Climate Change as a Metaphor of Social Change

Systemic implications of emissions, ozone, sunlight, greenhouse and overheating

Produced on the occasion of the United Nations Climate Change Conference (Poznan, Poland, December 2008)

Introduction

Since "climate change" is now framed as THE crisis faced by humanity on the planet, and all creative resources are to be mobilized in response, there is a case for exploring how such a crisis may be understood in other ways. The merit of doing so, irrespective of any direct fruitful outcome, is that it may offer insights from which it may be easier to learn fruitful responses.

As argued in an earlier exercise (Systemic Crises as Keys to Systemic Remedies: a metaphorical Rosetta Stone for future strategy?, 2008), there is already a confusion of metaphor between other crises and that of climate change. There are numerous web references to "financial climate", "financial hurricane" and "frozen economies", for example. It is also apparent that the earlier understanding of a "climate of change" is now itself being confused with "climate change" (Climate of Change Misrepresented as Climate Change: insights from metaphorical confusion, 2008).

The exploration below therefore builds on the approach suggested in the first paper by identifying -- in systemic terms -- the varieties of "emission", "ozone", "sunlight", "greenhouse effect" and "overheating" as providing metaphors through which the more conventional understanding of climate change might be understood otherwise. Determining whether this approach proves to be of any value is a reason for the exploration.

The question raised by this approach is whether the conventional focus on climate obscures a more systemic challenge faced by humanity that has its origin in a mindset that is manifest in other domains which may, or may not, be currently understood as problematic. Is "climate change" a symptom of a more fundamental systemic challenge? By highlighting the potentially problematic nature of other domains, understanding of their dynamics may offer insights into other ways of approaching the challenge of climate itself.

The juxtaposition of processes in the following table -- as being in some way systemically comparable -- is undertaken tentatively, provocatively and playfully as a means of eliciting further insight, in the spirit of arguments formulated elsewhere (Humour and Play-Fullness: essential integrative processes in governance, religion and transdisciplinarity, 2005; Playfully Changing the Prevailing Climate of Opinion: climate change as focal metaphor of effective global governance, 2005; Liberating Provocations: use of negative and paradoxical strategies, 2005).

The first such exercise was inspired by the report for the Club of Rome by Jay Forrester (World Dynamics, 1971) and his Counterintuitive Behavior of Social Systems (1971). That exercise appeared as World Dynamics and Psychodynamics: a step towards making abstract "world system" dynamic limitations meaningful to the individual (1971). The approach owed much to the pioneering work elicited by the Society for General Systems Research and its General Systems Yearbook.

Metaphorical comparison

The first row of the following table is used to indicate the phenomena which are the focus of the conventional climate change preoccupation. The column headings are the categories under which the challenge of conventional change is explained and understood.
The first column provides indicative labels for the variety of systems (each with their own characteristic "emission") that might possibly be considered in some way analogous to that consequent upon "carbon emissions". The associated rows then endeavour to highlight the phenomena corresponding to those of "carbon emissions", to the extent that such a comparison may be meaningful. A more detailed commentary on each row is provided, after the table, in a section on Deletorous systemic excesses.

<table>
<thead>
<tr>
<th>CATEGORIES</th>
<th>&quot;Emissions&quot;</th>
<th>&quot;Ozone layer&quot;</th>
<th>&quot;Sunlight&quot;</th>
<th>&quot;Enhanced greenhouse effect&quot;</th>
<th>&quot;Over-heating&quot;</th>
<th>&quot;Climate&quot;</th>
<th>&quot;Rising sea-levels&quot;</th>
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<tbody>
<tr>
<td>Carbon and equivalent emissions</td>
<td>greenhouse gases (CO₂ and equivalents)</td>
<td>ozone layer absorbs sunlight damaging to life; function damage by reaction of atmosphere; ozone with greenhouse gases</td>
<td>sunlight is essential to life in appropriate measure</td>
<td>greenhouse effect is enhanced by absorption of thermal infrared radiation emitted by the Earth's surface</td>
<td>global warming; rising temperature (glacial melting)</td>
<td>climate change; turbulence</td>
<td></td>
</tr>
<tr>
<td>Introduction of tangible artefacts</td>
<td>(seminal) innovations, products, packaging, waste (a)</td>
<td>potentially dangerous product dependency; constraints on ability of environment to absorb or recycle excessive production</td>
<td>impulse to creativity, innovation &amp; new things</td>
<td>destructive accumulation of systemically &quot;toxic&quot; waste products</td>
<td>economic inflation &amp; frozen economies; increasingly heated competition for scarce resource</td>
<td>turbulent finance, climate</td>
<td></td>
</tr>
<tr>
<td>Use of weapons</td>
<td>projectile (missiles, shells, bullets) &amp; non-projectile (radiation, toxic agents) (b)</td>
<td>protection ensured by security &amp; defence; confidence eroded by collateral damage</td>
<td>sense of integrity &amp; identity worthy of protection</td>
<td>accumulating lack of confidence in security forces and their use</td>
<td>increasing perception of security threats</td>
<td>turbulent &amp; changing economic climate</td>
<td></td>
</tr>
<tr>
<td>Increase in human population</td>
<td>seminal emissions resulting in reproduction (c)</td>
<td>constraints on excessive reproduction &amp; dependence; progressive erosion of constraints</td>
<td>impulse to affirm identity &amp; reproduce</td>
<td>erosion in sense of community &amp; capacity to share scarce resources equitably</td>
<td>increasingly heated social relations</td>
<td>turbulent social climate; clashing civilizations</td>
<td></td>
</tr>
<tr>
<td>Issuing intangible artefacts</td>
<td>financial products (money, loans, credit derivatives, stimulus packages, injections) (d)</td>
<td>constraints on excessive emissions (and debt dependence)</td>
<td>impulse to profit</td>
<td>erosion of constraints on level of indebtedness</td>
<td>economic inflation &amp; frozen economies</td>
<td>turbulent financial climate</td>
<td></td>
</tr>
<tr>
<td>Betting/Gambling</td>
<td>bets, lottery tickets (e)</td>
<td>constraints on excessive gambling</td>
<td>impulse to win</td>
<td>erosion of constraints on excessive gambling</td>
<td>excessive gambling</td>
<td>climate of greed, distrust, selfishness</td>
<td></td>
</tr>
<tr>
<td>Introduction of laws &amp; directives</td>
<td>(seminal) legislation, regulations, injunctions, massives, fatwas (f)</td>
<td>constraints on over-regulation eroded by increasing complexity of issues and agendas</td>
<td>impulse to control</td>
<td>increasing recognition of mismanagement and ungovernability, notably in response to crises</td>
<td>increasingly heated mutual accusations regarding effective governance &amp; erosion of human freedoms by fears</td>
<td>turbulent climate of governance; systemic &quot;fire-fighting&quot; responses</td>
<td></td>
</tr>
<tr>
<td>Prolongation of charters, conventions &amp; credos</td>
<td>(seminal) values, norms (g)</td>
<td>constraints on over-articulation of values eroded by confrontation of varied agendas</td>
<td>impulse to control</td>
<td>increasing challenge to appropriateness and relevance of systems of norms presented as universal</td>
<td>heated debate regarding relevant norms</td>
<td>turbulent climate of human values</td>
<td></td>
</tr>
<tr>
<td>Formulation of pronunciements &amp; commitments</td>
<td>(seminal) commitments, contracts, manifestos; promotional advertising (h)</td>
<td>constraints on insincere public commitments eroded by undeclared agendas</td>
<td>impulse to demonstrate commitment &amp; occupy the moral high ground</td>
<td>increasing public scepticism regarding pledges &amp; commitments</td>
<td>heated accusation &amp; defensiveness regarding fulfilment of commitments</td>
<td>erosion of climate of confidence</td>
<td></td>
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<tr>
<td>Issuing appeals &amp; calls</td>
<td>appeals, solicitation, mobilization campaigns (i)</td>
<td>constraints on unrealistic appeals eroded by number &amp; variety of actors</td>
<td>impulse to elicit support for a &quot;positive&quot; agenda</td>
<td>increasing public scepticism regarding appeals &amp; mobilization</td>
<td>increasingly heated demonstrations in response to appeals &amp; responses to</td>
<td>turbulent social climate</td>
<td></td>
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*Enhanced greenhouse effect* is analogous to *Climate* and *Rising sea-levels*.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Implications</th>
<th>Response</th>
<th>Associated</th>
<th>Rising</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fears</td>
<td>Increasing public scepticism regarding justice &amp; miscarriage of justice</td>
<td>Increasingly heated responses to public debate &amp; media (including parliaments)</td>
<td>Turbulent climate of public discourse</td>
<td>Rising lack of credibility</td>
<td></td>
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<tr>
<td>Hopes</td>
<td>Increasing response to censorship &amp; promoting society towards a just future</td>
<td>Increasingly heated consequences of lack of relevant information</td>
<td>Turbulent climate of risk-taking &amp; anxiety regarding the future</td>
<td>Rising lack of confidence in promised futures</td>
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<tr>
<td>Dialogue</td>
<td>Increasingly provocative range of publications sustaining a diversity of worldviews</td>
<td>Increasingly heated reactions to publications reflecting alternative worldviews</td>
<td>Turbulent publishing climate</td>
<td>Rising lack of credibility</td>
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<tr>
<td>Talk</td>
<td>Increasingly provocative range of broadcasts sustaining a diversity of worldviews</td>
<td>Increasingly heated reactions to broadcasts reflecting alternative worldviews</td>
<td>Turbulent broadcasting climate</td>
<td>Rising lack of credibility</td>
<td></td>
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<tr>
<td>SMS</td>
<td>Increasingly provocative range of websites sustaining a diversity of worldviews &amp; increasing information overload</td>
<td>Increasingly heated reactions to websites reflecting alternative worldviews</td>
<td>Turbulent cyberspace climate</td>
<td>Rising lack of credibility</td>
<td></td>
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<tr>
<td>E-mails</td>
<td>Increasingly provocative range of websites sustaining a diversity of worldviews &amp; increasing information overload</td>
<td>Increasingly heated reactions to websites reflecting alternative worldviews</td>
<td>Turbulent cyberspace climate</td>
<td>Rising lack of credibility</td>
<td></td>
</tr>
<tr>
<td>Spam</td>
<td>Increasingly invasive &amp; provocative range of (unsolicited) e-mails sustaining a diversity of worldviews &amp; increasing information overload</td>
<td>Increasingly heated reactions to e-mails reflecting alternative worldviews</td>
<td>Turbulent cyberspace climate</td>
<td>Rising lack of credibility</td>
<td></td>
</tr>
<tr>
<td>Talk</td>
<td>Increasing exposure to aggressively (or invasively) alternative worldviews</td>
<td>Increasingly heated dialogue amongst those with alternative worldviews</td>
<td>Turbulent climate of collective dialogue</td>
<td>Rising levels of intolerance &amp; emotion</td>
<td></td>
</tr>
<tr>
<td>Hopes</td>
<td>Increasing polarization between personal hopes &amp; fears for the future</td>
<td>Increasing personal anxiety regarding expectations &amp; their applications</td>
<td>Confused climate of personal hopes &amp; fears</td>
<td>Rising emotional attachment to contradictory hopes &amp; fears</td>
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</table>
A vast body of research has been conducted by thousands of researchers to confirm the systemic connectivity -- or chain of causality -- between the columns in the case of carbon emissions. The question is what research has been undertaken, if any, into the chain of causality in the case of the other rows? Has such research been expressed in systemic terms that might facilitate understanding of the degree of isomorphism between the rows?

The interest in the above approach was evoked by early concerns with the challenge of information overload and the related challenge of information underuse -- a collaborative project of the United Nations University (R. Salinas Bascur. Forget the NWICO and begin all over again: a report of the collaborative project on information overload and information underuse, 1986). Within a knowledge society other dimensions include the challenge of "diseases" metaphorically understood (Memetic and Information Diseases in a Knowledge Society: speculations towards the development of cures and preventive measures, 2008). The importance of appropriate stimulus was a focus of Orrin E. Klapp (Overload and Boredom: essays on the quality of life in the information society, 1986) and was preceded by his study of Opening and Closing: strategies of information adaptation in society (1978). The latter is especially suggestive in the above context because of his recognition of the generic implications of the eye's response to exposure to excessive sunlight -- namely the contraction of the human iris.

### Deleterious systemic excesses

Of particular interest is the possibility of a generic understanding of "bonding", given the significance of the interaction between the molecules of CO₂ (and equivalents) with ozone, the role played by the ozone layer, and the degradation of its function as a result of overloading that interaction. How could the deleterious "emissions" of the various systems, presented here as isomorphic, be understood as comparable in cybernetic terms -- especially as a result of their relative hyperactivity?

The following are indicative comments (linked from the above table) of possibilities of further exploration:

- **(a)** innovations, patents, products, packaging, waste: the impact of waste on the environment (especially the marine environment), has been well-explored; the issue of deleterious production is more controversial but is highlighted by exploration of consumerism as an unsustainable behavioural pattern. Much more controversial is the issue of deleterious innovation (such as genetic engineering) in a context in which innovation is held to exemplify the height of human ingenuity. But at what point does the rate and focus of innovation become damaging to a system? The question is especially pertinent in the case of restrictive patents inhibiting the use of new technology in response to emerging challenges -- in curious systemic contrast to the right to reproduce human beings (as noted below).

- **(b)** projectile (missiles, shells, bullets) & non-projectile (radiation, toxic agents): the deleterious effects on societies, communities and the environment of these "emissions" have been extensively researched and deplored, as with arms manufacture and trade, and notably from the perspective of "gun control". A number of developing countries continue to offer extensive insight into limitations on the capacity of societies to "absorb" such "emissions".

- **(c)** seminal emissions resulting in reproduction: the deleterious consequences in practice of unchecked population growth have been widely researched, together with increasing recognition of the limited capacity of the planet to supply resources to sustain existing population levels and further expected growth. The validity of such conclusions regarding "population overshoot" has been challenged by assumptions regarding human ingenuity and the capacity to generate and deliver the demanded resources in the future. The credibility of these assumptions is however significantly challenged by the vain efforts to respond to the needs of the malnourished and impoverished in the current period and recognition of an "ingenuities gap" (Thomas Homer-Dixon, The Ingenuity Gap, 2000).

- **(d)** financial products (money, loans, credit, derivatives): societies around the world are currently in process of digesting the learnings resulting from various forms of complicity in irresponsible "emission" of financial resources in a variety of forms -- and the only too evident impact on individuals, development programmes and "business as usual". The implications of the accumulating level of debt (whether global, national or individual), notably in the case of the USA, have been widely studied. The significance of the remedy taking the form of another "emission" -- namely the "injection" of funds in many countries -- is as yet unclear.

- **(e)** bets, lottery tickets: the deleterious impact on communities and families (of gambling in all its forms) has long been a focus of concern and research. The intimate relationship of such risk-taking to that associated with the stock market has also been noted. The question might be what level of risk-taking destabilizes a society and renders it unsustainable? Religions have notably been critical of gambling, although it might also be asked whether some of their practices do not constitute a form of gambling on the possibility of a more "profitable" afterlife.

<table>
<thead>
<tr>
<th>Beliefs Convictions</th>
<th>privately rehearsed (w)</th>
<th>constraints on inappropriate beliefs encoded by increasing exposure to challenging confirmation of alternative perspectives</th>
<th>impulse to believe (if only in atheism)</th>
<th>increasing polarization between certainties &amp; doubts regarding personal convictions</th>
<th>increasing personal anxiety regarding convictions &amp; their implications</th>
<th>turbulent climate of (personal) belief</th>
<th>rising investment in (contradictory) belief systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prayers Meditations</td>
<td>prayers (addressed to deity, saints, gurus or spirits), seminal meditation (s)</td>
<td>constraints on inappropriate prayers encoded by increasing uncertainty of life</td>
<td>impulse to a meaningful transcendental relationship</td>
<td>increasing polarizations between appreciative &amp; demonic understandings of the world</td>
<td>increasing existential anxiety</td>
<td>confused existential climate</td>
<td>rising anxiety regarding transcendental relationships</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STRATEGIC RESPONSE</th>
<th>Curtail</th>
<th>Regulate</th>
<th>Enable change</th>
<th>Mitigation of impacts</th>
<th>&quot;Cooling it&quot;</th>
<th>Adaptation</th>
<th>Adjustment</th>
</tr>
</thead>
</table>
information, societies are accustomed, with newspapers mongering governance (Graham Turner, understood as "emissions" in their own right contributing to this process -- as with the predictions offered by politicians in soliciting as such constitute deleterious "emissions"). Predictions of very recent times arising from (Mark Tovey, fragmentation of the body of knowledge thereby severely inhibiting any possible coherent response on the basis of collective intelligence specialized to the point of implicitly framing other perspectives as irrelevant or obsolete. This means that it in practice it increases the reproduction is subject to restrictive intellectual copyright). More pernicious is the manner in which such knowledge is increasingly the relative ignorance of those who do not have access to it and may never have the capacity to do so (especially if the right to its "publish or perish"). Some deleterious impacts may be seen in the manner in which any increase in knowledge must necessarily increase this process is framed as essential to the advancement of knowledge and is considered deleterious impact of the over-regulation of societies, communities and families by such "emissions" has been widely expressed and explored. It is a matter of continuing political debate as to how directive a government should be. However the current financial crisis has made it clear that the kinds of regulations considered inappropriate have been inadequate as checks against processes leading to the collapse of the financial system and that regulatory authorities, including those responsible to government, have been complicit in the outcome.

values, norms: the number of values and norms variously "emitted" as vital to individual and collective well-being is probably unknown (see Human Values Project), although many sets of values have been documented and promulgated -- irrespective of the possibly deleterious effect of their very quantity. Typically the deleterious impacts of particular values are the subject of concern, even research, by those who uphold contrary values. More problematic is therefore the impact of conflicting values, on the one hand, and the consequence of efforts to impose a unified set of values, on the other (especially when this is disguised under simplistic notions of "harmonisation" that ensure the marginalization of values important to some).

commitments, contracts, manifestos, promotional advertising: it is unclear what degree of exposure to unfulfilled commitment, breach of contract, broken (electoral) promise, or disappointment from advertising is to be considered deleterious. Each of these phenomena has been the subject of concern and research, notably as it contributes to loss of credibility, political apathy and mis-selling (Credibility Crunch engendered by Hope-mongering, 2008).

appeals, solicitation, mobilization: nations, communities and families are repeatedly subject to appeals (by those claiming to act with authority) enjoining them to action of some kind. As with the case of values, the deleterious impact is most assiduously noted by those making competing appeals. The number and variety of such appeals (irrespective of the abuses with which they may be associated) is however likely to be such as to reduce collective sensitivity to any such appeal -- to the point of reinforcing apathy and disinclination to any collective endeavour (see Collective Learning from Calls for Global Action, 1981).

assertions, accusations, fatwas: it is clear that many bodies in society stand accused by others of inappropriate action, whether or not this results in any form of indictment in practice. Such accusations are even typical of parliamentary discourse and assertions of the corruption of leadership. It is however unclear how the corrosive effect of such assertions has a permanent deleterious impact on societies, if only in desensitizing them to such judgements, even when formulated such as to lead to legal action. It is however clear that the accumulating evidence of the lack of action in response to a pattern of such assertions may lead to cynicism and social unrest.

speeches, preaching, sermons: it is unclear how the "emissions" constituted by these omnipresent features of social life accumulate to constitute a deleterious impact on society -- whatever the assertions and accusations they promulgate. It is however the case that speeches are readily recognized as "hot air", reinforcing the suggested analogy to greenhouse gases (Enough Hot Air Already: to slow climate change, it's time to talk about real action, Scientific American, November 2007; Bryan Walsh, The U.N.'s Hot Air on Climate Change, Time, 25 September 2007; Carrie McGourty, Will Hot Words at U.N. Climate Summit Be Enough to Cool the Planet? ABC News, 24 September 2007). It is perhaps the manner in which they are emitted by authorities, with a content that "rises" to a level of prominence in communication space -- such as to disable or disenable action -- that their accumulation actually erodes the will to change. They become surrogates for action with the attention accorded to them distracting from any necessary engagement in practice - substituting for it, possibly by enhancing a "feel good" factor (Alex Morales and Kim Chipman, Hot Air Emitted by Climate Summit Equals 20,000 Cars, Bloomberg.com, 6 December 2007). Given the plethora of "keynote" speeches, it is curious that the music they supposedly elicit continues to be so inaudible -- and despite aspirations to a "concert of democracies".

theories, surveys, opinion polls, research papers: society is continually exposed to the "emission" of new ways of understanding the world, reconfiguring previous existing ways (if only hypothetically) or clarifying the understanding of particular sectors of society. This process is framed as essential to the advancement of knowledge and is considered vital to the careers of those who engage in it ("publish or perish"). Some deleterious impacts may be seen in the manner in which any increase in knowledge must necessarily increase the relative ignorance of those who do not have access to it and may never have the capacity to do so (especially if the right to its reproduction is subject to restrictive intellectual copyright). More pernicious is the manner in which such knowledge is increasingly specialized to the point of implicitly framing other perspectives as irrelevant or obsolete. This means that it in practice it increases the fragmentation of the body of knowledge thereby severely inhibiting any possible coherent response on the basis of collective intelligence (Mark Tovey, Collective Intelligence: creating a prosperous world at peace, 2008). Such advances may also constitute an implicit denial of the significance of other knowledge systems meaningful to the coherence and identity of other cultures (Susanta Goonatilake, Toward a Global Science: mining civilizations knowledge, 1999; Darrell A. Posey, Cultural and Spiritual Values of Biodiversity: a complementary contribution to Global Biodiversity Assessment, 1999).

predictions, prophecies, doom-mongering, hope-mongering: prophecies of the past (as repeatedly upheld by religions), as well as those of recent times (notably as proffered by mystics and channelers), continue to undermine other approaches to the future and may as such constitute deleterious "emissions". Predictions of very recent times arising from futures research and global modelling may be understood as "emissions" in their own right contributing to this process -- as with the predictions offered by politicians in soliciting electoral support for their proposed initiatives. It is however curious that it is the prophecies of religions regarding the "end times" scenarios that are more widely considered than the predictions of futurists (or politicians) -- notably in a context of faith-based governance (Graham Turner, A Comparison of the Limits to Growth Thirty Years of Reality, 2007). It remains unclear how damaging is "doom-mongering" in comparison with the subtleties of "hope-mongering" (Credibility Crunch engendered by Hope-mongering, 2008).

dissemination of information (publications, periodicals, journals): these constitute a classic form of "emission" to which societies are accustomed, with newspapers offering "all the news that is fit to print". The extent of their deleterious impact has been the subject of commentary and research, notably with respect to understandings of bias, spin, focus on "bad news" or "negative information", blasphemy, exacerbation of violence and copycat crime, promotion of inappropriateness (consumerism, betting, celebrity

(f) legislation, regulations injunctions, missives, fatwas: the deleterious impact of the over-regulation of societies, communities and families by such "emissions" has been widely expressed and explored. It is a matter of continuing political debate as to how directive a government should be. However the current financial crisis has made it clear that the kinds of regulations considered inappropriate have been inadequate as checks against processes leading to the collapse of the financial system and that regulatory authorities, including those responsible to government, have been complicit in the outcome.
(q) **broadcasts, films, CDs**: as with publications, the "emissions" of these media have been a continuing subject of commentary and research regarding the nature of their deleterious impact on societies.

(r) **website postings, videos, RSS feed**: beyond the concerns expressed with respect to the deleterious excesses of traditional media, the potentially problematic nature of websites inciting people to unconventional viewpoints and actions has been highlighted by the capacity to post videos extolling violent or offensive behaviour.

(s) **e-mails, listserv communications**: the deleterious impacts of these "emissions" (perhaps to be understood as "emissives"), beyond the criticism focused on other aspects of the internet, have been highlighted by the volume, content and invasiveness of spam. Incapacity to deal with the latter effectively, without "shutting down the internet", offers an interesting model of effective capacity to deal with carbon emissions.

(t) **texting (SMS)**: concerns regarding the potential deleterious impacts in this case have focused on the manner in which these communication processes undermine conventional understandings of social relationships. SMS has highlighted questions regarding the nature of what will emerge and whether such emergent forms of organization will be appropriate to the emerging challenges of society.

(u) **talk, dialogue**: as the most ubiquitous form of "emission" the question it raises is whether the nature of dialogue, as typically understood and practiced, is adequate to the communication challenges required for appropriate response to the challenges of the future. Specifically, is the process as currently understood (whether practiced informally or in formal encounters at the highest level) such as to undermine the emergence of more coherent forms of psychosocial organization of adequately enhanced capacity (Anthony Blake, The Supreme Art of Dialogue: structures of meaning, 2008). Is current practice of dialogue inherently deleterious in ways that have traditionally been a preoccupation in intentional communities concerned with its inhibition of the emergence of higher modes of understanding? (Enhancing the Quality of Knowing through Integration of East-West metaphors, 2000; Documents relating to Dialogue and Transformative Conferencing).

(v) **hopes, fears**: as in the following case, and as a form of belief or conviction, the question of "by whom" any hopes or fears are "emitted" is a classic preoccupation of theology, philosophy and psychoanalysis. The nature, origin and impact of such beliefs are currently of considerable significance in a period of despair, of collective and personal insecurity, and of the practice of fear-mongering and the so-called "politics of fear" -- notably matched by the focus on hope by such as Barack Obama (The Audacity of Hope: thoughts on reclaiming the American Dream, 2006). As noted above, however, it remains unclear what exactly are the deleterious systemic consequences of fear-mongering or hope-mongering. For the individual, the challenge is to respond appropriately to the uncritical understanding of those advocating thinking "positively" as being the appropriate remedy (Being Positive Avoiding Negativity Management challenge of positive vs negative, 2005).

(w) **beliefs, convictions**: of particular interest in this case is any understanding of "by whom" any such beliefs or convictions are "emitted". This is a classic preoccupation of theology, philosophy and psychoanalysis -- dating notably back to the Delphic injunction Know Thyself. Exactly in what way any such beliefs may be deleterious to the potential development of the individual has been of concern to each of those disciplines -- irrespective of the manner in which those beliefs are sustained and reinforced by cultural and educational factors. A less well-known Delphic injunction is Nothing to Excess (reflected in the Nicomachean Ethics of Aristotle) -- appropriately consonant with the general concern here with "deleterious systemic excesses". The preoccupation with excess has its earliest associations with Enki, the Sumerian deity exemplifying balance.

(x) **prayers, meditations**: whether addressed to a deity, to saints, to gurus or to spirits, the question is again "by whom" they are "emitted" and what that is understood to imply about the identity of the "emitter" and of the "addressed". It is such processes which are condemned as fundamentally deleterious by those who see religion as responsible for human incapacity to respond appropriately to the current challenges of society (Richard Dawkins (The God Delusion, 2006; Christopher Hitchens (God Is Not Great: how religion poisons everything, 2007). Curiously their views are held by a minority, however significant or insignificant. And what they propose as an alternative is proving increasingly problematic (End of Science: the death knell as sounded by the Royal Society, 2008).

**Questions**: In each of the above cases (the rows of the table above), interesting (if not provocative) questions are raised about:

- how any protective "ozone layer" (in the lower "stratosphere") is to be understood
- what "invisible" extra-systemic "high-frequency ultraviolet light" that layer constitutes a protection from
- how the layer functions under normal (healthy) conditions, in the absence of excess
- how the deleterious excesses act upon that layer to undermine that function
- what might constitute an "ozone hole", namely a hole in that layer
- how the trapping of the deleterious excesses in an "ozone layer" results in "over-heating"
- what "polar icecaps" and "mountain glaciers" melt as a result
- alternative ways of understanding the "climate" changed by this process
- the nature of the "sea" whose "normal level" rises as a result

The generic implications of "emissions" are also fruitfully challenged by the argument of the Indian delegate to the UN Climate Change Conference (Poznan, 2008): "In the west you want to drive your Mercedes as fast as you want. We have 'survival' emissions, you have lifestyle emissions". (India won't accept emissions limits, says climate envoy, 8 December 2008).

"Excessive multiplication"?: In the current context the strategic options of faith-based governance (in response to "growth" and "climate change") are fundamentally determined by comprehension of the injunction, acclaimed by the Abrahamic religions, to "be fruitful and multiply" (Genesis 1:28). A more generic understanding of potentially deleterious excesses may however be appropriate -- if such "multiplication" is damaging an "ozone layer" ("Be Fruitful and Multiply”: the most tragic translation error? 1995).
Identity: Given the fundamental importance of prayer to believers, the fundamental role of religion in politics, the emphasis placed on belief and conviction, and the role of hope in a time of fear and despair, the three final "systems" in the table merit careful attention from the perspective of the above questions. For example, is it appropriate belief in transcendental deity that indeed functions in some way as a protective "ozone layer"? Is it this "layer" that is undermined by deleterious excesses -- in ways which theologians have long sought to articulate? Who, however, is the believer and the emitter of prayers in this context? The challenge of "climate change" may be fundamentally a challenge of identity. An inappropriate sense of "individuality" might even be closely associated with the formation of some form of "ozone hole"!

Towards a periodic table of change processes?

The above table can only be an exploratory exercise -- necessarily incomplete and inadequate in its articulation. Some of the "systems" distinguished by rows might indeed be usefully collapsed together. As stages in the process of anthropogenic global warming, some of the columns might be usefully split. This might even be suggested by consideration of the metaphors they engender for other systems. More specific examples of the consequences of global warming (landslides, shorter crop cycles, flooding, drought, etc) might offer further insight as metaphors.

It does however offer a suggestive framework that lends itself to "tuning", possibly into a form of periodic table -- as explored from another perspective (Tuning a Periodic Table of Religions, Epistemologies and Spirituality-- including the sciences and other belief systems, 2007). The possibility of generalizing the periodic table to encompass socio-cultural phenomena was notably envisaged by Edward Haskell (Full Circle: the moral force of unified science, 1972). Elements of this approach have been applied to the classification of the complete range of international organizations, the problems they perceived and the strategies they advocated in response -- currently online (Functional Classification in an Integrative Matrix of Human Preoccupations, 1982).

Within the context of the general systems approach (mentioned above), it is noteworthy that the most widely accepted theory has been that of James Grier Miller (Living Systems, 1978), although recognized as having the limitation of omitting many of the subjective phenomena in the above table to which Humberto Maturana and Francisco Varela subsequently might be said to have effectively given much greater attention. The Viable System Model initially developed by Stafford Beer might be seen as providing an abstract framework for many of the subsystems in the table. However, perhaps more directly related to the dimensions of the table is the work on knowledge cybernetics of Maurice Velle (Knowledge Cybernetics: a new metaphor for social collectives, 2006).

The challenge with respect to "climate change" or "social change" is whether, and how, any systematization of knowledge can elicit forms of understanding capable of engendering more appropriate strategies.

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