Addendum to *Emergence* paper.
Version date: 26 January 2013

This Addendum summarises a few insights that have emerged since my main *emergence* paper was written. These deal with (i) the location of the emergent system we call "mind" and (ii) what might be implied by a perceived need to speak to – address – whole systems (as distinct from the people within them) when trying to bring about social change. The emergence of these insights was prompted by (i) the unexpected arrival of a paper by Peter Robertson[I], (ii) viewing *The Hunt* – a film produced by Thomas Vinterberg, and (iii) discussions with Aidan Ward. In order to keep the main arguments as clear as possible, a great deal of important supporting material has been assigned to footnotes and endnotes. The former are identified by superscript symbols (eg [*]) and the latter by superscript Roman numerals.

The Location of "mind".

In the main paper we first saw that the creation of "developmental environments"[II] in classrooms and workplaces leads to the development, deployment, and visibility of diverse high level talents or competencies. We then saw that the exercise of these high level competencies, taken together, leads to the emergence of collective intelligence or climates of enterprise or initiative having emergent characteristics going far beyond the sum of the individual intelligences. These emergent group characteristics do not have any physical form and are not located in any individual. Yet they are real enough. They lead individuals not only to develop, use, and display competencies that were previously invisible, but also to develop competencies which they could not previously even have been said to possess – and, which, indeed, could not exist outwith an appropriate context of "supporting" – although not necessarily congenial – others engaged in complementary activities.

So what we have here is co-creation of competencies – talents – and environments each having properties which cannot be located anywhere in an assumed-to-be-physical universe.

Now let us apply this insight to the mind–brain–body problem which has perplexed so many for so long.

To be clear: we are not here concerned with such things as Jungian archetypical minds or the issues which preoccupy those currently discussing the "extended mind"[III]. We are talking about individual minds – the kinds of mind most people think of when they use the word.

In the light of what we have just said about the location of collective intelligence, individual mind then appears as an emergent characteristic not located in any neuron or collection of neurones or network of neurones … or even in any particular organ (such as the brain).

It is an emergent property of a system which is itself a product of emergent properties derived from the operation of systems of systems.

These emergent properties go beyond the emergent properties of compounds like PVC (discussed in my main article) in that they are *autopoietic*. Like the "educational" system, minds are self-extending and self-elaborating. They are perhaps better described (and

understood) as clusters of properties which collectively – and literally – have lives of their own.

In the context of such thinking, collective intelligence emerges as a property of a network of processes bringing the non-locatable individual minds into a collective mind[*]. As we have seen, this autopoietic system is able to transform the individuals within it in such a way that they can contribute in previously unimaginable ways to the emerging collective "environment". Thus "it" – the system … this network of processes – co-creates both itself and its environment.

And so it is with the still more diffuse social system known as culture.

Topic No. 2: Dealing with whole systems.

In the main paper, we saw that one way of "understanding" the problems of the "educational" system is to do for the social sciences one of the things that Newton did for physics. He "de-animated" explanations of movement.

Instead of viewing movement as being produced largely by the internal properties of the moving objects – they were thought to be "animated" – Newton showed that movement could largely be understood as a product of the operation of a network of invisible *external* forces which acted upon the moving objects. Although invisible, these forces could nevertheless be mapped, measured, and harnessed.

What we saw in the main paper was that the actual (as distinct from desired) operation of the "educational" system could be largely understood as the outcome of a network of social forces … instead of, as is commonly said, resulting from the underhand interventions of capitalists, classes, or tribes.

In short, we, too, "de-animated" the obvious, common-sense based, "explanation".

The implication was that anyone interested in getting the system to focus on its manifest (educational) as distinct from its latent (sociological) goals would have to find ways of intervening in, or harnessing, this network of forces.

Many systems thinkers had noted that, if behaviour is mainly determined by systems processes, it is largely pointless to shout at those within the system – eg parents, teachers, or politicians.

But few had suggested – as we did– that, if anything is to be done about this problem, it is necessary to map the networks of socio-cybernetic forces controlling the systems – as Newton had done for the planets and sailing boats and as Forrester, Meadows, and others had done for the network of physical and biological linkages controlling the ecological conditions of life on earth – and thereafter intervene in those systems.

However, some, noting the powerlessness of people and the capacity of systems themselves to negate the effects of interventions in order to sustain themselves, had suggested that it was

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[*] The term "collective mind" as used here must be distinguished from both the kind of "extended mind" mentioned above and a kind of pre-existing ethereal or spiritual mind into which individual minds may be able to tap.

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necessary to "address the *whole* system" instead of shouting at the nominal power holders within it.

Now that is intriguing! What can they mean by that? How is it to be done?

A quest for their answers to these questions did not get us very far.

It is true that some, like Meadows et al (1972) and perhaps Senge (1990), had answered along the lines of "by re-designing the whole system". But they then fell at the last ditch by saying that it was the responsibility of some*one* – some manager – some world government – some "political will" – to enact the policies they suggested. Unfortunately, as noted, those authorities were unable (the authors of the reports said "unwilling") to enact their suggestions.

But, wait a minute! While discussing the socio-cybernetic systemogram of the educational system in the main paper we had noted something potentially rather important. The system was not only self-perpetuating, negating the effects of single interventions or generating unanticipated and generally undesirable outcomes from such interventions, but also self-extending, self-elaborating, in a word "autopoietic" … perhaps literally possessing the properties of life itself. The system co-created its environment.

Now. In some sense, we do know how to address whole living systems. Instead of interfering with the organs and nervous systems of a donkey, one can dangle a carrot in front of him.

Once we have understood that the educational system belongs to a known class of systems – such as "elephants" – it might be possible to ask what one might "feed" it/him to influence it's/his behaviour. How might one change its/his environment?

But let us now take a quick look at two sub-systems that we know have generic characteristics that enable them to influence whole systems – namely "leaders" and "viruses".

The teachers who manage to create developmental environments in schools and the managers who orchestrate pervasive climates of innovation in workplaces are outstanding "leaders" – managers – able, within their niches, to release high-level cultures of development.

Yet it is painfully obvious that the majority of teachers and managers do not engage in the necessary activities.

They are driven by a wider culture which fails to tap and release their energies and nurture and release their prospective talents in the direction of nurturing collective intelligence. Indeed, the wider culture we speak of often seems to drive them toward releasing many activities that are destructive of both individuals and their organisations

I have elsewhere[IV] discussed the need for radical change in the way we think about and assess individual differences and developmental environments, and the way we think about "management". Likewise I have discussed the networks of social forces which drive genuine education out of schools more fully than I did in the main paper[V]. And I have suggested ways of dealing with each of these problems one at a time.

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The question is whether I/we now need to abandon these insights in the light of what has been said here.

Indeed not.

Let me create an analogy for what I want to say. If we wish to develop a plastic having certain properties one important way to do so … and the one actually followed in the development of PVC … is/was to understand the composition and structure of the polymers we've got and those of the one we are aiming for --- and the conditions of temperature and pressure under which the new polymer with the desired emergent properties could be formed.

I have no doubt that, if we would like to see more multiple-talent oriented education in more schools, one thing we need to do is to develop the understandings and tools that would enable more teachers to nurture such qualities explicitly. (This means radically revising our ways of thinking about and assessing individual differences in motives and talents and the nature of the developmental environments required to nurture the wide range of talents available[*].)

But it would still not be sufficient.

Our argument here is that it is still more important to understand, and find ways of intervening in, or harnessing, the network of social forces which prevent most schools pursuing these widely endorsed goals.

This confronts us with the two key tasks I have spent so much time discussing over the past 15 years: (1) explicitly using what we know about socio-cybernetics to design a societal management system which will operate more effectively in the long term public interest[VI]; and (2) understanding the network of social forces which have consistently, over many millennia, driven most societies toward the kind of dysfunctional hierarchical organisation which now has the future of mankind and the planet in its grip – viz the network that can perhaps best be characterised as an anti-Gaian, Thanatos, network[†].

But what happens if we somehow try to approach the problem from the "address the whole system, including its emergent, self-elaborating, self-extending, life of its own) properties" perspective developed earlier in this Addendum? It seems that some people (teachers, managers, leaders) know "intuitively" how to create developmental environments and emergent collective intelligence or enterprise in schools and workplaces

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[*] Although it is a digression here, it is vital to note that, in contrast to the currently approved paradigm for thinking about individual differences in psychology, (1) the differences between the billions of chemical substances known to us can only be captured by employing a *descriptive* framework grounded in 92 elements combined in different structures and relationships … i.e. *not* in terms of scores on 1, 2, or 16 "factors" or "variables", and (2) that the multi-billion *properties* of those emergent compounds can only be captured in terms of an even more complex network of *descriptors*. In some areas, e.g. when dealing with the emergent properties of complex systems (such as plants and animals), there are systematic, branching, classificatory frameworks (such as those of Linnaeus and Darwin) for doing so. What is notable is that the frameworks that have emerged in the attempt to systematise thinking about the variance in talents and personality on the one hand, and organisations on the other, parallel neither the atomistic framework used in chemistry nor the Linnaeus/Darwinian branching framework adopted in biology. But then, the frameworks used to classify the emergent properties of chemical compounds (and combinations of compounds such as the clays used to make bricks) also consist of *variables* such as "hardness", "tensile strength", "insulation properties" etc (and I have a feeling that factor analysis has in fact been deployed in an attempt to reduce the number of these). At which point the role played by the user's *purposes* intrudes more forcefully.

[†] See Fig 20.6 in *The New Wealth of Nations. http://www.eyeonsociety.co.uk/resources/diagram%2020.6.pdf.*

Equally, there are some who seem to know how to set off climates of persecution and destruction – Hitler, Mao, and so on.

There appear even to have been some who first unleash huge programmes of hatred, persecution, death, and destruction, but then undergo some kind of conversion and set about releasing the same energy in the opposite direction creating such things as respect for diversity and unleashing the kinds of living arrangements required for home-sapiens and the planet to survive. Some of the cultures and ways of life so unleashed appear to have persisted for centuries … until they were confronted by someone else's germs, guns, and steel[VII].

But there is something else that I feel that I need to mention before we move on – although I am not quite sure what it has to do with the rest of the argument. One is continuously encountering what appear to be non-centrally-directed "chance" happenings in which desperate community destruction is triggered – as in *The Hunt* – by apparently isolated single cases of such things as (culturally defined) child abuse, sexual harassment, homosexuality, heresy etc. It seems that an apparently trivial happening in one part of a system can trigger pervasive change throughout.

But, setting that observation on one side for the time being, what are we to make of these seemingly intuitive understandings of whole-system processes? And how might one go about using such insights to, on the one hand, run operations like the educational system more effectively, and, on the other, promote the evolution of societal management arrangements[*] which will enable us to survive as a species.

As mentioned earlier, some of my colleagues have repeatedly (and somewhat mysteriously) – but with good reason – asserted that "We need to speak to (address) the *whole* system, not individuals within it".

As briefly indicated earlier, we hope, in this Addendum to offer one interpretation of what "addressing the whole system" might mean.

If we wish to influence someone's behaviour one can speak to him or her or alter the environment in which they live and work. Or we can carry out brain surgery.

Now. Since an individual is a system of systems … or, perhaps more correctly, a colony of systems working in symbiotic relationships[†] … having emergent properties not locatable in any of those systems or in the relationships between them, the first and second of these

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[*] Some indications of the developments our own research (summarised in Raven, 1995) points to were given in the main paper. Here it is important to emphasise that, when speaking about "societal management arrangements", we do not have in mind any kind of hierarchical system based on chains of command. Rather the need is to design a *system* which will innovate and learn *without* central direction, indeed without anyone having to know very much … or, to put the same thing the other way round, which will harness the expertise which is widely dispersed in the hearts, heads, and hands of billions of people. Adam Smith thought he saw a basis on which such a system might be built in the "market process". Unfortunately, that market mechanism (for reasons outlined in *The New Wealth of Nations*) does not, and cannot, work. Psychologists have a crucial role to play in generating an alternative design – and that is what we sought to offer in *The New Wealth of Nations.* Our question here is rather different: How would one engage with the Gaian or Thanatosian *whole system* processes which emerge from the networks of socio-cybernetic processes depicted in our systemograms?

[†] It seems that only about half the cells in our bodies contain our DNA. The rest are bacteria, viruses, and all manner of other things, many of which we need in order to stay alive.

involve "speaking to a whole (sub) system" (as in holistic medicine?) whereas the third involves intervention in what might be regarded as a relatively mechanical network of internal cybernetic loops. (None of which is to imply that any of these interventions will have the desired effect because other social forces determining the individual's behaviour will come into play.)

So, to repeat and re-state my problem and question. I feel there ought to be implications of what has been said for coming at the question of how to reform the educational system and/or the operation of our overall societal management system[*] holistically, ie "addressing the whole system", addressing the emergent autopoietic system which has properties that are not located in any of its sub-systems[VIII] *qua* an emergent autopoietic system, instead of what might be said to be mechanistically .... i.e. by manipulating one feedback loop (or collection of feedback loops) at a time.

It seems somehow incongruous to expose the network of social forces controlling the operation of the "educational" system (or society more generally), draw attention to the fact that these networks form autopoietic systems directed toward "latent" "goals" which are radically different from the manifest goals the systems are generally thought to have been developed to pursue, and then only suggest tackling the problems via carefully-identified[†] "mechanistic"-type interventions *within* the system.

I may make the point more vividly by introducing yet another analogy. A group of scientists working in the dark might identify all the components of an elephant and the linkages between them and then, on the basis of this information, suggest ways of influencing the system's behaviour while still not recognising it as a whole. But as soon as someone switches on the light they are able to see the whole elephant and entirely new ways of interacting with what was previously understood simply as some kind of mechanistic system suggest themselves.

So maybe the question is: What *kind* of system are we dealing with? What are the holistic properties of such systems? And what do we know about how such systems can be influenced *as wholes*?

So maybe our first step is to promote the development of a classification of social systems equivalent to those which have emerged in chemistry and biology.

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[*] It may be of more than passing interest to relate these comments to the *Limits to Growth* report (Meadows et al l 1972). The report's authors importantly map the network of biological and economic feedback loops which determine mankind's consumption of resources and contribution to the destruction of the environment and document the effects that alternative interventions in that system would have. They then identify nodes at which it would be feasible to intervene in this network to avoid predictable and imminent collapse. But they then say we "lack the political will" to do what needs to be done. This statement gives the game away. It relies on hierarchical authority One interpretation of this – the one I have favoured in the past – is that they have failed to map the socio-cybernetic loops that are external to the system they map but which nevertheless determine the way humankind will interact with it. If they did that, it would be possible to discern ways of intervening in *that* network. But what I have said in this Addendum suggests the possibility of an alternative approach. What would an attempt to identify the emergent autopoietic properties of the system and address it *as a system, qua system* tell us?

[†] I say "carefully identified" because Forrester (1971) has neatly shown that common-sense-based interventions in poorly understood systems typically have counterintuitive, and usually counterproductive effects.

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Endnotes

[I] Robertson (2012)

[II] We may note that this term is already a characterisation of an emergent culture.

[III] See Robertson (2012) for references to relevant publications

[IV] See, among others, Raven and Stephenson (2001), Raven (2012).

[V] Raven (1994).

[VI] See my *New Wealth of Nations* (Raven, 1995) for an account of one way in which this might be done.

[VII] Accounts of such happenings will be found in Michael Wood's programmes on India.

[VIII] The word *autopoietic* is used to underline that these "self-organising" systems not only have (1) emergent properties paralleling those of PVC and sailing boats and (2) self-maintaining properties derived from having multiple feedback loops which collectively either negate, or generate unanticipated and undesirable consequences from, attempts to change their operation by altering one feedback loop at a time, but also, and most importantly (and most mysteriously), (3) *the self-reproducing and self-extending properties that are generally associated with life itself.*