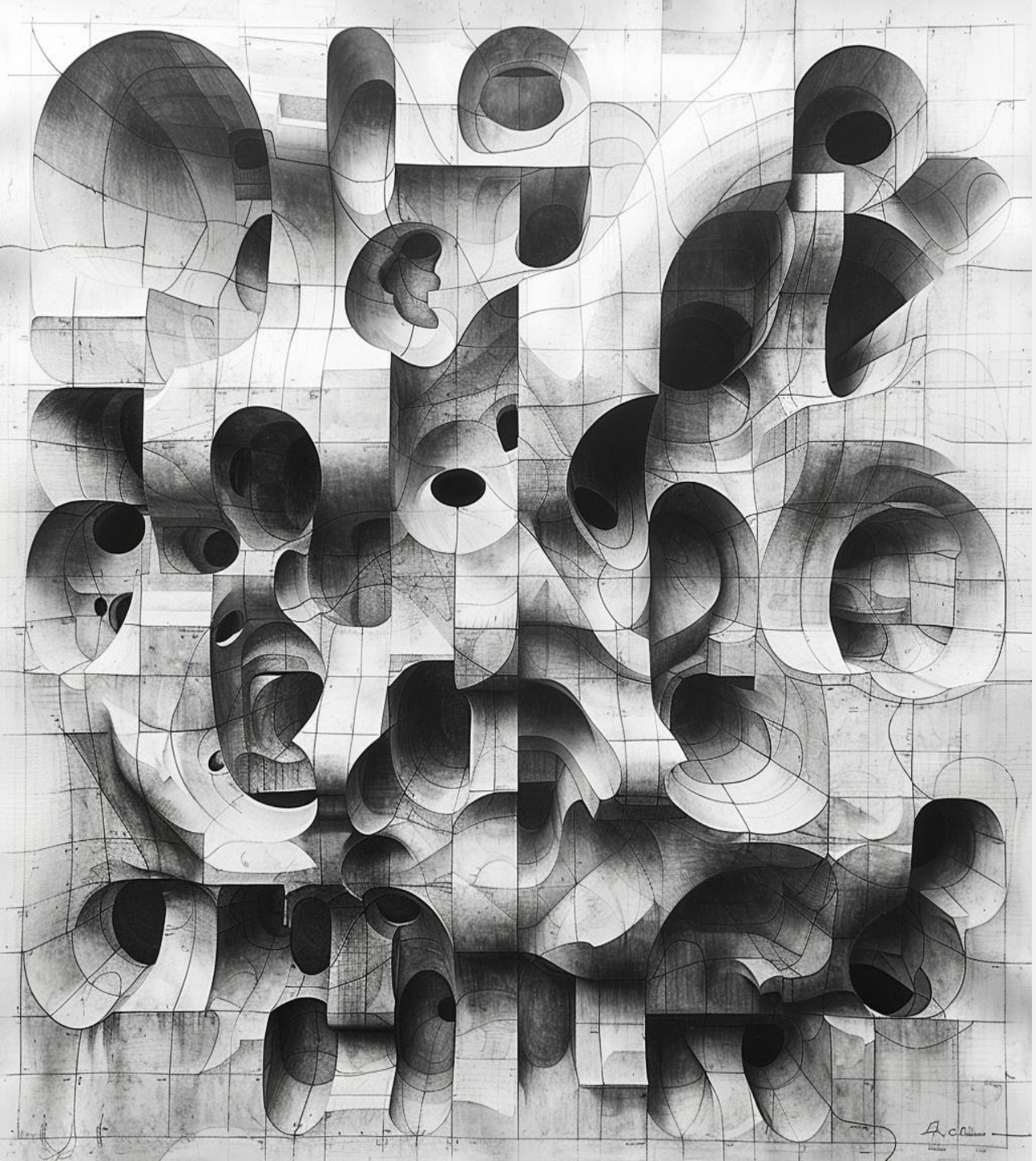


A MODULAR SYSTEM NEEDS AN INTERFACE

- "Theorists of complexity emphasize that systems are almost always hierarchical. It was crucial that systems be decomposable."
- "A modular system is a nearly decomposable system that preserves the possibility of universal cooperation by adopting a common interface."
- "In terms of Figure 1, the modules communicate with each other only through the interface, never directly. Sparseness of the off-diagonal is a crucial characteristic of a well-designed modular system."
- "There is a flip side. Once a relatively modular system of institutions is in place, agents may have an incentive to undo that structure, to bypass the interface. The solution to the problem is a constitution. There is a deep connection between a modular institutional structure and an impartial institutional structure: 'the essence of a constitution: to remove certain kinds of alternatives from the province of majoritarian control.'"

ENCAPSULATION BREEDS ADAPTATION/RESILIENCE

- “Crucial are encapsulation and information hiding. The basic idea is that ‘system details that are likely to change independently should be the secrets of separate modules; the only assumptions that should appear in the interfaces are those unlikely to change.’”
- “Even though a non-modular system might surpass a modular one in fine-tuning adaptation to a relatively stable environment, a modular architecture dominates because it is better able to generate change.” “Best of breed...”
- “Modules can undergo fission. Modules represent in effect a portfolio of options. With this in mind, we can reinterpret Tempus and Hora as a parable about evolvability - modularity isolates one subsystem from another.”



INSTITUTIONS ARE MODULAR!

- "What makes a system of rules function like a platform is that its rules are abstract. The more abstract a set of rules, the more those rules function as an interface."
- "A modular architecture of social institutions also requires design rules to ensure encapsulation and information hiding."
- "Property rights 'demarcate for every individual a range of permitted actions. To say that property is importantly about exclusion is thus to say that property is about encapsulation."
- 'In a modular system, complexity is effectively imprisoned within subsystems.'

ENGINEERED SYSTEMS EMBED DEATH DECISIONS!

Industrial man—a sentient reciprocating engine having a fluctuating output, coupled to an iron wheel revolving with uniform velocity. And then we wonder why this should be the golden age of revolution and mental derangement.

—Aldous Huxley, *Time Must Have a Stop*

- Shut it down!
- First (apocryphal?) example of a nuclear killswitch
- We can engineer sufficiently complex systems that they can spiral out of control with devastating consequences.
- Enter the killswitch!

KILLSWITCHIN' AIN'T EASY.

- What conditions should trigger the exercise of a killswitch?
- Who gets to exercise it?
- This presents an adversarial attack vector like no other.
- Are there some complex systems that should not have a killswitch?
- The power of a killswitch thus constrains the powerful yet there are no panaceas, only solutions that pose tradeoffs.

HUMANITY CONFRONTS THE INDUSTRIAL AGE

- Circuit breaker!
- Failsafe!
- Override!
- First emerge with the development of electricity – a transformative invention, but one that also carried a dark side in terms of fires and destruction of all things wired into the system.
- Trains, airplanes, nuclear reactors...

COMMON TRIGGERS

- Too much electrical current!
- Fluctuation outside an observed set of programmable parameters (market closures via “circuit breakers”)
- Exogenous shocks (impending or realized)
- Human judgment exercised by a discretionary monitor

GOVERNING KILLSWITCHES

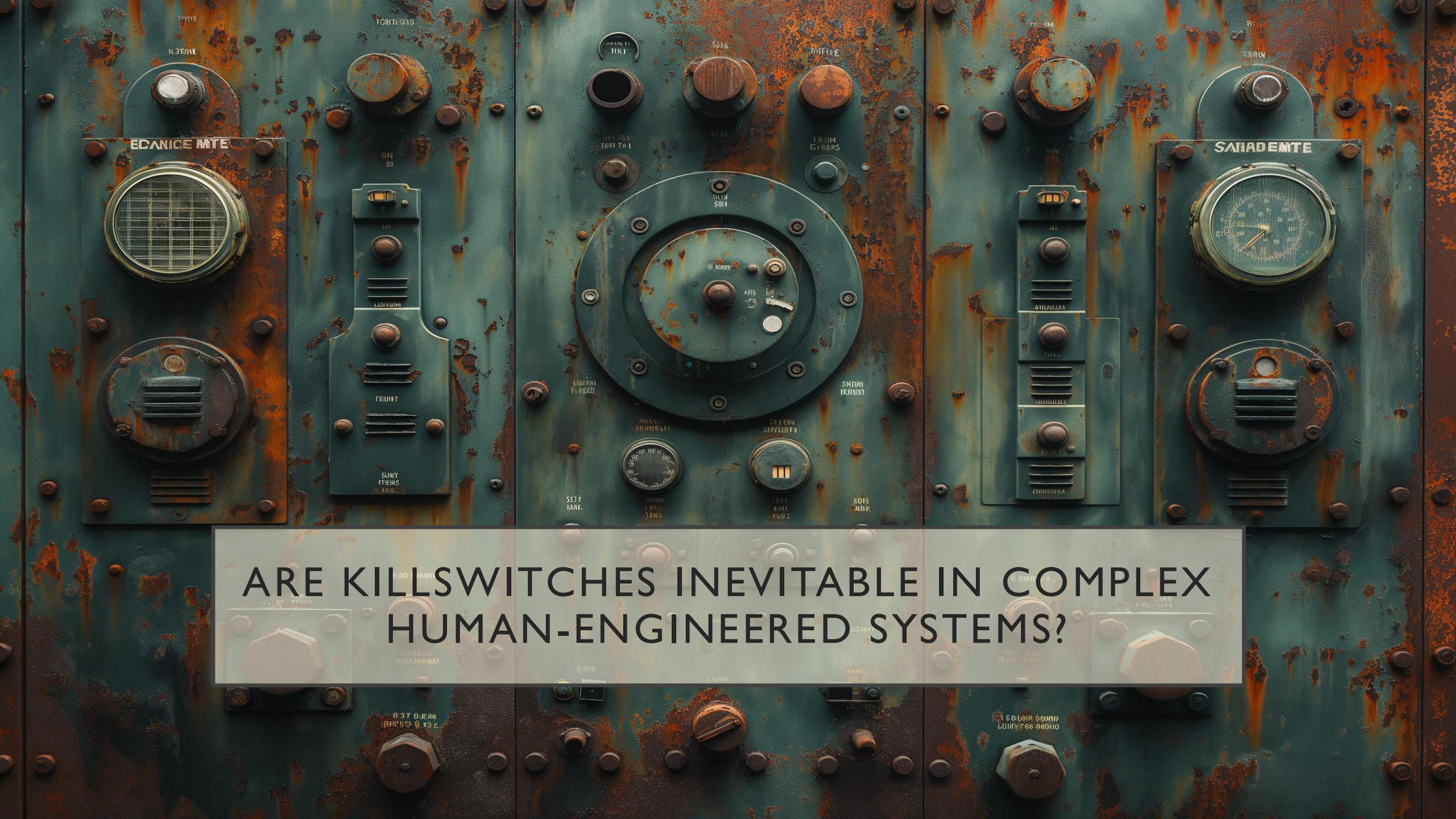
- "Who controls the controllers?" – Juvenal, 2023
- Tradeoffs b/c no perfect solution
- Automation? (OG circuit breaker)
- Human judgment?
- Centralized?
- Specialized?
- Democratized?
- Expediency v. representativity

THIS STUFF ISN'T JUST MECHANICAL/NUMERICAL…

- Assembly lines (Toyota)
- Gaming tournament directors
- Adversarial v. cooperative contexts
- "Hostile" takeovers
- Substantive due process review
- Recall elections & popular referenda

WAIT…THE THREAT OF SYSTEM DEATH CAN ALIGN INCENTIVES?!

- Are participants aware of the nature of the complex system whose killswitch (partly) governs them? Governors surely are...
- Constitutional amendments
- General strikes
- Superset data trust & the “circuit breaker”
- Did the DAO hack response reduce hacks on Ethereum?



ARE KILLSWITCHES INEVITABLE IN COMPLEX HUMAN-ENGINEERED SYSTEMS?

CONSTITUTIVE CHOICE READINGS

- *Concept*: Zargham M., E. Alston, K. Nabben, I. Ben-Meir. "What Constitutes a Constitution?". BlockScience, 2023.

- *Exemplar*: Alston, E. Constitutions and blockchains: Competitive governance of fundamental rule sets. Case Western Reserve Journal of Law Technology & Internet, 2019.

- *Frontier*: Cutsinger, B. "Peter J. Boettke, Alexander William Salter, and Daniel J. Smith: Money and the rule of law: Generality and predictability in monetary institutions." Public Choice, 2022.

WHAT CONSTITUTES A THING?

- "The first thing that most people think of when they hear the word 'constitution' is in fact the most limited (and limiting) sense of the word."
- "Clearly, our existing understanding of constitutions is quite jumbled: it is possible to talk about a formal, written constitution (1b) being part of an organization's overall social constitution (1a/3), which is in turn part of the general constitution (2b) of that organization — and all of these constitutions are themselves the products of a process called 'constitution' (5)."
- "We reformulate [definitions] in functional terms the function of a constitution is to delineate the boundaries of a particular organization or entity, entrenching elements of its composition, reinforcing the coherence of that entity while nonetheless retaining its identity."

***1a**: the basic principles and laws of a nation, state, or social group that determine the powers and duties of the government and guarantee certain rights to the people in it*

***1b**: a written instrument embodying the rules of a political or social organization*

***2a**: the physical makeup of the individual especially with respect to the health, strength, and appearance of the body*

***2b**: the structure, composition, physical makeup, or nature of something*

***3**: the mode in which a state or society is organized*

especially: the manner in which sovereign power is distributed

***4**: an established law or custom*

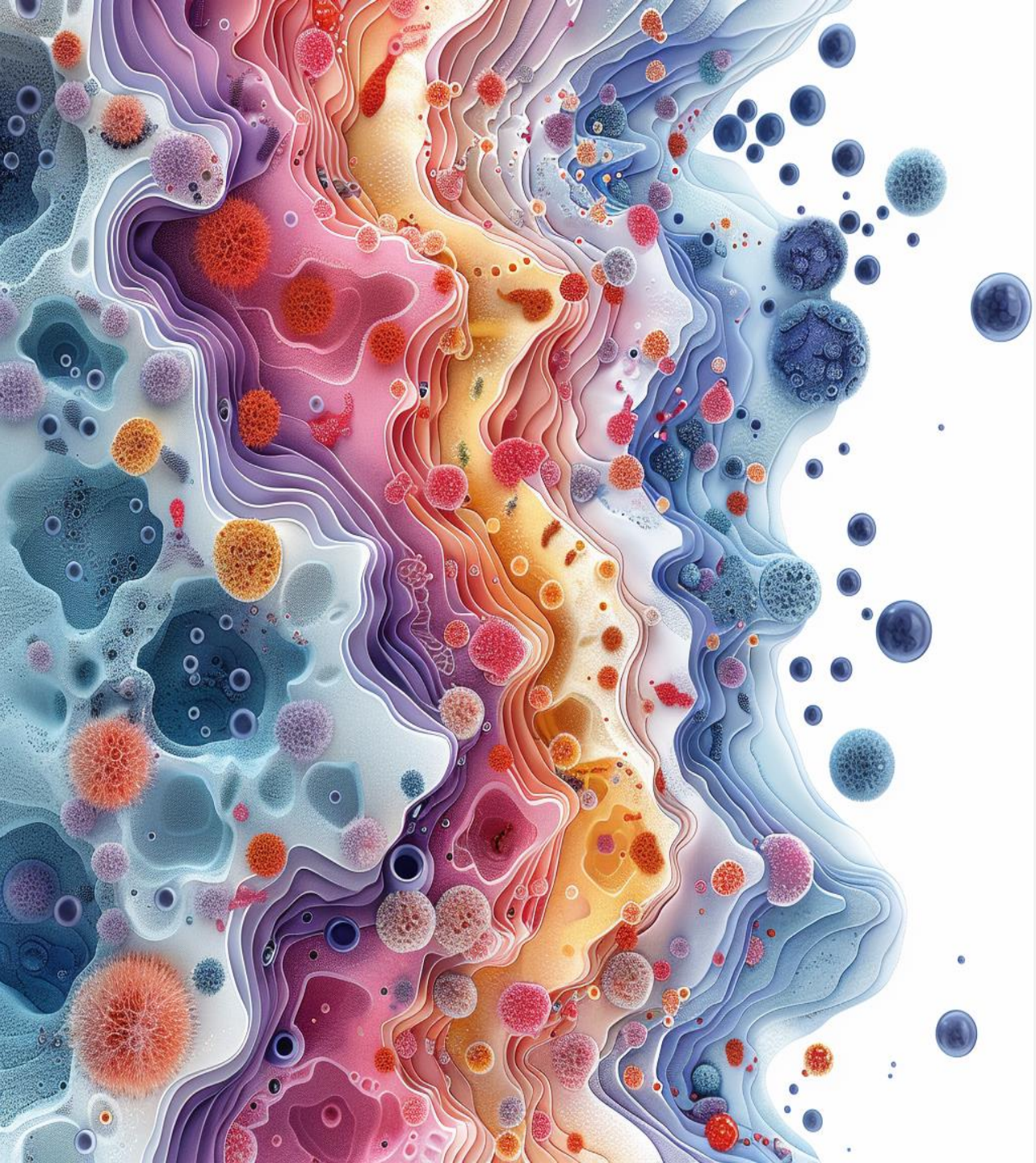
***5**: the act of establishing, making, or setting up*

CONSTITUTIVE INFRASTRUCTURE

- "An organization's constitutive infrastructure consists of all of that organization's implementations of the constitutive function, accounting for the relationships between these implementations."
- "For example, written, formal constitutional documents are a form of constitutive infrastructure suited to centralized nation-states [which are] embodied by a host of distinct but interrelated infrastructures and institutions."
- "In the context of blockchain communities, software is a primary constitutive infrastructure… [Smart contracts] can be implemented, administered and enforced uniformly via executable code suitable for infrastructuring procedural elements of an organization's constitutive function"
- "The elements that make up an organization's constitutive infrastructure will, by definition, contribute to the process of constituting that organization's internal and external boundaries."

PEOPLE, PURPOSE, ENVIRONMENT

- “This process can be further broken down into subsidiary processes: Determining which people are subject to the organization’s governance, mapping the environment and defining the purpose that animates the organization.”
- “People refers to an organization’s internal context [citizenship/membership]; a well-constituted organization is one with a constitutive infrastructure that adequately and accurately embodies the values and wants of its members.”
- “Environment refers to an organization’s external contexts — everything that remains distinct from an organization once it is constituted exerts various forms of pressure (i.e. regulatory, legal, economic, cultural, etc.) on the shape of an organization’s boundaries from without.”
- “Finally, an organization’s Purpose can be thought of as its mediating context [orienting] the mechanisms through which the organization mediates the relationships between its internal and external contexts.
- This includes temporally mediating, as well; an organization moves towards its purpose through time.” “People, Environment and Purpose collectively define the circumstances in which an organization constitutes itself.”



ADAPTATION + RESILIENCE

- "The function of a constitution is to delineate the boundaries of a particular organization or entity, entrenching elements of its composition relative to that organization's regular processes of decision-making, as well as against the broader array of legal, social, economic, and environmental forces that make up its context(s)."
- "This constitutive function operates to reinforce the coherence of that entity in the face of both internal and external pressures, such that it can dynamically evolve through its interactions with both its members and its environment while nonetheless retaining its identity."
- Resilience through entrenching certain system elements relative to those subject to or facilitating more dynamic processes - all complex adaptive systems have certain elements that are more dynamic relative to others which remain more fixed

WHY DO (CRYPTO) MINERS MINE?

TO MAKE MONEY!

WHY DO CRYPTO NETWORKS PAY MINERS?

TO PROCESS NETWORK TRANSACTIONS (RELIABLY)

WHY NOT TAKE THE MONEY AND RUN?

NETWORK RULES (AND OTHER MINERS) PREVENT IT!

WHY DO POLITICIANS POLITIC?

TO MAKE MONEY, POWER, FAME!

WHY DO CITIZENS REWARD POLITICIANS?

TO PROCESS POLITICAL TRANSACTIONS IN THEIR INTEREST

WHY NOT TAKE UNCONSTRAINED POWER?

THE CONSTITUTION (AND OTHER POLITICIANS) PREVENT IT

POLITICIANS AND CRYPTOCURRENCY NETWORK PARTICIPANTS ARE THE CONSTRAINED REPRESENTATIVE AGENTS OF A LARGER POLITY

TOWARDS A MONETARY CONSTITUTION?

- "Reviewing contemporary monetary policy research reveals...issues of governance receive comparatively little attention"
- "This asymmetry reflects a failure on the part of the economics profession to grapple seriously with the political economy of discretionary central banking."
- "Every conceivable monetary system involves tradeoffs. In consequence, ascertaining which system is most likely to promote sound money requires comparative institutional analysis to identify the strengths and weaknesses of the feasible alternatives."
- "This perspective stresses the importance of general and predictable rules, which serve as the normative standard to which any monetary system must conform."

(UN)CONSTRAINED DISCRETION?

- "The current way of dealing with issues of central bank governance, a framework known as constrained discretion, is impracticable. In this framework, the monetary authorities are free to pursue short-run objectives provided they publicly pre-commit to a nominal target. In principle, this commitment is supposed to anchor the public's expectations of the central bank's future behavior."
- "The trouble with constrained discretion is that it places insurmountable epistemic burdens on the monetary authorities by requiring them to possess knowledge that does not exist in the form necessary to guarantee monetary stability."
- "Constrained discretion fails to account for the internal and external pressure on central bankers to pursue objectives inconsistent with the public interest."

KNOWLEDGE PROBLEMS CREATE POLITICAL RENTS

- Determining the "right" money supply is infeasible because: (i) extremely technical; (ii) constant dynamism of market economy makes it a shifting target whose measures are always behind reality; (iii) productivity shocks are unpredictable
- "These knowledge problems produce uncertainty about the optimal policy, which creates space for both internal and external pressures to influence policy-makers in ways that are at odds with the public interest."
- "Contrast the views of three former Federal Reserve (Fed) chairmen before they served on the Board of Governors with the policies they adopted during their tenure as chairmen. In each case, their actions belied their earlier views. [Authors argue this was] the product of bureaucratic and political incentives inherent in the institution of central banking."

WE DON'T GET THE IDEAL POLICY

- "The design of our monetary institutions, must confront these incentive problems directly rather than ignoring them by assuming that because our monetary authorities tend to be accomplished economists they will always opt for optimal policy."
- "The only solution is to constrain the monetary authorities with binding rules, imposed and enforced from outside the central bank."
- "A common argument against strict adherence to a monetary rule is that doing so prevents the monetary authorities from responding appropriately to financial crises because such events are difficult to predict and vary in their specifics."
- "Ideal policy will never emerge from this context owing to the knowledge and incentive problems inherent to the nature of discretionary central banking. The solution is a robust monetary framework that will work well under less-than-ideal circumstances."
- "In the context of monetary policy, the rule of law requires the Fed's actions to be both general and predictable. Predictability requires the monetary authorities to commit in advance to a particular behavioral pattern so that the public can be certain of what actions the authorities will take under a range of circumstances. As the Fed's response to the financial crisis illustrated, monetary policy has failed to live up to the rule of law."