Response to the Viterbo Conference

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When people ask me about the conference, I want to be able to tell them something about what syntropy is, and why it is important, without going into too much physics, and especially not into really difficult concepts like retro-causality.

So what is syntropy? The simple answer is: the opposite of entropy. As we know, any discharge of physical energy brings about an increase in entropy, in accordance with the 2nd law of thermodynamics, and entropy is characterised by the breakdown of order. On the other hand, life appears to be able to defy this law, and so to put together disordered molecules into an exquisitely-ordered organism. This "Life-Energy" has been given the apt name *syntropy* by the brilliant, but little-known Italian mathematician Luigi Fantappiè.

Fantappiè saw syntropy as being a fundamental feature of the universe from the very beginning. Thus, long before what we call "life" appeared, the universe was becoming more ordered. From the unitary simplicity of the big bang, to particles, to atoms, to compounds, and through all Darwinian evolution to our human species.

During this process there has been a continuous increase in complexity. Thus identical units (eg electrons and protons) came together to form more complex and varied units: atoms. These now have emergent properties far beyond those of their component parts in isolation. Just think of how the simple Hydrogen and Oxygen came together to yield the extraordinary emergent properties of water. And organisms themselves have become immeasurably more complex, with emergent properties appearing at each major stage.

Arthur Koestler wrote of this process as a succession of "holons": each holon being the more complex result of simpler subunits, or holons, coming together. Note how the subunits must lose some of their independence in order to co-operate in the formation of a more-inclusive holon. They also become differentiated: eg identical single cells lose their independence in order to co-operate within a multicellular organism, and then play different roles within it.

Each of these stages represents the appearance of something new which *never existed before* in the whole universe. One could say the same for the major steps in biological evolution. Whereas gradual small changes are adequately accountable by neo-Darwinian mechanisms alone, the more radical novelties are less easily explained, and have given rise to theories of "punctate" evolution.

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Here I have to bring in the quantum interpretation of reality. (This has been with us for 100 years, but has yet to percolate very much into our general world-view). Nevertheless, no-one who is aware of it can escape the conclusion that, at some subtle level, *everything is connected*. This kind of "non-local" connection, or "entanglement" has been proved without a doubt for subatomic particles, and even for molecules as large as "buckyballs". And on the larger scale it forms a much more satisfying account of how all the millions of molecules making up a living organism can continue to hang together as such precise, persisting, and moreover, *highly-dynamic* patterns. Indeed, there is plenty of evidence that such quantum connections may extend in non-local fashion to any distance. Thus many scientists now think we can consider the whole universe as a vast living organism.

To come back to the essential step where subunits come together to co-operate within a larger whole, there are plenty of examples from human society. Even a man and a woman, when they come together, lose some of their independence to become co-operative units in a larger whole. Together, as a couple, they have capabilities beyond those available to them as individuals. And this is abundantly true (not always for good) for larger groups as well. Thus our history, although chequered, has been towards the formation of ever larger groupings – now even with a functioning United Nations.

Why would two individuals choose to lose some independence in order to become part of a co-operative unit? The reason is that they are motivated by *love*. This is a loaded word of course but, in its broadest sense, it extends beyond interpersonal love (greek *eros*), to a more universal love: greek *agape,* or Buddhist *metta.* In this form we could apply it to the tendency motivating all the afore-mentioned creative steps which have led to the evolution of the incredibly complex and beautiful universe we now see.

When the legacy of 19th century materialist/mechanist science banished the personal God, it also threw out the whole spiritual dimension. Yet now, with the theory of syntropy we can see the beginnings of a new mode of faith, because the universe has obviously had *creativity* from the beginning, and seems to have something analogous to *love.* It may also (I think) have had transcendence from the beginning – in the sense of the subtle unifying quantum field which is beyond the reach of our instruments or our rational minds.

This theory does I think represent an enormous paradigm shift. This is because it takes us away from the vision formerly bequeathed us by science: of a cold desolate universe, arising by random chance, and lacking in any deep meaning, to a new, and *equally scientific* vision of a universe based on love. Although often painful, this universe is now ultimately meaningful, and thus restorative of our faith – in humanity, the future and everything.

So, what might be the next big step in evolution, the next incursion of radical novelty? There are indications that it may be bringing together the whole human race as a vastly greater whole, along the lines of the theory of Theilhard De Chardin. This would take place first at the subtle quantum level, and then in the material world it would mean that human competition would progressively

give way to human co-operation. A radical transformation of this sort now seems increasingly urgent if we are to survive the next century. Indeed many see the seeds of it already.

The poet Matthew Arnold felt very keenly the loss of faith engendered by science, which has left us such a dry and soul-less image of the world:

The Sea of Faith
Was once, too, at the full, and round earth's shore
Lay like the folds of a bright girdle furl'd.
But now I only hear
Its melancholy, long, withdrawing roar,
Retreating, to the breath
Of the night-wind, down the vast edges drear
And naked shingles of the world.

Ah, love, let us be true
To one another! for the world, which seems
To lie before us like a land of dreams,
So various, so beautiful, so new,
Hath really neither joy, nor love, nor light,
Nor certitude, nor peace, nor help for pain;
And we are here as on a darkling plain
Swept with confused alarms of struggle and flight,
Where ignorant armies clash by night.

Dr Ulisse Di Corpo, a mathematician and principal instigator of the conference, had found these ideas coming to him before he encountered Fantappiè's work. Becoming frustrated that he could not get scientists interested, he wrote his ideas in the form of a novel. It has now been translated into English with the title:

The Theorem of Love

Does not this, with the mathematical precision of the word “theorem”, perfectly bring into the scientific arena all the attributes previously given by religions only to God? Except that now, instead of being somehow above and separate from it, they are inherent within the universe, and have been from the beginning. And, if (or when?) Theilhard's prediction comes about, will it not be the greatest triumph of love yet?

But, since we *are* all connected, none of us can escape responsibility for the future. So, rather than standing back trying to *predict* the future, we could be looking for ways in which we can help to *create* the kind of future we want to see.