

KYBERNETES SUBMISSION 2005

Allenna Leonard

BETWEEN MOMENTUM AND CONTROL: a dynamic of democracy**INTRODUCTION****The Promise of Cybernetics****ELECTIVE GOVERNMENT****Voting and Political Parties****Proportional Representation****Direct Democracy****COMMUNICATION AND ITS LIMITS****The Internet****INFORMATION AND REGULATORY PROCESS****The Viability of Systems****The Private Sector****THE LEGISLATIVE LAG****International Scope****Outside the Law****LOOKING FOR BALANCE AND RESPONSIVENESS****Conclusion****References**

INTRODUCTION

Cybernetics, or governance, is a means to encourage and channel human behavior for the common good. While there are many definitions of the common good, the most basic concerns viability. Human life on earth will only be viable if our cybernetic endeavors succeed, whether or not they are part of our explicit awareness. It is argued that a more explicit understanding of the basic concepts of cybernetics would improve the likelihood of success. Neither the general public nor most policy-makers understand cybernetics any better than the earliest bridge builders understood gravity or the laws of physics – it was done by trial and error, aided by intuition. A similar position applies with respect to Ashby's Law of Requisite Variety (Ashby, 1956) and other cybernetic invariances. Although there are records of successful trials and some intuitive understanding, results are not consistent. Public initiatives are prone to breakdowns and inefficiencies, especially when there are circular causal relationships, such as those explored by our cybernetic pioneers. It is difficult not to conclude that the capabilities of democracies lag behind the challenge of events when we consider how they work.

As things stand, the issues are urgent. Current environmental exploitation is not sustainable. Invisible threats from chemicals, radiation, and unknown thresholds of other variables are potential time bombs. The likely consequences of global warming could overwhelm societal resources for dealing with disease, shortages, disasters and social disintegration. These social resources are already severely stressed. Failed states, no-go regions within states and terrorism attest to the failure of governance to address grievances and offer hope for a better life. Forces contributing to social and environmental harm have considerable momentum and will be difficult to rein in and control, and there is much current damage to repair. Will it be possible to contain our actions within the thresholds of social and environmental viability? How can global security and human rights be delivered when western democracies, with their superior resources and long-established legitimacy, are struggling to maintain the balance?

Governance structures have changed little since their beginnings some two hundred years ago. The eighteenth century system of checks and balances is still useful but it's a mechanical device based on a Newtonian concept of the universe. Its heterarchical modality follows the pattern of a rock/paper scissors game (rock breaks scissors, scissors cuts paper, paper covers rock) which functions to keep any one branch of government from taking over. Considerable progress has been made extending voting rights and moving toward equality and stability under the law. But progress is far from universal and governments are slow to develop requisite variety in their regulatory processes.

[back to top](#)

The Promise of Cybernetics

Democracy would seem to be a wonderful expression of cybernetics; after all, feedback is central to the operation of cybernetic models. Elections, public hearings, regulatory comment periods and referenda are obvious feedback mechanisms. Feedback, however, has to be timely to be effective. **If there is too** Too much lag and the information will arrive too late to be of use. If feedback happens too quickly, small blips may be mistaken for trends and oscillations introduced. And it has to have an appropriate frame. Elections try to answer the question of whether the present administration is doing a good job and should remain in office or whether the opposition would be a better alternative. They stand or fall on an aggregate assessment in which a single issue or a personality factor may carry a disproportionate amount of weight. The frame may be too large or too small. Terms of elected officials usually range from two to six years but initiatives have more variable time scales. Some effects may be realized within months; others have impact decades into the future. Public hearings, comment periods and referenda also suffer from framing constraints. Sometimes only a piece of a broad issue is addressed, and much is left outside the frame. Sometimes the frame is too large and broad changes are made that are disadvantageous to those who do not quite fit the mold.

While cybernetics has a strong association with technology, that is not what it is about. After all, *Kybernetes* means steersmanship, not the technology of rudder and sail. Technology is important but technological expertise is not always matched by wisdom in its application. As Jacques Ellul (Ellul, 1964) noted, technology has its own momentum and may not be under the conscious control of any legitimate deliberative body. While technology has provided many tools that support democracy, especially with respect to security, transparency and access to information, it can also be mobilized to invade privacy and to serve narrow or short-sighted interests.

[back to top](#)

ELECTIVE GOVERNMENT

Representative government depends on the more or less informed consent of the governed expressed by their vote for its legitimacy. But there are problems. The first problem is that voting implies a dominant frame of reference of majority rule and the assumption that there is a cohort of people who know best and can represent our views. The eighteenth and nineteenth centuries set the framework for legislative governance and many of its protocols. While there were always competing interests: the countryside and the city, the

sacred and the secular, employers and workers; there was considerable cohesion within groups and a strong geographic or nationalistic frame. It is more difficult to have a truly representative government in the age of identity politics where identities are fragmented and pluralistic while political parties are either 'big tents' with multiple sometimes conflicting constituencies or 'small tents' covering regional interests or single issues. The examples here refer to the United States and Canada, but apply to other parliaments and presidential systems as well.

[back to top](#)

Voting and Political Parties

Who are these voters? They are individuals but are counted in blocs. Each person is born with some immutable characteristics, absorbs some more in childhood, and becomes who they are through experience; including but by no means limited to education, traditions, work, travel, relationships and responsibilities. These chunk somewhat into political profiles but present an interesting paradox. It is possible to be fiscally conservative and socially liberal, or the reverse and to have strong opinions on everything from A to Z. But a match may not be on offer among a small number of political parties and voters often end up choosing the least bad rather than the best.

Yet our variety is measurable – at least in aggregate. Pollsters can predict your vote based on a handful or fewer characteristics. I, as a female United States citizen with a graduate degree, am assumed (correctly as it happens) to vote Democrat. But not all similarly situated women do. A party platform with the small number of issues it covers cannot come close to matching the variety of concerns in a complex society. It cannot have requisite variety, so platforms and campaigns find ways to attenuate it.

According to cognitive linguist George Lakoff (Lakoff, 1996, 2000), considerable attenuation occurs because conservatives and liberals have worldviews in which morality is based on differing understandings of family structure. He contends that both relate to morality as it applies to the nation from models of how a family is run with the conservatives following a 'strict father' model and the liberals a 'nurturant parent' model. Each model has its own priorities and its own internal consistency although neither model looks consistent from the perspective of the other's worldview. A conservative values moral strength and obedience to authority most highly, while a liberal values nurturance and empathy. The conservative can justify policies that just seem wrong to liberals and vice versa. Lakoff contends that there are many variations within each group but that the generalizations hold. It is possible that compromise is more difficult to achieve if positions are based on assumptions that may be partially hidden from the individuals who hold them. If they are not explicit, it is difficult to judge when it is appropriate to extrapolate from the family to the nation and the world and when it is not.

Lakoff's argument is consistent with the proportion of negative campaigning about how bad the 'other' is compared to campaigning on the virtues of your party's positions and priorities. This replaces the concept of 'voting for' with 'voting against', and may have the peculiar effect of tilting election results toward the preferences and prejudices of the least informed voters. Certainly the ratio of noise to information is high, and made higher by the infusion of large sums of money into political campaigns. This is especially troublesome and troubling when the entities spending the money are not accountable to anyone – as is the case with the

privately financed '527' organizations in the United States. In the 2004 US Presidential election, the "Swiftboat Veterans for Truth" spent millions on television advertising distorting John Kerry's war record but the Bush Campaign was able to disavow any connection.

Lakoff's argument is consistent with the use of marketing in campaigns. Lifestyle, personality and minutia attenuate electoral messages. American candidates must tell their personal stories and wear their religious beliefs on their sleeves. One of the wedge issues in the 2004 election was "morality". President Bush's campaign devoted considerable resources to promoting his opposition to indecency and homosexual marriage rather than to arguably more pressing concerns. The tactic spoke to a population made fearful by terrorism and a sense that things were spiraling out of control and appealed to the protective aspects of a conservative mentality.

Despite the hoopla and misinformation of campaigns we are all familiar with, established democracies do vote according to legitimate processes – or do they? Hanging chads, poorly designed ballots and electronic voting machines that have no paper trail are all prone to disenfranchising voters who come to cast their ballots. Nor could anyone be proud of the many additional factors that came into play in the 2000 US presidential election in Florida. With many elections decided by swing voters in swing ridings, very close results will occur frequently. Their legitimacy and credibility will not count for much if the margin of error is greater than the margin of victory; still less if this becomes common. In the United States, where the president is elected by the Electoral College rather than directly by popular vote, the winner of the most votes does not necessarily become president. The anachronism persists because doing away with the Electoral College would eliminate some advantages currently enjoyed by small states. Yet, when the winner of the popular vote does not become president (even if the Supreme Court doesn't become involved in the recount), the legitimacy of what is arguably the most powerful office in the world is undermined. Although members of parliaments such as Canada and the United Kingdom are directly elected, they too yield results that do not distribute seats strictly on the basis of who gets the most votes, but riding by riding.

[back to top](#)

Proportional Representation

When there are, as in many countries, more than two parties, first-past-the-post elections almost guarantee that the majority of voters will be disenfranchised. One opportunity for cybernetics would be to design and model variations of proportional representation or combination frameworks that were transparent and simple to implement. The argument has often been that they are too complicated but first past the post systems have been shown to be vulnerable too.

In British Columbia, a Citizens Assembly on Electoral Reform has been studying various forms of PR. The Liberal Party in the last B.C. provincial election took 97% of the seats with 58% of the vote. The opposition got two seats. In Ontario, the New Democratic Party got 15% of the vote in the 2003 election but fell one seat short of official party status with its attendant resources. Parliaments become elective dictatorships, however benign, without effective opposition. And, they can be volatile on small margins. In Canada, the last time the national party in power changed, the Conservatives dropped from a substantial majority in the previous election to two seats. The 'official opposition' (with the next largest number of seats, because their votes are

concentrated in a single province) became the Bloc Quebecois, whose mission was independence for Quebec. It is a testimony to the resilience of Canada that this was not a disaster.

[back to top](#)

Direct Democracy

Proposals for direct democracy are attractive on the surface but are vulnerable to financial and technical problems. Referenda, which are democratic in theory, turn out to be anything but in practice. It is difficult for ordinary citizens to organize and get a sufficient number of signatures to get on the ballot but easy for interest groups, corporations and wealthy individuals to form organizations and hire staff to collect signatures. Nor can ordinary citizens usually afford to purchase television advertising and mailings. This is not to say that items from citizens' agenda never succeed, but the barriers are high.

Timing presents another issue. Voting at the national level happens every four to six years but it usually takes the incoming administration close to a year to get people settled in their jobs. If new legislation moves quickly it either deals with simple issues or simplifies complex issues by haste or by letting the strongest and best-funded lobbyists have their way. Budgets must be compiled yearly to be adaptive but costs and benefits of many decisions operate in different time frames with consequences rippling out over decades. It makes it unpopular to raise taxes today when benefits, although substantial, will not be realized until another administration. As well, governments are tempted to incur obligations when the costs are modest at the beginning but escalate in later years.

[back to top](#)

COMMUNICATION AND ITS LIMITS

Modern – or is it Post-Modern – thinking looks at constructed realities, minority rights and multi-cultural contexts but has not developed adequate means to realize them in political infrastructure. Second order cybernetics, concerned as it is with the observer and its understanding that objectivity must be bracketed to be valid, could be helpful here but is poorly understood in the public mind. One would never know from listening to public debates that there was any room at all between the certainty of a black and white world and 'anything goes' or that there were tools to address complexity.

On a practical level, it is almost impossible to see how the collective visions that are possible in a small community can be realized at a national level. It may be achieved in large cities when change comes with a combination of optimism and purposeful leadership. From an outsider's perspective, London under Ken Livingston seems to be making a good try. Toronto under David Miller has promise but the infrastructure is inadequate. It remains to be seen whether Miller can get the necessary legislative authority and resources to match the city's responsibilities. It is one thing to achieve a sufficient level of identity and coherence in a bounded geographical area but similar levels of coherence across geography have to compete with other points of view and priorities. Perhaps Jane Jacobs (Jacobs, 1985) is right when she contends that the city is the natural limit for most issues of governance. Cybernetic (and organizational) notions of autonomy allow for

decisions to be made as close to the ground as possible where there is the most information available and limit what must be decided at higher levels.

Public discourse on the politics of the day does not come close to addressing the number of issues that could have an impact. The expression ‘under the radar’ describes happenings that do not merit media coverage. Small issues don’t stand a chance unless they qualify as one-off human-interest stories and large issues like Afghanistan disappear from view. The channel capacity of news media and political campaigns is very small and the number of items people can be concerned about within the pace and stress of their daily lives is quite limited. Media coverage tends toward amplifying the items it selects while attenuating or ignoring others. There are also problems addressing changes outside the usual scale. Complex ideas and changes that occur gradually, regardless of their importance, are given scant attention by most of the mass media.

[back to top](#)

The Internet

The Internet can be effective in accessing an incredible amount of information but neither the accuracy nor the currency of much of it can be verified. As well, its channels are clogged with viruses and spam and can be used to enable cyberspace lynch mobs to attack dissenting voices and any venue that would give them a voice. That it is generally careers rather than lives that are threatened does not diminish the chilling effects of these increasingly well-orchestrated attacks by right wing advocates.

However, in the United States, the Internet made it possible for Howard Dean, a former governor of the small state of Vermont, to jump to the front of the pack running for the Democratic presidential nomination and raise an unprecedented amount of early money. It did so by a combination of technology and organizing face-to-face meetings in living rooms and coffee shops. Dean stepped out in front challenging President Bush on the war Iraq before it started, on health care (he’s a doctor), and the economy. Dean wasn’t supported by the Democratic Party establishment or the early caucus and primary voters who wanted the safest nominee, but he did put pressure on the other candidates to take positions that were distinct from those of the President. Perhaps more importantly, he demonstrated the possibility of the Internet to connect an unorganized group of people and give them some political power.

[back to top](#)

INFORMATION AND REGULATORY PROCESS

Rather than being proactive on behalf of the public, much new regulatory effort is spent in catching up. Nuclear reactors, genetic modification of food, overuse of anti-biotics and mad cow disease all resulted in the public becoming guinea pigs for technological and biological experiments. All these were facts on the ground with their own momentum before the broader framework was established and regulatory questions posed – never mind answers found. The learning lags for scientists are daunting enough. It isn’t realistic to expect people in politics, or indeed the public, to learn enough about these topics to make sensible decisions. But, where are the channels for multiple stakeholders to formulate and air their views? A recent G8 meeting was held on an island of the Southern United States where protesters could be kept on shore a hundred miles

away. Access to many political decision-makers is often controlled by money. In both Washington and Westminster restricted invitation lists and high admission prices for political fundraisers make it very difficult for ordinary citizens to have access to office-holders. Public advocacy groups sometimes succeed in getting media attention, but the messages come through as sound bites. Dialogue, when it occurs is often polarized and may leave people less informed than before. In public debate there seems to be a demand for certainty before action is taken. People schooled in the scientific method are reluctant to speak of certainty but that should not delegitimize their input or invalidate their contributions. Certainty is only possible after the fact. By then potential harm has become history. Not surprisingly, the most effective channel to government is when individuals bring complaints to the surgery or constituent services. But it may take a number of complaints before a pattern emerges and the issue gathers momentum.

[back to top](#)

The Viability of Systems

Perhaps it should surprise us that with greater wealth than ever it has become more difficult to get funding for new public initiatives or foreign assistance. A large proportion of public money is earmarked for entitlement programmes or debt service but surely it is not necessary at the same time to stifle the innovation that would lead to better ways of doing things, clearer accountability and risk avoidance.

When we think of viable systems in terms of a human body, there is no doubt that all the organs and muscles are part of the same whole. If one part starts to grow to the detriment of others, it is diagnosed as cancer. Except in so-called primitive cultures, there is not the same appreciation of the whole or perception that we are all in this together. The individual is not viable without a nutrient environment providing essential variables of food, shelter, security and companionship. Communities and countries cannot survive without a nutrient environment either. Failed or failing states have been unable to provide those essential variables to their populations. Unless more resources are shared so that all of our city neighborhoods, country regions and nation states are at least viable, humanity as a whole may lapse into another Dark Age or perhaps not survive at all. Viable systems are recursive. They repeat their characteristics like Russian dolls from the smallest to the largest. They are nested within other viable systems and are usually composed of smaller viable systems. The message of 'united we stand, divided we fall' predates cybernetics but cybernetics provides another layer of understanding to the message. Tools such as Beer's Viable System Model can address the complexity of recursive systems and help us to understand and improve them. Javier Livas (Livas, 2003) has written a book called *The Cybernetic State* that explores the application of the viable system model to the notion of a state and its economy.

Instead disparities in wealth and power are increasing. This is predictable because large systems tend to follow the eighty-twenty rule. This rule of thumb, also sometimes called the law of diminishing returns says that 80% of the production goes into 20 % of the orders; 80% of shoes fall into 20% of the sizes and so on. There is a natural tendency for small advantages to increase over time, like interest on a bank account, and vice versa. Progressive social policies introduce measures to counteract this tendency and rebalance resources. Provisions to protect small countries and small businesses and social safety nets for families to make sure that no individual or group is denied the essentials for survival are necessary for our common welfare.

[back to top](#)

The Private Sector

When the public sector falls short, many look to the private sector and the market to provide albeit indirectly for public needs. This is not the business of the private sector. It is a grave error to expect it of them. Corporations are legally constituted to make money for their shareholders and usually weight this limited role toward the short term. The book *The Corporation* (Bakan, 2004) and the film of the same name recently evaluated the entity called 'the corporation' according to the World Health Organization's ten criteria for mental health. The corporation failed on all ten counts, having been defined to pursue a circumscribed self-interest. From the days of its original charters a hundred and fifty years ago, the corporation has been a 'person' under law but without either the range of perceptions or responsibilities of a human being. Despite having power comparable to what science fiction envisaged for robots, a corporation does not meet the first of Isaac Asimov's Three Laws of Robotics: "Robots must never harm human beings or, through inaction, cause a human being to come to harm".

Bakan documented numerous ways in which human beings come to harm through corporate action as employees, customers and investors. The general public may suffer effects of social and political degradation, pollution and damaged health. Often these are third party effects where externalities have an impact on 'downwinders' or others who were not part of the transaction. Usually it is very difficult for those who have been harmed to get redress. Even when individual actions of corporations are not detrimental to the larger society, their collective actions may be. 'Tragedy of the commons' behaviour occurs when each farmer puts another cow out to graze on the common land until it is depleted. If it is to every player's advantage to take advantage of a loophole or ignore a problem until the negative effects are widespread it will be tempting to do so. In these circumstances it is difficult to assign blame to any individual operation; everyone is responsible, so no one is culpable.

Even where the damage was severe and responsibility unquestioned as with the disaster at Bhopal, people may wait many years for compensation if they receive it at all. But the sanctions against corporations that behave badly are not the same as sanctions for human beings. At worst, corporations go bankrupt which only means that creditors are paid back a portion and the whole enterprise is reborn as before. One may wonder why countries such as the United States, which impose the death penalty on people, do not have a death penalty for corporations that inflict lethal harm. My colleague Penelope Colville has suggested that if this were so, investors could purchase corporate life insurance to protect them against that eventuality (Colville, 2004). It is interesting that individuals require a passport, and sometimes a visa to travel, but this does not apply to enterprises. If there was the political will, corporate passports could be used to assure that acts that were illegal at home would not be performed with impunity abroad. Probably no one had any inkling a hundred and fifty years ago of how many third parties could be affected or the extent of potential consequences.

Corporations have little accountability to the public except to keep books that 'fairly present' their circumstances while refraining from illegal acts. Far from being open to talking, some corporations concentrate on reducing communications channels through a wall of public relations, aggressive use of libel action and fencing off information through unintended uses of patent and copyright law. Some want to privatize not only nature and our intellectual commons but also our common speech. Donald Trump's effort to

copyright the phrase “You’re fired” is the latest egregious example. But rogue elements are not necessary to bring about a bad situation. Harm to the public involves not only acts of commission, like pollution, but acts of omission like lack of planning.

[back to top](#)

THE LEGISLATIVE LAG

Legislation operates in a piecemeal fashion. It must be one-size-fits all and it is almost impossible for it to have requisite variety. Although it would be possible to design contextually based regulations, it is difficult to do with a reductionist toolkit – just look at tax law. In legal language there is little room for context or place for the differences in perspectives of different observers. In fact, the response to greater complexity seems to be simpler, if not more simplistic rules. It was probably easier to air differences in the past when there was more time for debate and not as much to decide. With fewer issues and a lesser role for lobbyists, public input could be proportionately more extensive. Even so, the best that was usually achieved was compromise. Nor are courts well suited to reintroducing complexity. They are tasked with responding as narrowly as possible to the issues. By the time a case goes through the full appeals process to the highest court, years will have gone by and circumstances may have already outstripped the arguments.

Much is made of the slowness of legislative and judicial changes. These may become gridlocked. Originally delays were built in to curb high passions, to give people more opportunity to become informed when communications were slower and to give them time to adjust to changes. But scheduling can be manipulated. Delays may be introduced or extended by lengthy appeals processes and other legal maneuvers for reasons that do not serve those most in need of justice. It is not uncommon for legislation to resemble an old country house with additions from every period. In the US, for example, the Communications Act of 1934, as amended, was not massively altered until the Telecom Act of 1996. Even then it was an amendment. The idea of governing the internet, telecomm and cable and satellite services and protecting the privacy of users under principles developed for radio and telegraph would be laughable did it not fall so short of requisite variety and so fail the citizenry.

And yet bizarrely, things may happen too quickly. Members of the US Congress have admitted that they did not have time to read, never mind study, the Patriot Act of 2001 before it was passed. The post World Trade Centre sense of emergency made their fulfillment of legislative review responsibilities impossible. In non-emergency situations, public relations in an era of instant communications and the Internet can sow confusion and derail public opposition before it can coalesce. At other times, lobbyists do their best to assure that issues are decided before they become public knowledge. Contracts may be signed or cancelled before all of the interested parties even know something is happening.

It is difficult for measures taken on behalf of the general public to gain sufficient momentum to succeed. Opportunities must be seized or they are gone forever. On the other hand, it is much easier to destroy than to build. Even a short funding gap of a year or two is enough to destroy the continuity of long term research in many fields. The cost cutting in meteorology and climate change research occurring now could hardly be more self-destructive for humanity. Funding gaps destroy the creative critical mass that exists in laboratories, or, for that matter, dance companies. The individuals that make them work are on short-term contracts and

live from paycheque to paycheque. Even if funding is resumed, they cannot pick up where they left off.

Some problems fall within regulatory boundaries but the regulations themselves are too loose or too poorly enforced to be effective. In the energy industry, self-reporting and patchwork regulatory authority did not reveal decades of Unocal oil spills and environmental damage off the California coast. Authorities finally found out when someone blew the whistle. Sometimes the boundaries are not clear. One of the reasons behind the decline in the electric utility infrastructure is that it was impossible to decide whether state or federal regulations applied to the interstate regulation of transmission lines. The vulnerability of those lines was underscored in the 2003 summer blackouts that affected fifty million people in the northeastern United States and parts of Canada. Red flags had been waving for years. Although these regulatory problems are blatant, cybernetic tools can discover other anomalies before they become crises.

In the systems field it is accepted that things do not look the same to different observers and that small events can have large consequences. Disturbed systems can reverberate over decades if not centuries and their reverberations can revive and escalate conflicts that had been believed long forgotten. This makes it difficult to see the patterns clearly. Many people probably realize this but do not know there are tools available to help.

Beer's models use and extend Ashby's discoveries about variety to provide a means of understanding and comparing organizational structures and communications. In *Heart of Enterprise* (Beer, 1979) four principles of organization dealing with variety are set out as initial requirements. They are:

“ Managerial, operational and environmental variety tend to equate throughout the system,

The communications channels carrying information between these areas must have a higher variety to transmit than the subsystems have to produce variety and,

The variety of the transducer operating on a boundary between systems must be at least equivalent to the variety of the channel.

The fourth principle of organization says that the operation of the first three principles must be cyclically maintained through time without hiatus or lags.”

These principles are not present in any government. In specific areas, however, it should be possible to address this lack through the use of real-time monitoring of established key indices. They detect problems or incipient instability by evaluating behaviour through the use of statistical filters. This was the thrust of Beer's work in Chile (Beer, 1981) and the technology has improved greatly since the early 1970's.

It is not necessary to use systems thinking or models in great detail to obtain benefit. Informal systems thinking can pose questions and discover insights. In the VSM, one of the first steps is to look at how to distinguish the System one or productive units. The distinctions chosen depend on the purposes of the different observers but must be consistent and coherent. To take one of many possible configurations, one might say that the system one units in the global system were business, government, civil society, religion, the knowledge and/or creative society, and personal life. From this perspective, each sector's needs must be integrated with those of the others. If they are not balanced, pathologies and anomalies will occur. This approach bypasses traditional distinctions like public vs. private or right vs. left and is more helpful than ideology.

Infrastructure is one area that is ill served by the binary distinction. In the range between fully public and completely private there are various levels of regulation, competition and subsidy. Energy and transportation are two areas where public and private meet. If electricity transmission lines are operated by competing private interests with high demands for return on investment and minimal regulation, it is predictable that maintenance will be short changed and blackouts will occur. In the transportation industries, a systemic view would not have yielded such an imbalance between road and rail subsidies.

It seems that if binary logic fails, the next step should be to use a multi-valued logic. But pretzel logic seems to be the default and leads to situations where the tail is wagging the dog. In the United States, in 2005, the Supreme Court is to hear a challenge to the right of municipalities to use eminent domain to force people to sell private property to the government so it can be resold for other private uses that would yield higher property taxes. This is a novel use of a legal mechanism that has traditionally been applied when clearance was needed to build a road or a public building. To be sure, municipalities are pressed for funds. But how long will it take to realize that property tax no longer has requisite variety to meet municipal needs? It should be seen as being as outmoded as the window taxes or frontage taxes on buildings in past centuries.

[back to top](#)

International Scope

Most of the situations so far discussed take place within national boundaries. When boundaries are crossed, transduction if not translation issues arise, lags get longer and more interests are at stake. International agreements, like Kyoto, take years to negotiate and may or may not be fully implemented, although to proceed with the status quo amounts to slow global suicide. Moreover, there is no effective international metasystem. The United Nations is as close as it gets, but is hampered by a linear and reductionist infrastructure. The World Health Organization, UNICEF and the International Labour Organization do good work, but are organized in silos. Many NGO's do good work too, but they inevitably must focus their resources narrowly to have an impact. Both are frequently so resource-poor that they must proceed slowly as funds become available. The United States, as the sole superpower, has military superiority but not unlimited funds, and is primarily focused on its own security and domestic interests. Afghanistan and the Middle East are prime examples of places where earlier interventions were not followed up with enough assistance to leave healthy states behind. Who would want to bet that these areas will be stable and responsive to the needs of their citizens when the United States departs after the current interventions?

Internationally, one size fits all less well less well than domestically and falls further short of requisite variety. International Monetary Fund, World Bank and the WTO trade agreements are rightly criticized as being agreements that push small players to the sidelines, whether they are small countries or small companies. Although their aim is stability, the result may be the opposite.

[back to top](#)

Outside the Law

Crime and corruption have become easier with enhanced communication and ease of travel. The low risk that off balance sheet transactions will be detected serves criminal and covert operations well. With turf wars among law enforcement agencies and gaps in local, never mind international cooperation and cohesion, it is easy for organizations to operate outside the law. Criminal elements may also collaborate with fundamentalist or political insurgents. Such activities can be carried on more easily undercover in cyberspace or within the boundaries of weak or failed states that lack the capacity to observe or control them. Current means to address social pathology are, as in medical care, tilted toward treatment rather than prevention. It is almost seen as condoning pathologies when an attempt is made to point out that they are a predictable result of the way things work now and to suggest rethinking our actions. Instead, new terrorism laws are applied to the old problem of youth gangs whose troubles come from too little connection to events outside their immediate environments rather than too much, thus blurring meaningful distinctions.

[back to top](#)

LOOKING FOR BALANCE AND RESPONSIVENESS

How can cybernetics and systems help enable government and politics to act for the common good? One improvement comes from the promotion of transparency, which is surely a prerequisite for regulation and accountability. Even in undemocratic countries, if their actions are visible, governments often prefer to be seen to be behaving well. So do organizations. It has taken some pressure but corporations have been becoming more responsive to concerns about social and environmental degradation where their products are sourced. Increasing transparency also has an effect on individuals playing roles within governments and organizations as they prefer to be proud of what they do. Cybernetic models can contribute here by designing effective feedback loops and making sure they have sufficient channel capacity.

But this still falls short of the balance that is achieved by homeostasis. In the human body, homeostasis involves many minor adjustments that seldom intrude into consciousness. In a social body, power considerations or other distortions can override the feedback that might maintain balance. Sometimes the balance is complex and maybe unconscious. One of the stories in *Decision and Control* (Beer, 1966) was about an operational research study conducted in Denmark among ship captains to discover what situations they found dangerous in the channel between Sweden and Denmark. As it turned out, they couldn't say but an important factor was detected later when the researchers listened to the audio-tape of the meeting. Everyone knew what to do when there were two ships in motion but the group became audibly uneasy when

three or more ships entered the picture. This has its counterpart in international conflict situations where there are more than two players or there are interventions by outside players. Often these involve a group that is by far more powerful within a national boundary, but is a minority in the region. All parties legitimately feel threatened and none feel very comfortable making concessions. But, unless the dialogue brings together all the parties, inside or outside national boundaries, solutions will be elusive.

Syntegeation (Beer, 1994) and other heterarchical group processes have been developed and found to be successful when they are applied. But, using such processes implies being open to the full range of different perspectives and their validity. In international negotiations and legal maneuvering, one of the first tactics is to limit the number of perspectives that have standing. That reflects a much different attitude than the inclusive approach characteristic of group processes.

[back to top](#)

CONCLUSION

The circumstances are serious and current institutions and infrastructures do not have requisite variety to describe or deal with them. Those in the systems and cybernetics community are aware of the problems and have some solutions. But not much can be done until a critical mass of people concur. This is difficult because among the constraints identified are the limits of channel capacity for public discourse and decision-making. Tools exist including models and group processes but are not widely employed. They could and should be developed and applied further. But this will be difficult without massive resources. Gatherings during the Second World War, the Macy Conferences, and the Biological Computer Laboratory at the University of Illinois all produced significant advances – some of which still wait to be applied on a meaningful scale. While there are many millions to support think tanks following reductionist approaches, there are few sources of support for systems approaches. Most of those few sources are located in universities but they are vulnerable. In the United States, systems departments have been reduced or eliminated when key people retire and others competing for the same scarce resources prevail. In the private sector, some consultancies and corporations use systems models but their work does not usually find its way into the public domain. Unless financial backing can be found to support people working in systems, governments will be at unnecessary risk from our lack of control over events and their momentum. Considerable though still insufficient progress has been made in understanding and acting to protect the natural environment. Government agencies and environmental advocacy groups are now on board. Similar efforts in the social environment lag far behind. Moreover, these lags are already impeding the effectiveness and scope of environmental protection. The derisive connotations of social engineering must be put aside. Social engineering is happening anyway, but without transparency, perhaps even to the people involved, and without the broad input of all affected parties.

Humankind has gathered considerable momentum and is clearly heading towards the edge. How close the brink is and how deep the drop won't be known until it is happening. Somehow, control has to be reestablished before we go over that cliff. So here are some questions.

How can we rise to the challenges posed by the lag between our momentum and our control over our affairs?

How do we avoid a result that no one desires?

Can we devise a route that can be accepted as recognizably effective?

Can this be implemented through the will of the people?

What happens if we do nothing?

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[back to top](#)

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[front page](#)