

Complexity and Democratic Theory: Building a new Cosmopolis for the 21st century

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Introduction

The feeling that we are, today, in the tide of forces greater than our ken is hard to avoid if one reads a newspaper occasionally. When confronted with the deeper implications and ethical issues of bio-technologies and the complex, uncertain potential consequences inherent in much of today's technological developments, the idea that we are in a situation on the verge of spiralling out of control is hard to hold at bay. Chaos and complexity are not the same thing and while it may be complexity for which we are striving it may well be chaos toward which we are proceeding.

Certainly, ethical issues relating to the development of new technologies require broader social discourse, beyond the theory of moral philosophy. Equally, the application of complexity theory and principles of dissipative systems dynamics in organisational design and management raises ethical questions which also can no longer be left exclusively to the departments of moral philosophy. Where the matters of concern are one of social organisation and institutional design, I reject the notion that the 'democratic deficit' and the 'decline of the public realm' leaves these questions squarely at the feet of private organisations alone. If private organisations are to manage a direct dialogue with society, then government as we know it is obsolete. If it is not, then part of conceptualising these new, complex organisational systems must be understanding their position and role relative to the governments and governance of self-determined, sentient, autonomous individual members of free societies. Surely there is a responsibility for private organisations to handle these new issues responsibly, as many are now seeking to do, however, these question, where 'stakeholders' are to be consulted, are matters that reside under the authority of the *polis*. If the *polis* is atrophied, outdated or not up to the task, then the central question that must be

confronted in exploring how organisations can use complexity theory to manage, shall we say, complex ethical issues, must be an exploration of how complexity theory merges with democratic theory.

Complexity theory offers a means of conceptualising and understanding and possibly even designing for the democratic legitimacy of the multi-dimensional, global social systems that now touch the lives of all inhabitants of the planet. If we understand human society as complex, and the technologies of complexity as potentially liberating or oppressive, then the need for a new ethical discourse is clear. The potential consequences of malevolent employment of bio-technologies is indeed frightening and is likely to draw public concern, insofar as the public is able to conceptualise the associated risks and uncertainties. But who are the relevant stakeholders for considering the ethics of nano-technologies? Clearly: the ‘stakeholders’ in this case are the global *polis*, the many different bodies politic across the entire planet, which together comprise those who have a stake in the development and applications of nano-technologies.

That we are even able to imagine such concepts as a global polis and to consider a choice as to whether or not to proceed with the development of new technologies demonstrates that 21st century western society is embracing a new world-view, which may bring technologies to a place where they might serve both human and non-human (nature) needs, sustaining both us and the planet upon which we reside. However, in a world where the concept of a cyborg is no longer a fantasy but a genuinely reality, where this technology could interface with systems of mass production, where nano-technologies hold the potential to interfere with human autonomy unbeknownst to subjects, where “our power to change things vastly exceeds our power to understand what we have done” (Eames, 2003) not only can these ethical issues not be left to moral philosophers, they can not be left beyond the grasp or command of the body politic. These issues are today brought to the public through media, citizen juries, public discussion parades and modes of ‘consultation’ that fail to engage with structural questions of how institutions of governance could be designed to acknowledge and engage with the complexity of 21st century society.

The need for a new Cosmopolis

In his book *Cosmopolis* Stephen Toulmin (1990) presents the challenges facing the 21st century within the context of the evolution of modern rationality. Looking back over the past 300 years, Toulmin explores the evolution of western understandings of the *cosmos* (the order of nature) and the *polis* (the order of society) and illustrates how Western ways of scientific knowing have, over the past 300 years, been governed by, and governed our social and political systems. Toulmin defines Modernity as reaching back into the Renaissance and suggests that, within the context of evolving cosmopolitical justifications for social systems Modernity can be understood to have three stages: the first 16th century humanism, the second 17th-mid-20th century Cartesian dichotomous rationality and the third late 20th century forward relativity and complexity. By identifying a relationship between the certainty of Cartesian rationality and the uncertainty of Descartes context (the 30 years war 1618-1648), Toulmin builds a way of understanding scientific knowledge that is both context based and

cognizant of the social role of science, not only in the particular but in the wider consciousness of a society or societies.

Written in 1990, his essay traces the evolution of European cosmology, from Copernicus to Galileo to Descartes to Newton and presents Einstein's theory of relativity as the final blow to the Newtonian cosmology. Toulmin attributes the orderly and stable vision of the nation-state systems of governance as a conceptual model for the *polis* built with the help of Newton's 'nature' model of the *cosmos*. He suggests that we have a choice of backing into the new millennium, with our focus on the cosmopolis of the 19th and 20th centuries or facing the future and taking up the challenge of building a new cosmopolis for the 21st century, where "our concern can no longer be to guarantee the *stability and uniformity* of Science or the State alone: instead it must be to provide the elbowroom we need in order to protect *diversity and adaptability*"(Toulmin, 1990:183). Toulmin's closing thoughts could hardly be more relevant to the topic of this conference:

"The limits to which technology will be subject in the new, third phase of Modernity thus lead directly onto the social, political, and institutional changes demanded by the third millennium"(1990:205).

However, since 1990 two major events have taken place that both temper and colour Toulmin's description of the possibilities for a new cosmopolis: the events now commonly referred to as September 11th and Prigogine's resolution of the time paradox. Building from within Toulmin's theory, that unstable times create a philosophical climate that breeds stability in the theoretical conceptions of the cosmopolis and that 21st century cosmology is about adaptation and diversity, the events of September 11th 2001 and the consequences in terms of global military deployment could be interpreted to bring us back toward a need for stability, similar to the retro-nostalgia for Modernity experienced between the two World Wars, notwithstanding Einstein's overturning of Newton. However, when combined with Prigogine's certainty about uncertainty, perhaps there is a path where we can be certain, to serve the current need for stability in thought, while that about which we are certain is that we can not be certain any longer.

Prigogine's (1996) resolution of the time paradox and his presentation of the principles of the creative and systemic functions of far-from-equilibrium dissipative structures, bring us to a cosmology different from that explored at the end of Toulmin's *Cosmopolis*, where the potential associated with complex systems is for both creation and destruction.

If we have a new cosmology, in the complexity theory and *The End of Certainty* and we take up Toulmin's exploration of the historical relationship between cosmologies of different periods and the *polis*' that emerge from and contribute to their formation, then the principles of complexity theory, could be extended to develop a complementary exploration of principles for the *polis*, that is to say, within a Western world view, through democratic theory. Toulmin finishes *Cosmopolis* with the suggestion that the tools of 16th century humanists and 17th century Cartesian rationality and this creates a context where the applied philosophy of the social role of science must remain within the scope of political theory. In exploring the relationships between ethics, complexity and organisations, scientists and the

private sector do not have the authority, moral or political to take decisions on behalf of society. If the democratic systems of governance seem incapable of engaging with the issues then it is first and foremost, to the updating of their structures that we must turn.

Post-normal Science and Complex Democratic Theory

While Toulmin brings us to a position where the relationship between the new cosmology, be it ecology or complexity theory more generally, can be understood to underpin a new conceptualisation of the political ordering of things, Funtowicz and Ravetz (1990) through the development of the concept of a post-normal science, present a new mode of knowledge production, the method of extended peer review, where scientific knowledge can be situated within democratic systems of social discourse; “the democratisation of scientific expertise” (210).

As early as 1971, in the wake of Thomas Kuhn’s (1970[1962]) *The Structure of Scientific Revolutions*, Ravetz (1971), in *Scientific Knowledge and its Social Problems* identified the need to distinguish between adequacy and value criteria in the pursuit of scientific explorations; where adequacy criteria (is it right?) can be set within the puzzle solving paradigms of science but value criteria (what should we study?) must be set by society (157-162).

Ravetz (1971) makes the point that the production and application of scientific knowledge must be situated as a directed social activity. Under the heading criteria of adequacy, he notes that “philosophical questions of the possibility and nature of scientific knowledge” contrast with criteria of value, which relate to “the social activity of science” (1971:159): “although judgements of value are also made on completed work, their crucial role is in the choice of problems to be investigated” (1971:159). In order to receive such direction, science must be situated as a discourse participant, so that it’s value decisions regarding what problem to investigate can be informed by society’s understanding of the adequacy constraints inherent in scientific analysis of complex phenomena.

Returning for a moment to the Kuhnian concept of normal science puzzle solving, within the context of sustainability, ecological economics and indeed all explorations of the relationship between human and non-human nature, imprecision and uncertainty inherent in the very systems subject to enquiry becomes a fundamental factor in the construction and application of scientific knowledge. Funtowicz and Ravetz (1990, 1991, 1994) propose that the huge social pressures relating to scientific knowledge on such questions, combined with the inherent imprecision of that scientific knowledge, creates the basis for interpreting a Kuhnian revolution that rejects the idea of puzzle solving as the core project of scientific enquiry. To distinguish this from a redefining of rules to a redefining of the social role of science they have given it the name post-normal science. In this post-normal scientific context complexity can be understood as part of the challenge of effectively articulating subjects of scientific enquiry.

In outlining the elements of a post-normal science Funtowicz and Ravetz (1994) offer the following description: “These include the scientific management of uncertainty and of

quality, the plurality of perspectives and commitments, and the intellectual and social structures that reflect the varied sorts of problem-solving activities”(199). Funtowicz and Ravetz present what I will call here a translation tool, NUSAP, which serves as a sort of a disclosure statement, intended to reveal the biases and limitations inherent in a scientific argument. The provision of such a translation tool is a recognition that discussing sustainability issues entails dialogue between epistemological frames, which needs to be facilitated through such translation. They also introduce the concept of extended peer review, where the quality of scientific enquiries must now be measured not only according to the criteria of other peer scientists but by scientists from other disciplines and by laypersons. Rather than science seeking ‘truth’ they suggest that a post-normal science, conscious of the political factors contributing to the production of scientific knowledge, needs to pursue quality, through a “plurality of competencies, perspective and commitments”(205).

Making a direct connection between the new thermodynamics of non-equilibrium and the principles of ecological economics, Funtowicz and Ravetz (1997) develop an elegant discussion on the importance of formulating sustainability science theory as an exploration of the interplay between complex human and non-human systems. Here they explore the need to understand human society and the science of sustainability as multi-dimensional complex systems and argue that, “The distinction between qualitatively discrete hierarchical systems of artefact, nature and human have become blurred. To cope with this cultural novelty, new, more reflexive systems of thought and organisation are required, lest all the systems collaborate in mutual and self-destruction” (Funtowicz and Ravetz, 1997:808).

Within this context, the idea that complexity theory might be directly applied to concepts of democracy is both intriguing and potentially quite frightening. However, if Prigogine’s certainty of uncertainty brings us back full circle to the humanist acceptance of practical philosophy then, where the systems are complex, perhaps we lose little in calling them as they are. Perhaps by exploring how we might build self-consciously complex democratic institutions, where scientific knowledge and ethics and other forms of expertise are explicitly accommodated for and accountable within the *polis* then we move some way toward situating the ethical questions of bio-technologies correctly and effectively.

The Federalist Papers offer some insights into how complexity and democracy might be combined in practice. For James Madison, the federated republic of balanced powers was seen as a way to ensure personal liberty while avoiding the fractures that could take place, were factions to gain undue influence within the polity. The three authorities of congress, executive and judiciary and the bicameral balance between population based representation in the US House of Representative and equal per state representation in the US Senate, all serve to produce these balances. The US federal system can be understood, in this respect, to reflect recognition of the underlying complexity of the interstate governance system it seeks to co-ordinate: as a self-consciously complex system. However, the problems of sustainability before us today were not the problems before the framers of the US constitution. The self-conscious complexity of the US system reflects the project of establishing a federal republic within the context of 18th Century society and knowledge systems and therefore it can be excused for missing many of the complexities relevant today,

which arise mainly in pre-modern and recent discourses where philosophy and politics engage with the questions of how to sustain human societies.

A Tentative Attempt at a Normative Theory

While the relationship between authority and legitimacy - the consent to be ruled - is an enduring subject in political theory, it is hard to find a clearer articulation of the issue than that put forward by Machiavelli (1998[c.1520]) in *The Discourses*, where he points out the essential relationship between legitimacy and the ability to exercise authority, through an exploration of how and why states of certain types are formed. In discussing the social transformations leading the inclusion of a democratic component in the Roman state with which he was so interested, Machiavelli argues that, “when the Roman nobility became so overbearing...the populace rose against them, and they were constrained by the fear that they might lose all” (111). Today, in our complex societies where rich and poor are neatly separated into different regions, the risk of such forms of direct overthrow may seem remote. However, the need to relate effective authority with legitimacy remains. Perhaps, in this context, sporadic acts of terrorism can be seen as a consequence of a legitimacy gap in the global governance systems of our complex world. More down to earth and in the context of multi-level environmental governance, perhaps implementation problems where policy and practice are found to directly contradict each other can be understood as a manifestation of a legitimacy gap in a complex system.

Within environmental political theory the concept of deliberative democracy has been pursued widely as a means for legitimately articulating political will on questions of environmental governance. The basic concept is Kantian in origin and relies on the Habermasian theory of communicative rationality, where the legitimacy of decisions is a consequence of free and equal discourse among participants. Common forms of deliberative democracy include citizens juries and stakeholder consultation.

It might seem reasonable to take this practice of deliberative democracy as a starting point and simply set up stakeholder consultations that include scientific experts, however O’Neill (2001), Parkinson (2003) and others have identified what Parkinson calls a ‘representation gap’ in the deliberative democracy approach. Since the process itself is dependant upon small group settings, where deliberation, as opposed to speech making, can take place, it necessarily limits the number of participant and produces questions regarding who is included and why; that is to say, questions of representation. O’Neill (2001) focuses on the problem of representation as a means of ensuring legitimacy, who is representing whom on what basis and on the problems scope, where non-human nature and future generations are seen to be relevant positions of interest. His suggestion that deliberative institutions might be suited to a weaker role than decision-making such as “the formulation of options”(O’Neill, 2001:494) sits well with the discussion of discursive closure or problem definition, presented above and with Parkinson’s discussion of the possibility of building deliberative systems, which will be explored below. With respect to the question of scope, O’Neill (2001) points out that, “[c]onflicts sometimes exist between international conservation bodies speaking on behalf of the interests of nature seeking to protect ‘natural landscapes’ and the socially marginalized groups whose lives and livelihoods depend on working with them”(497).

Returning to Parkinson (2003), following a detailed discussion of the representational problems of deliberative democracy, and various proposed alternatives, he suggests that if deliberative democratic processes are to be made legitimate, within the context of representation, then the theoretical problem becomes finding “rules that legitimately exclude, rather than making legitimacy depend, impossibly, on full inclusion”(186). The solution Parkinson proffers provides an interesting platform for exploring how complexity theory might be transposed onto democratic theory. First it is important to note that Parkinson is suggesting how representation might serve to improve deliberative democratic process rather than replace them. He proposes that representation is context specific, that representation should be by election and that representative should be recognised to have a dual role of trustee and delegate, where they are authorised to change their position during the deliberative process but are also accountable to their constituency. It is interesting to note that the example Parkinson uses is one that developed spontaneously in response to a policy developed through reliance on expert knowledge and a ‘non’-representative citizens jury.

The structure of the emergent deliberative system Parkinson (2003) discusses may be used as a model for considering how such complexity might be designed for. Adapting the concept of deliberative systems drawn from Mansbridge (1999), where she proposes that deliberation takes place across a range of social discourses and levels, on a spectrum encompassing “the public sphere and private talk that is recognisably political” (Parkinson, 2003:190, referencing Mansbridge, 1999:215).

In order to reflect Parkinson’s criterion of context specificity, perhaps knowledge production could be represented through a form of federal, deliberative bodies constituted at local, national and supra-state levels. These could rely on inter-cameral deliberative dialogues, direct inter-cameral co-operation on sub-issues or perhaps some form of tiered dual mandate representative structure.

While Parkinson neither fully explores nor fully embraces Mansbridge’s theory, he does suggest that the idea of deliberative systems may present a means of overcoming the scale/legitimacy problems of deliberative democracy, which by definitions must operate through small groups in communicative discourse. He notes that representation features in Mansbridge’s theory and takes up this concept for further exploration. Discussing a case study in Leicestershire, Parkinson describes how a policy relating to the redistribution of services across several hospitals was developed, largely on the basis of bureaucratic and technical expert contributions and review by a citizens jury. When the policy was made public, it became clear that members of one community had a vested interest in how these services were reallocated and a popular movement, including petitioning and the invocation of support from elected representatives, ensued. Eventually a second citizens jury was convened and the structure of the expert recommendations, developed along with the first jury were retained, while allocations were revised to reflect the one community’s vested interests (Parkinson, 2003:191-193). Here we can see a complex, iterative process, where technical expertise and localised democratic legitimacy are found to interact in the formulation of both problem and solution.

If the governance process itself is understood as a complex system, then, rather than the means justifying the ends or the ends justifying the means, in the context of the uncertainty and surprise of complex systems, *the means literally become the end*. Then perhaps, we can ‘specify the mechanisms’ of these irreversible processes of creativity, taking place far from equilibrium, in order to design institutions for governance that employ the full breadth of knowledge production resources and creativity within a democratically legitimate system.

This leads us to the question: what could a self-consciously complex democratic representative structure look like *today*? Perhaps such a system might look something like the emergent system Parkinson presents in his example, where in the first instance technical experts are asked to develop problems in direct consultation with laypersons while subsequently the problem is iteratively adjudicated in a wider political discourse. Here, we might imagine deliberation from within the scientific community, to elect representatives, who would participate in problem formulation discourses along with participants representing other epistemological positions. Formulated problems might then be brought before a wider, parliamentary authority for decision-making. In this way, the formulation of the problem itself would be explicitly recognised as part of the democratic process. By moving scientific knowledge’s contribution into the democratic structures of representation, perhaps the fugitive power exerted through scientific ways of knowing could be recaptured under democratic authority and legitimacy.

So, how then might the representative scientists be elected? Keeping in mind that obvious does not mean best, the most obvious first answer would be through existing procedures of scientific peer review. Scientist, deemed by their peers to be producing scientific knowledge of high quality could immediately be construed as ‘elected’ by their peers as suitable representatives of what constitutes the ‘right’ or ‘best’ scientific way of knowing within their discipline. These scientists, elected to participate in the democratic discourse as representatives of scientific knowing, could be understood to be engaged in a form of extended peer review.

If, at a macro scale, decisions by government can be understood to impact what science studies, then the participation of science as a form of citizenship offers scientists the opportunity to participate in the setting of value criteria, which could be interpreted as a violation of a distinction Ravetz (1971) makes between value and accuracy criteria. However, if scientific knowing is represented as a form of citizenship within a complex deliberative system of multi-level governance, that is to say, where it is self-consciously operating as a producer of emergent properties, this no longer presents a dilemma. Scientists could not ‘rig’ the outcome to suit their epistemic frame because the outcomes are emergent, through the design of the system.

If, for arguments sake, the selection of representatives through peer-reviewed performance were taken as the deliberative electoral system, then we, of course, face the very real possibility that those elected may not wish to serve. However, the idea that an obligation to serve might be included as a criterion for ‘license’ to practice science is not so far fetched as

it might seem. Indeed the Legal Aid Society of New York (founded in the 19th Century), which now has peer institutions throughout the US and internationally, relies upon legal professionals to operate a rotating pro-bono legal service for citizen's who cannot afford to purchase legal advice on the open market. Most lawyers are members of Bar Associations and are obliged under a code of professional responsibility to provide pro-bono legal services as part of their good professional conduct. While this is not a 'licensed' system but a voluntary one, it is a common practice.

Clearly there would be differences between how the pro-bono provision of legal representation operates and how a proposed deliberative representation of scientific knowing might work. This example is presented merely to suggest that within the society of physical scientists, it may not be beyond the realm of possibility that a system could be developed, which would enable those individuals 'elected' by their peers (constituency) to be supported, encouraged or facilitated in serving as representatives within such a deliberative system. Here, we need to ask questions about leadership and rhetoric, which are beyond the scope of this paper. However, if there may be a way of structuring such an electoral process, through a deliberative system, perhaps it is worth looking at these leadership and rhetoric questions as the idea develops in future work.

Conclusions

If we cannot know then we must choose but in order to make choices we still need information. The post-normal science argument, from a position that endorses scientific knowledge as an important contributor to understanding human/non-human nature interactions, places scientific knowledge within the context of political discourse but does not seek to 'throw out the baby with the bath water'.

By recognising democratic discourse as a complex system, with emergent properties, and then using some of the conceptual tools available from complexity theory, perhaps rather than technology firms bearing the burden of the ethics of their activities on their own, these questions and the choice in uses of technologies, can be situated with the democratic discourse, where scientific, technological and ethical experts might all both join as legitimate and accountable participants.

In this paper I have sought to bring together the complexity theory and deliberative democracy theory discourses in order to facilitate the task of exploring how human societies can better formulate their understanding of the issues and options underpinning the relationships between human and non-human nature. It has been suggested above that by understanding governance as a complex system, knowledge production and ethical issues, may be brought into dialogue with the formulation of democratic will and the collective evaluation of the worth of common goods.

This discussion has brought together a variety of discourses and in the brief space of this paper it is not possible to offer a rigorous treatment of the questions raised and tentative solutions proffered. However, it seems that there may be some convergences emerging between the various discourse touched upon here, which, if engaged with effectively, could

offer solutions useful to the task of making good quality scientifically informed decisions through processes that retain their democratic legitimacy and thus their authority to govern the polis.

References

Eames, Malcolm (2003) *Personal Communication*, Tenerife Spain, 15 February 2003.

Funtowicz, S.O. and J.R. Ravetz (1990) *Uncertainty and Quality in Science for Policy*. Kluwer Academic Publishers, the Netherlands.

Funtowicz, S.O. and J.R. Ravetz (1991) 'A New Scientific Methodology for Global Environmental Issues' in Robert Costanza Ed. *Ecological Economics: The Science and Management of Sustainability*. Columbia University Press, New York.

Funtowicz, Silvio, O. and Jerome R. Ravetz (1994) 'The worth of a songbird: ecological economics as a post-normal science' *Ecological Economics* 10:197-207.

Funtowicz, Silvio, O. and Jerome R. Ravetz (1997) 'The Poetry of Thermodynamics' *Futures* 29(9):791-810.

Kuhn, Thomas S. (1970[1962]) *The Structure of Scientific Revolutions, 2nd ed.* University of Chicago Press, London.

Machiavelli, Niccolò (1998[c.1520]) *The Discourses* Penguin Books, London.

Mansbridge, J. (1999) 'Everyday Talkin the Deliberative System' in S. Macedo (ed) *Deliberative Politics: Essays on 'Democracy and Disagreement'* Oxford University Press, New York. pp 211-239.

O'Neill, John (2001) 'Representing people, representing nature, representing the world' *Environment and Planning C: Government and Policy* 19:483-500.

Parkinson, John (2003) 'Legitimacy Problems in Deliberative Democracy' *Political Studies* 51:180-196.

Prigogine, Ilya (1997) *The End of Certainty*, The Free Press, London.

Ravetz, Jerome R. (1971) *Scientific Knowledge and its Social Problems*, Clarendon Press, Oxford.

Toulmin, Stephen (1990) *Cosmopolis: the hidden agenda of modernity* Free Press, New York.