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SHAPE JOURNAL

THE FOURTH LAW

RESONANT STABILITIES / RESEARCHING QUALITATIVE CHANGE/
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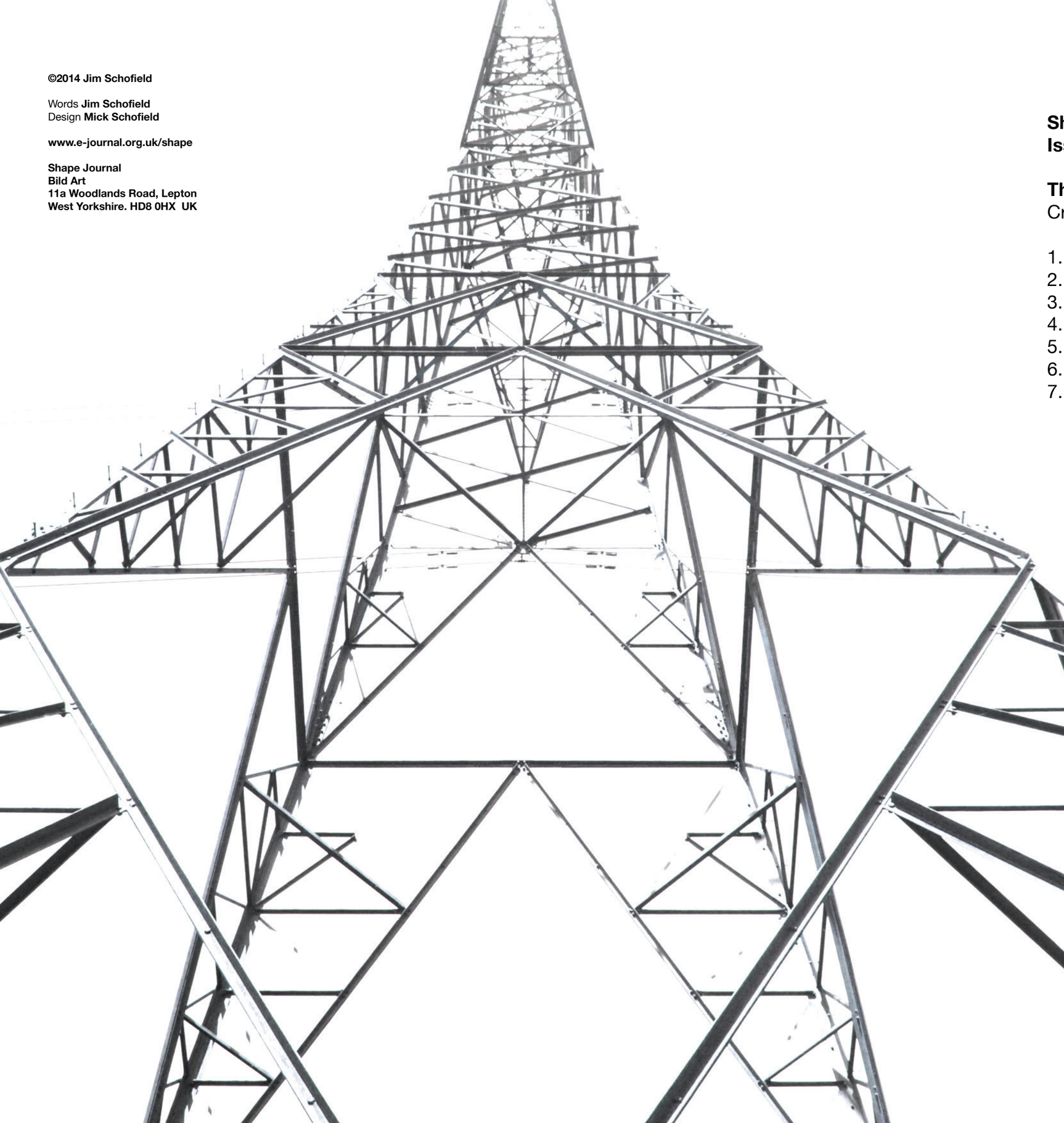


Shape Journal
Issue 35

The Fourth Law:
Creation in Development

Introduction
The Fourth Law of Thermodynamics?

Welcome to Issue 35 of the **SHAPE Journal**.

I am reluctant to label my latest contribution “The Fourth Law of Thermodynamics”, because of the absolutely necessary context, into which such a title positions it.

The three original so-called Meta laws of Science, arose within the context of a wholly and exclusively pluralist and technological approach to Science. It could not be other, as that approach was the ONLY one that Mankind could use to attempt to both reveal and use the relations acting within Reality.

Indeed, outside of the found-to-be-essential constraints imposed upon all activities in that investigative AND producing sphere, a law such as the Second Law makes no sense at all!

It is a correct law as an indispensible rider to a pluralist approach, which never investigates entirely unfettered Reality-as-is, but, on the contrary, limits all investigations to within carefully designed, constructed and maintained Domains, without which the sought-for relations could neither be revealed nor extracted.

The Second Law is thus a permanent, accompanying foil to all such pluralistically derived laws. It actually makes totally unfettered Reality into a completely dissociating sump, surrounding the ideal Domains of all investigations and uses.

And, the merest crack in such a fortress, will therefore immediately begin to destroy what was so painstakingly achieved in the purposely isolated island of interpretable Form.

Thus the Second Law is not what it is claimed to be! It is actually the World seen reflected in a wholly pluralist, technological mirror.

The incongruity of a Law of Total Dissociation, without an essential countering Law of Construction makes absolutely NO philosophical sense at all!

How can the only way be down?

This collection of papers aims to counter the Second Law with a proved Law of Creation and Construction.

Jim Schofield Sept 2014

Preface to The Fourth Law

The possibility of a Fourth Law of Thermodynamics (usually suggested as a counter to the totally pessimistic Second Law), is usually dismissed out of hand by most critics, as they all bring in such supposedly "illegitimate" biological concepts as Evolution, and in one sense you can understand that view.

They are, after all, "Laws of Thermodynamics" that were derived as Meta Laws in the purposely-limited area of most scientific studies. But, in addition, such a restriction is certainly incorrect anyway. The Second Law is seen as being extremely general, and insists that all Order is on its way to dissociating into Chaos. So, it may be true in the contexts in which it was first defined, but is NOT applicable generally, as Life, Evolution and Consciousness prove conclusively.

So, what are, variously, put forward are not in the same context as Carnot's and Clausius's ideas, for all contributors to these established Laws of Thermodynamics came from a standpoint where any weakening of the essential conditions imposed via specially constructed Domains of investigation, that had to be carefully prepared to enable the revelation, extraction and use of all physical and chemical laws, would inevitably lead to dissociation (as the Second Law certainly proposes).

They were unquestionably predicated both upon Stability and the pervasive Principle of Plurality.

Clearly, when considering the development, not only of living things, but of all that occurs in Reality itself, such an artificial context is not required: indeed, it imposes a very different set of possibilities upon the phenomena involved, and the self-movement of totally unfettered Reality is clearly essential for natural, integral development to occur, and the whole basis will be at odds with that of the engineering era of Science!

So, though these alternatives were invariably called The Fourth Law of Thermodynamics, these counter Meta Laws were grounded in Reality-as-is, and not as we might like to make it.

So, this set of papers will not concern itself with abstract (invented) scalars, such as entropy, but with the trajectories of qualitative change that take place outside of the necessary stabilities of "Thermodynamics"!

Indeed, the first step in addressing the "Wormhole to Oblivion" of the Second Law, has to be an investigation of the trajectories of change in Reality-as-is, in particular the clear alternation between long periods of stability, and the crucial short interludes of significant qualitative change in what are beginning to be termed Emergent Episodes.

While the Laws of Thermodynamics were arrived at by studying only stabilities, the "Fourth Law" can only occur in the revolutionary interludes termed Emergences.

Resonant Stabilities

Why are stabilities so dominant?

You would expect, in an enormous and varying, developing and complex world, for it to be very transitory and rare. But it isn't! Though such stabilities do always dissociate in the end, they do indeed prevail for long periods, and so give the impression of permanence, and, even after their dissociations, they are each always replaced by a new stability, which, once it has been established, will in turn also prevail, again for a substantial period of time. So, if looked at overall, yet also from a point with it, it gives the impression of constant stability, with a few step changes here and there.

Why is this?

It is almost as if Reality moves inexorably towards stability, whenever it can, and even when it fails, rushes to find an alternative stability.

NOTE: Indeed, Mankind has long taken stability as the norm, and when it found situations that were difficult to investigate, it would artificially impose the kind of stability that would facilitate some sort of easier investigation.
"Staying the same" or Constancy was therefore an early and persisting assumption for All Things. And, indeed, over normally experienced time period for Mankind, and for many entities and even living things, it was a very apt assumption.

Now, there are conceptual principles that can be taken, which endow certain natural processes with both a self-fulfilling, and a self-maintaining nature, but they are usually minimising-energy forms – such as all "movables" ending up at the bottom of valleys. But, that is not the kind of stability that Reality seems to prefer over longer periods of time.

They tend, instead, as a sequence of stabilities, to mount-in-complexity and potentiality when one stability ends and another replaces it. The template example is, of course, the emergence of Life, but even when less dramatic than that, it is still always some sort of development, involving things and processes that are wholly new! Yet, each such stability is never final: it always, in the end, crumbles and is replaced in a very short time period termed an Emergent Event or Episode, or more simply called an Emergence!

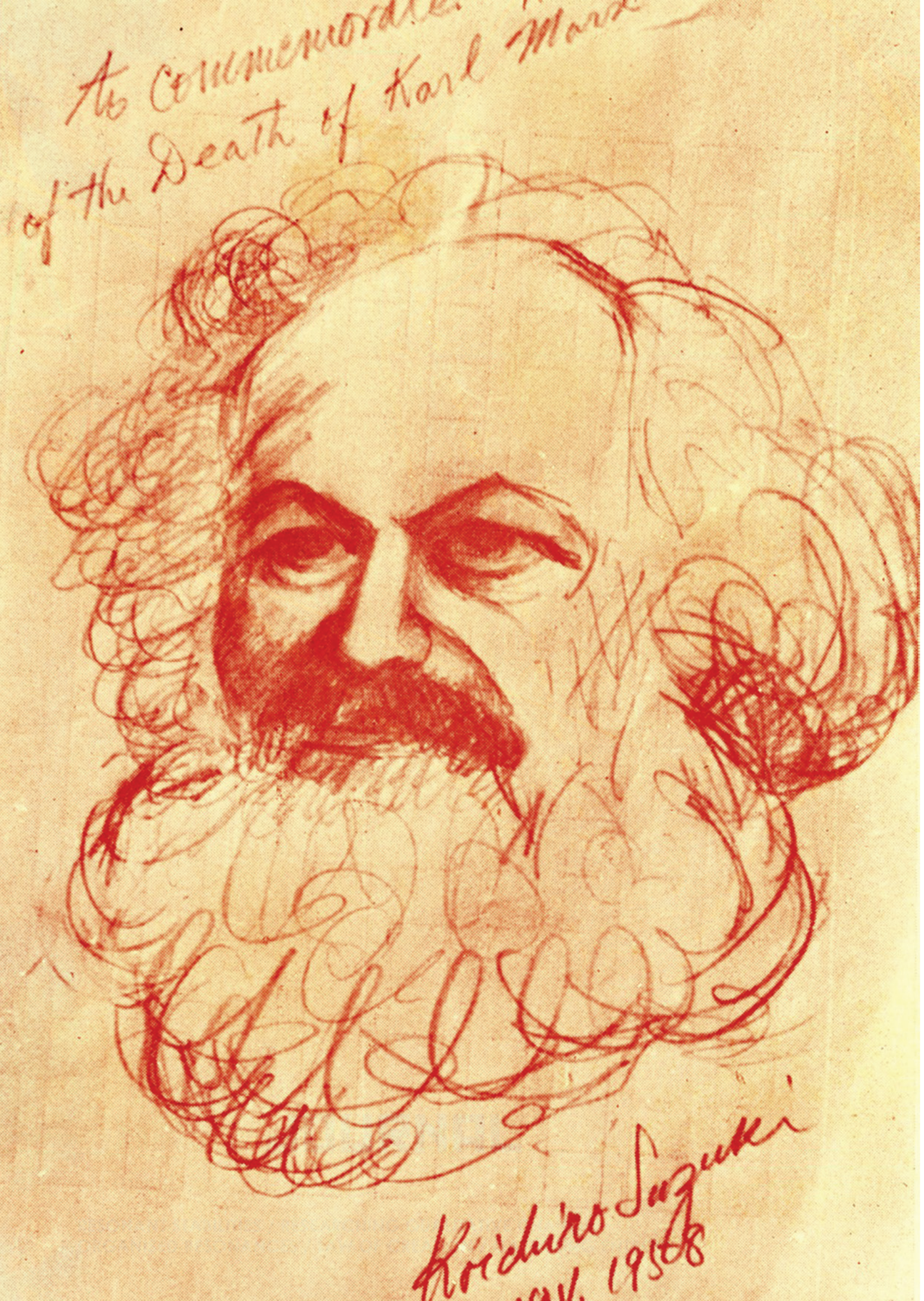
So, what determines such a progression or development, and why should the stabilities prevail, rather than the more usual least energy set-ups or transient settling down governed by the imperative, "Stir well and wait for equilibrium!". What drives such clear examples of promotions-to-higher-levels? There has to be a promoting feature, where things come out at a higher level than they went in. It has some of the features of a kind of resonant amplification!

For, taking this much more mundane occurrence – *resonance*, it does seem to, when energy is available, delight in residing in naturally resonant situations in preference to others, Indeed, once initiated such situations seem to be able to steal energy from other disorganised systems, as long as something sets the ball rolling via an initiator with the same natural frequency actually setting it off!

The energy pours into the resonant situation, and steps up the amplitude involved. It is like when soldiers march, in-step, across a bridge, some of the energy of their marching that associated with a resonant frequency of a part of the bridge, will be directed to that part, increasing its amplitude, and, thereafter, other uncoordinated energy can also be added until that major oscillation can shake the bridge to pieces.

Now that is a poor example, because it wasn't designed to do that. So, let us alternatively consider a situation, which is so designed that it will absorb energy from other sources, and in concentrating that energy into a single resonant frequency, but this time only enlarge in amplitude.

Could stability be some kind of resonant situation?



Researching Qualitative Change

Now, if the reasoning used so far is indeed applicable to absolutely everything, then the same sort of trajectory of change will occur whatever level of Reality we are at. Except, of course, that as things get to higher levels, which must contain all those below it, then, perhaps it will be more frequent, and also somewhat slowed during the transition, and hence much more amenable to study.

Clearly, the processes taking place at the bottom-most situations involved will be particularly fast, once they are underway, but, as we consider ever higher layers, they will have many more things going on, and occurring at many different levels, and this could slow things down.

NOTE: Tempos are clearly important in attempting to understand such changing systems, for both if they are too fast to notice, or so slow that they also cannot be perceived, they will not usually be addressed.

I am, of course, talking about the transcendent qualitative transformations occurring in an Emergence Event, and not those, which regularly occur within an established Stability, for the latter do not significantly affect that stability. But, if these suggested conclusions are valid in a similar manner to those in a Social Revolution, they will there not only be much extended in time, but would also include thinking individuals attempting to make some sort of sense of what is going on, even down to changes occurring literally hour-by-hour!

So, here we have what might well be ideal territory for the study of those crucial Emergent Trajectories of vital qualitative change. But, only if, of course, those attempting this are clear about the real processes of qualitative change that are inevitably involved. And this means that the attempt must be by those who have studied the achievements of Hegel and Marx, and are also currently in the midst of a further revolution in their methods, and are attempting to intervene in such crucial processes.

Now, such things as Social Revolutions are by no means common events, so having to wait until you find yourself in the very midst of such dramatic cataclysms of change is too much to ask, for those who need to study Emergences in general. But, we are rescued by Frederick Hegel, for he brilliantly realised that Human Thinking was also the same kind of ever-present process, which would also undergo a very similar trajectory of development. It too would have relatively stable sets of ideas that would be gradually undermined by increases in knowledge, and which could ultimately undergo major crises, and see whole sets of once reliable concepts dissociating totally.

So, Hegel knew where he had to pursue his important studies, and his contributions were therefore made entirely within the realm of Human Thinking. And, though this would never be a one-to-one mapping, and would involve more general developments, they, nevertheless, would be constantly available for study, and real progress could be made in the more general area of qualitative changes!

Indeed, it was Marx who realised that Hegel's discoveries, though stamped throughout with their source, could still reveal something of general development, and so he began to transfer Hegel's idealist contributions into a materialist standpoint, and hence make it possible that they could be applied to Development in General.

But Social Revolutions, which were Marx's chosen area for study, though ideal for such investigations, are too unique and too infrequent for being the only situations for studying Emergences, and particularly those involving unconscious entities – even though they too most definitely developed and suffered the same cataclysmic dissociations of emergent transformations into wholly new levels: yet in such cases the involved entities most certainly could not choose to redirect what was going on. At such sorts of levels, the situation would be more automatic, even though they would follow the same sort of trajectory. So, Revolutions can be unconscious, but since Marx, there is a chance that participants may, indeed, intervene to attempt to achieve particular conceived-of outcomes.

The writing of Michelet on the French Revolution, and of Trotsky on the Russian Revolution do indeed show that the trajectory does proceed at a pace slow enough to be both thought about, decisions made as to what was necessary, and then acted upon. But, of course, without the very latest philosophical understanding, they would not be able to make sense of what was happening day-by-day and even hour-by-hour.

There have been many "failed" Revolutions, and even those who consider that they are appropriately equipped to do the job, are frequently found to be dramatically short of the necessary conceptual tools and dialectical understanding, and, in spite of "good intentions" they fail in their tasks, and the reactionary regime is reinstated.

You might think that Consciousness is an even higher level than what appears in Social Revolutions – like Hegel's chosen area of study – his own Thinking, but that is not the case! Whereas, most of what goes on in the Thinking of an individual is dependant upon that individual, a Revolution is composed of literally millions of individuals, and even relatively significant numbers of trained revolutionaries, so the "Theatre of Conceptions" is much wider than it ever

could be in the musing of a single individual, especially if that person were not constantly immersed in political actions in society.

The processes involved will not be exactly like those investigated by Hegel. For, they will involve the people, with whatever positions they hold, and even in an organised and educated revolutionary party – like the Bolsheviks in Russia, the spectrum of positions held was very wide indeed. Lenin had to intervene at one stage to criticise some of his colleagues for being seduced theoretically by the Empirio Criticists. And, even in 1917, he had to get back into Russia to divert his party from a significantly counter-revolutionary set of policies. From the moment he arrived at the Finland Station in Petrograd, he immediately set about his colleagues, and his April Theses finally brought his party into a correct orientation to know-what-to-do within the developing revolution. And, it changed constantly! By July, Lenin was in hiding in Finland, and Trotsky was in Jail. By October the revolution was ready, and the party equipped to lead it!

Yet, since the Russian Revolution, NO significant revolutions have occurred, and the reason is because the necessary developments in Theory were not addressed. In particular, it was in Science that the Marxists failed to make the necessary contributions to wed that investigative discipline to the philosophical standpoint of Marxism.

Now, of course, a great deal more needs to be said than that bold statement! The developments by Hegel, and thereafter by Marx, in Philosophy, had to be further developed. The extension of Hegel's Dichotomous Pairs from Thought exclusively to concrete Reality in general was not straightforward. Nature doesn't arrive directly at such Pairs, though it does arrive at *crises*. But, even when Mankind is studying non-living Reality, it still takes place in the thoughts and ideas of the participants, so there is no getting away from these "Artefacts of Thinking": they WILL be what Man handles whenever his assumptions and principles run out of steam.

So, he must, in applying Hegel's discoveries to Reality in general, be clear that our problems are identified by these thinking anomalies, while the general crises in concrete development in most of Reality are based upon the dissolution of a prior Stability, and the actual construction of another during an Emergence

So, we must not confuse these two kinds of crisis. One is a natural feature of development in all aspects of Reality itself, while the other occurs in Mankind's thinking about Reality. And, as we are not Gods, the former will always be seen through the prism of the latter!

These are not the same and will almost never coincide!

Indeed, though we can learn from one about the other, that is because they both occur in the same overall ground – Reality, but at different levels. They are both about development, but one is true of intrinsic development of concrete Reality, whereas the other is in the development of reflections of that Reality in a very unusual part of Reality – the thinking brains of human beings!

Indeed, without other means of study, which were more objective by being social developments, yet developing at such a pace as to be amenable to philosophical study, this standpoint in Philosophy could not be reliably extended and improved.

The necessary area to be philosophically addressed had to be Science! And, this was certainly NOT undertaken.

Let me be absolutely clear: Science was not seen as crucial for what it could deliver in its "Collections of Truths", but, on the contrary, for the problems it also delivered.

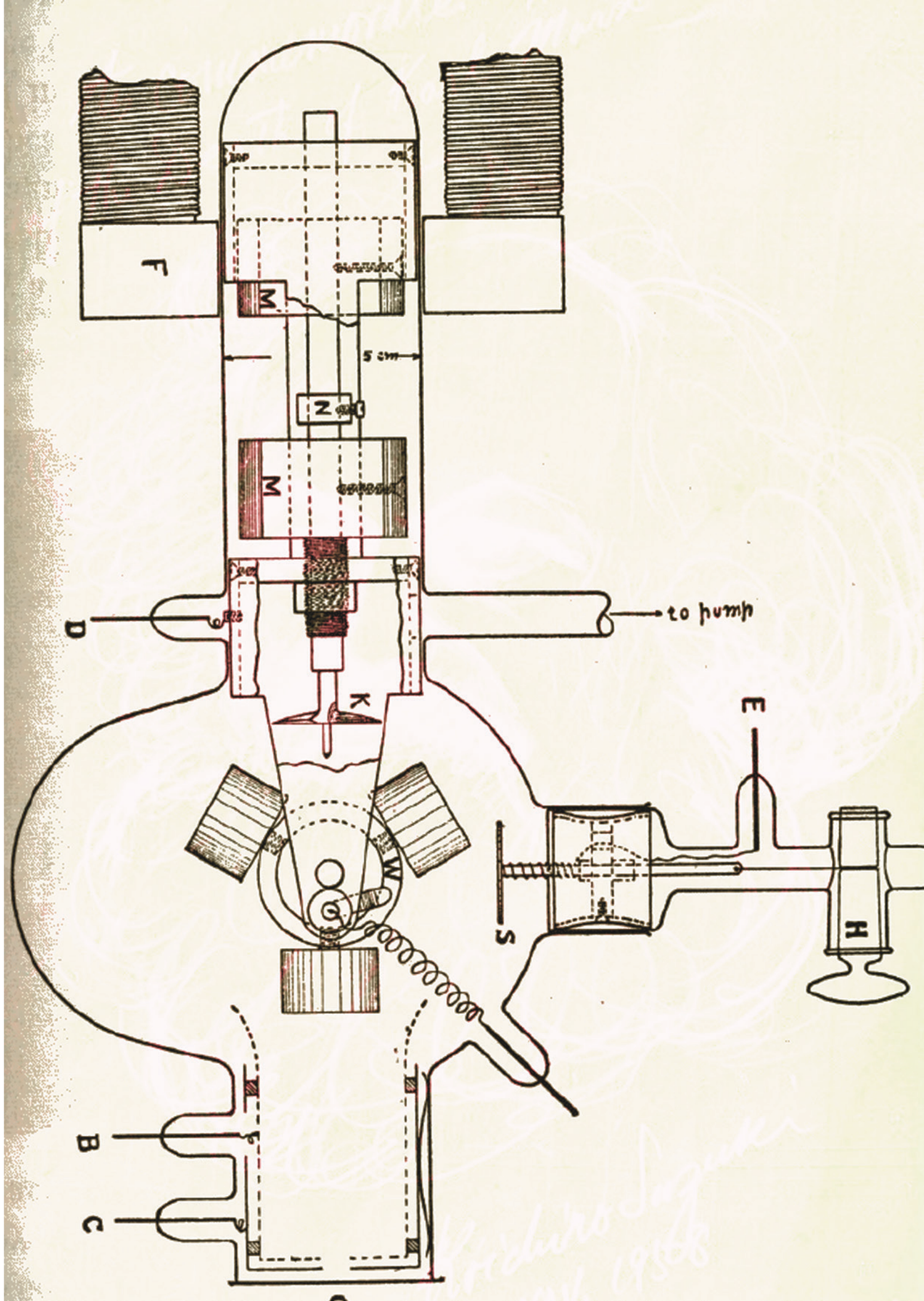
The main front for the development that Hegel, Marx and Lenin had contributed to, MUST next tackle the increasingly dominating approach that was termed Science. Already, over 100 years ago, Lenin had to write Materialism and Empirio Criticism to wrest back some of his colleagues from looking to the scientists Mach and Poincaré for "scientific" improvements to their "Marxism", but though successful at that time, it was but a remedial attack, and NOT a necessary further development in the general Marxist standpoint.

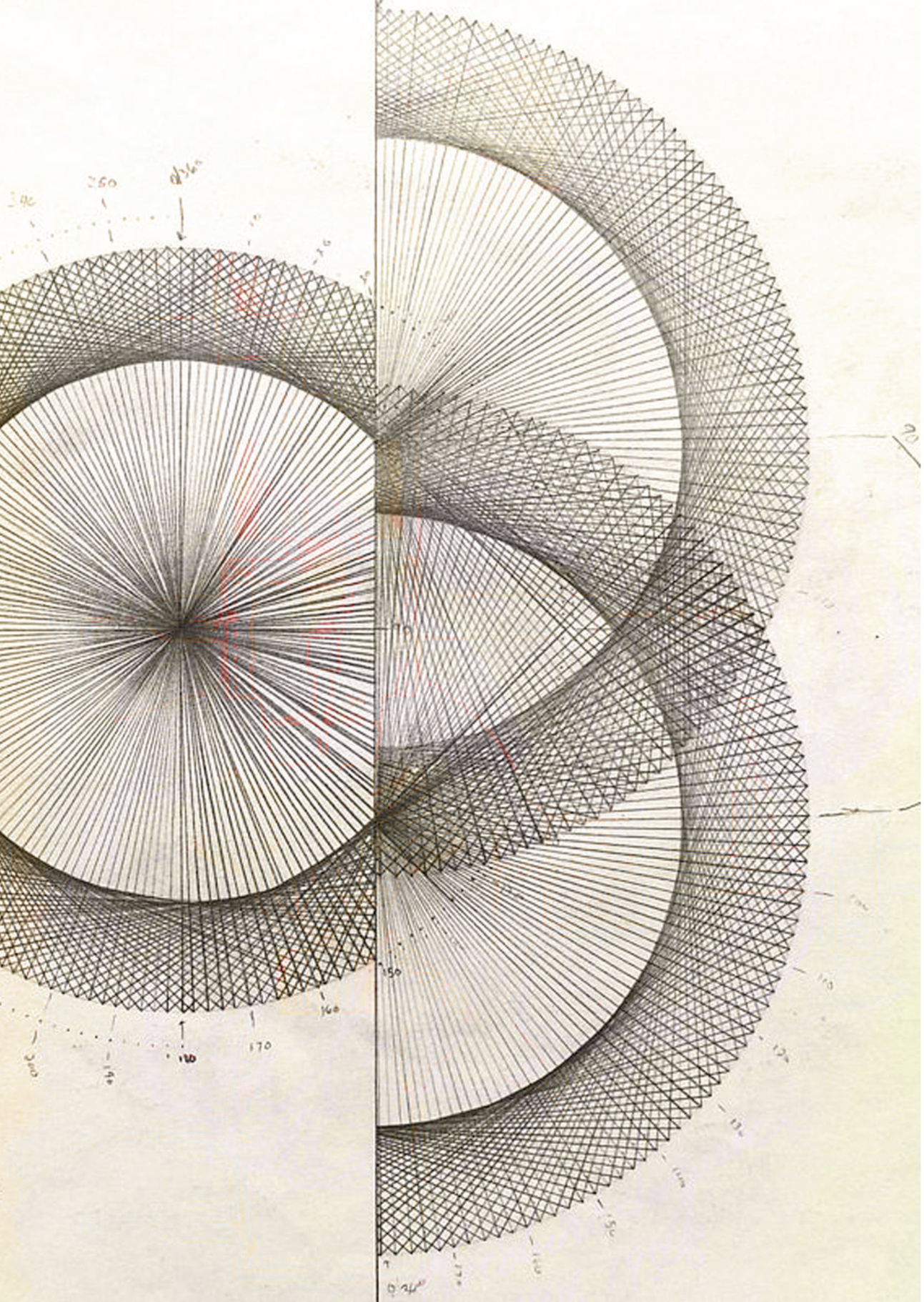
The proof of this was that it soon became absolutely imperative to tackle Science, for, almost immediately, this urgency was demonstrated by the enormous crises occurring in Physics, due to vitally flawed standpoint and methods in this Science.

The discovery of the Quantum – a descrete disembodied "particle" of pure electromagnetic energy, along with the dramatic Ultra Violet Catastrophe in Black Body Radiation, and the inexplicable Photo Electric Effect, all hammered at the gates of conventional Science, until they finally gave way.

What might have merely seemed to be a crisis in a particular discipline, now took centre stage, and finally with no resolution on the traditional grounds, cause a major retrenchment in what was generally regarded as the "best bet" for real progress in how Mankind generally considered Reality.

The gains of Hegel, Marx and even Darwin had to be wedded to the objectives of Physics to rescue it from the "New Solution" of Copenhagen Idealism, and at the same time reinvigorate itself via the re-establishment of all of Science upon a Holistic basis, instead of the universal stance there based upon the Principle of Plurality.





Clearly, the initial tasks were in Sub Atomic Physics where the Copenhagen Interpretation of Quantum Theory had originated, and which thereafter had conquered all of Physics with its idealist belief in totally disembodied “Natural Laws” actually making Reality what it was!

But, instead of a merely countering philosophical standpoint, what had to be achieved was the actual solution of all the anomalies propagated by this false standpoint, that the physicists were clearly totally incapable of solving for themselves.

Their crisis, the culmination of centuries of mistaken assumptions and principles made them incapable of any sort of solution, and their answer was a major retreat into the most abject Idealism.

The clear starting point had to be the infamous Double Slit Experiments, but current Marxists were not physicists! The task was beyond them too, for they had neglected the development of their philosophic position. They too were at a loss to address the problem!

It took researchers who were BOTH, to even attempt a solution, and they began to have increasing success! The real Marxists had continued to sharpen and improve their philosophical criteria and methods, and they saw the relationship between periods of Stability and Emergent Events, and were able to characterise current Science as being wholly stability-based. The dependence upon the Principle of Plurality was revealed, and how that stance inevitably came to a position where the Second Law of Thermodynamics took centre stage, and the future could only be downhill to oblivion cosmologically. Marxist studies in these areas revealed their crises and started to deliver some solutions.

The Double Slit has been explained, this has been achieved by Marxists, while even the very best scientists were unable to offer anything other than a wholesale retreat.
In consequence, a whole new front opened up within the sciences delivered entirely by a holist, Marxist approach.
Real philosophical progress is now underway, both in Science and in Marxism!

Naturally and Purposely Organised Resonances?

Now, to mention Yves Couder's current series of experiments, though exciting and clearly pointing the way forward towards similar natural and constructive imperatives in Reality, is not yet sufficient, for they do not yet deliver these things via full explanations.

To involve both resonance and recursion without such a explanation of what these phenomena are, and why they occur, will not yet move the crucial investigation concerning possible naturally occurring versions sufficiently to be generalised and applied to the actual Evolution of Reality.

The problem is, of course, that they are "organising" processes, that somehow focus dispersed (and balanced?) entities, and their energies, from a more extensive "averaged" existence, into organised self-supporting systems - and, clearly, this aspect must be explained!

How, does it happen, first in Couder's set-ups, and then, more widely and wholly naturally, occur in unfettered, self-moving Reality? And, of course, explaining the former may well enable us, for the first time, to tackle the latter!

So, how do such phenomena occur? There are certainly known (yet still unexplained) phenomena, which may well be addressed by these studies. Let us consider a few, and see if some general ideas can be gleaned from them, which may throw important light upon our suggested, and now keenly-sought-for *Law of Organising Order.*

The most surprising thing about resonance is its "apparent?" focussing of available energies into the single vibration of a given structure, which is at a frequency natural to that structure's dimensions and construction – its natural resonant frequency! Now, normally, such structures do not display any dramatic behaviour: their properties are neither evident nor displayed in any revealable way. The Key to a resonant behaviour of such a structure, is when some adjacent or associated source of energy includes the same frequency as the resonant frequency of the system that is affected, and the result is that the latter structures begin to oscillate at their own natural frequency, getting their energy, at first, solely from the initiating source.
But surprisingly, the initiating source cannot be the sole provider of all the energy clearly concentrated into the resonant structure. The initiator certainly starts the process, but the much larger oscillation caused, must also be getting energy from elsewhere.

The proof is in the fact that the initiator alone will die away much more quickly than when it doesn't, than when it does, start a resonant effect. So, it must be getting energy back from the resonance in a recursive effect.

Clearly then, the resonance involves MORE than just the initiator and the resonator! Energy must also be being drawn in from elsewhere! And, if it is - where is it coming from, and why does it migrate to the resonator?

So, such questions and suggestions will certainly have to be addressed. The most important being from what, and why does the apparent extra energy come? What causes it to leave its prior situation, and move selectively to the resonating area, and enhance that particular frequency in preference to all other possibilities?

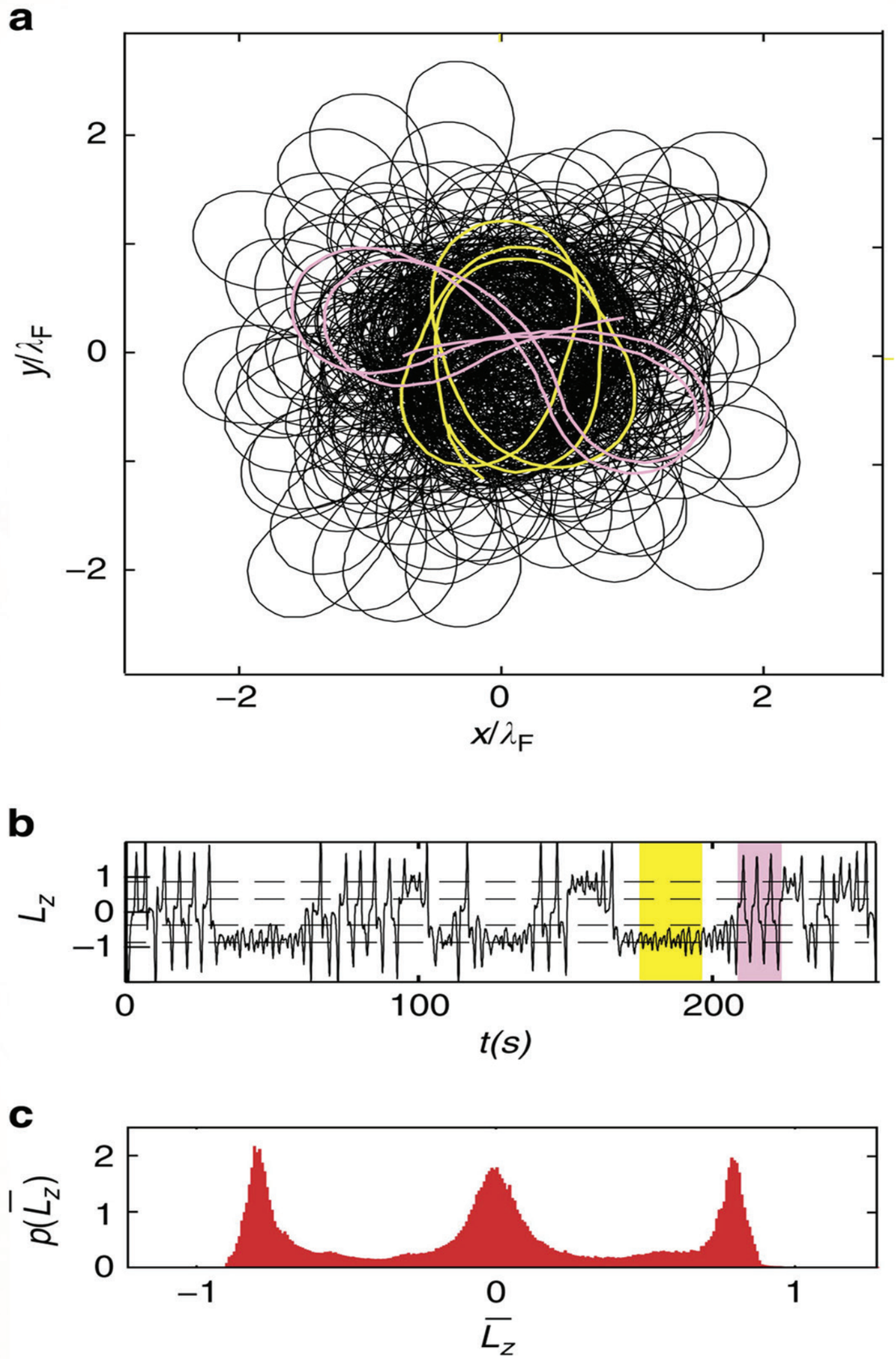
Now, if we, alternatively, consider that all the energy involved in such a resonance must come only from the initiator, with the very same frequency, we are surely immediately in trouble, for that would unquestionably deprive the initiator of much of its energy very quickly indeed. And then, the resonance too would also then cease. But, that doesn't happen!

Indeed, if anything, the initiator is somehow, if only to a degree, in receipt of energy back from the resonating part, and continues to vibrate longer than it would, if without any chance of causing a resonance. Some sort of recursion seems to be highly likely. Yet, this makes it even more likely that extra energy is involved, which must come from sources other than either the initiator or the resonator.

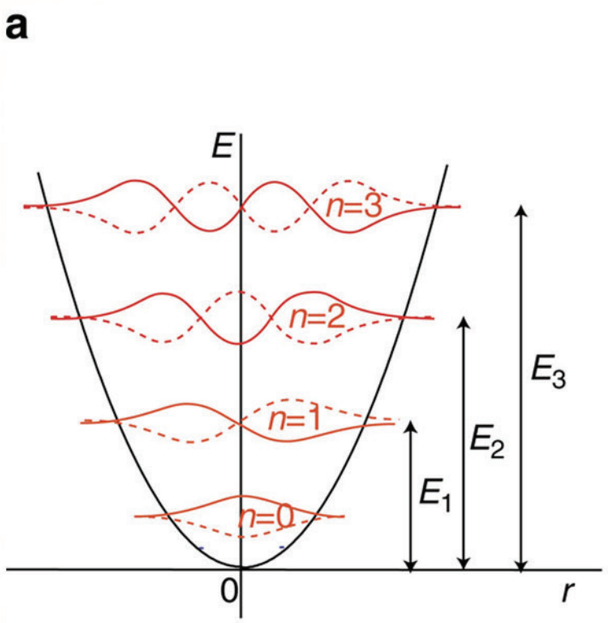
There must be a gathering of energy from elsewhere, though in intimate connection with the resonator, indeed, from any non-resonating parts connected to the resonator, and as that source isn't itself resonating, the energy must come from that residing in it as its ambient temperature! Where else? But, such a transfer doesn't take place without the presence of the tuned initiator. It is almost as if with the presence of that initiator and a corresponding resonant frequency within an affected structure, a whole set of other oscillations contributed to the resulting resonances. It certainly seems as if such an overall super system, that is not only the resonant frequency part and its associations, but also including the initiator becomes a complex interaction of interactions, resonances and recursions.

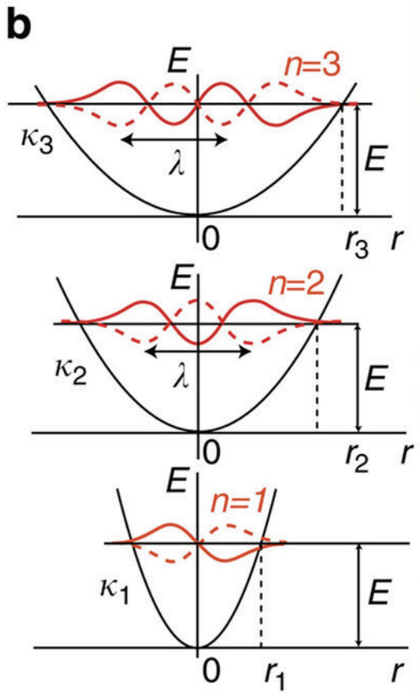
Simplified somewhat, the initiator sets the resonant part into sympathetic vibrations, and once it is vibrating, it both garners energy from throughout its overall structure (or even linked environment), and even gives some of that drawn-in energy back to the initiator by recursion.

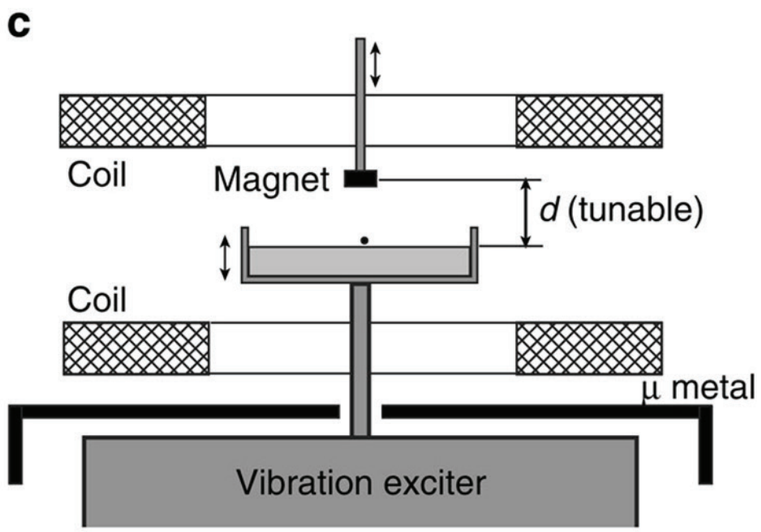
NOTE: One can conceive of a set up, fed continually with constant energy via driven oscillations, providing enough drawn in energy for such a system to continue as long as that reservoir of extra energy is kept going.

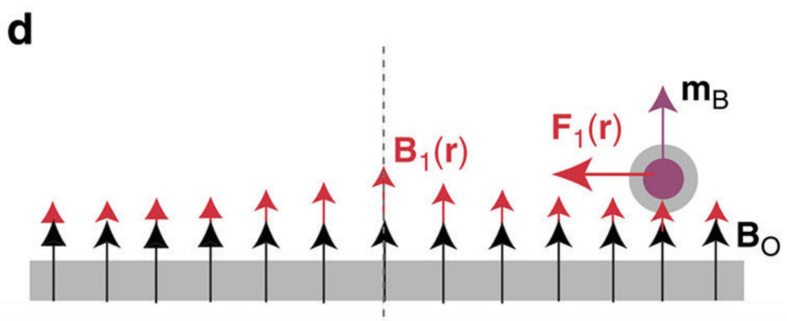


Yves Couder's experiment









This seems to be what happens with Yves Couder's "Walkers", that seem to be sustained as those persisting systems by the constantly replenished energy in the driven oscillations of the silicone oil bath.

Now, if all these surmises are true, the effect of a resonance will inevitably lead to a reduction in temperature of the overall situation, for it has been focussed into the resonance, leaving the source of the extra energy cooler.

Also, by some means the in-contact situation could be continually supplied with extra energy, the resonance might well be made to continue indefinitely.

Let us look away from our resonant situation momentarily, to get supporting evidence from elsewhere.

In so-called adiabatic expansion of a gas, where it is released from its container via a small hole, the usual Gas Law $PV = C$ gets modified to become $PV\gamma = C$. And, in such a phenomenon, energy is extracted from the environment to "fuel" the produced jet. It is how a refrigerator works, so it isn't just speculation. It is another example where a phenomenon once initiated, gathers energy from its immediate environment to sustain the situation.

Similarly, we might expect Streamline Flow and its ever-present peripheral turbulence to behave in a similar manner. And, perhaps, be even more informative, for instead of just considering the jet (in streamline flow) we have also to consider the clearly evident peripheral turbulence.

Now, as soon as such a phenomenon is introduced, we are pushed into supposedly non-linear situations, and into the darling of contemporary Mathematics – "Complexity", or more properly Mathematical Chaos (to distinguish it from the usual idealisation of Chaos, which is a kind of maximal randomness).

Already, these musings are far from being a comprehensive physical account, but that is what is essential. The Formal solutions of the mathematicians are singularly insufficient!

Now, these musings still don't explain why the energy is garnered into the resonance. There has to be a physical reason why this could be occurring. Somehow, there is an imperative for the energy to move to a naturally oscillating structure, rather than continue to exist as multiple independent and uncoordinated oscillations that are only meaningful, when taken overall – that is as a conceived-of scalar quantity, such as temperature.

There has to be a kind of analogy here with how competition was dealt with in this author's paper entitled Truly Natural Selection concerned with non living developments in Reality generally.

The Law of Creation?

What is the imperative embodied in the illustrious Second Law of Thermodynamics, which insists upon the natural dissociation of all Order into inevitable Chaos? And, in a Universe chock-full of Order, what unknown and clearly invisible counter law explains the exact opposite – the marshalling of Chaos into ever increasing Order? For, without the latter, you are only left with God – delivering a Universe of maximum Order, and then observing its inevitable decline!

Now, such laws as these are different in nature from all other laws, for they are all-encompassing, and are thus some kind of overarching Meta Laws!

A Universe with only one of these is totally incomprehensible, for it leaves all Order unexplained, and sees the only imperative of the Universe as its own dissociation and ultimate death! [In fact, Professor Brian Cox has stated exactly that in more than one of his "informing" T.V. series]

So, where, and what, is that necessary counter Meta Law? Why is it not in clear, observable evidence, and when and where did it build Reality?

The layman can be forgiven for not being aghast at this universally accepted position on these questions, for, apart from reasonably long-lasting stabilities, which do involve a form of Order, the only evident driving force in Reality is that of Dissociation and Decay: the moment the active forces of maintenance are ended, rapid and inevitable deterioration is bound to occur. The Second Law rules! O.K?

Yet, in spite of this clearly seen set of processes, the Universe is full of Order, with no evident way in which it actually came-to-be! Everywhere, we see the products of development and even progress, but nowhere do we see what must have caused it all.

You can see why Mankind found the need to invent Gods! If the forces for Order weren't evident all around them, they must be supernatural – elsewhere, but affecting our World in a constructive way.

Yet common sense insists that they must be here, somewhere, or, maybe, at some past time! But, for this to be the case they must be either well hidden, or only occurring in rarely, if ever, observed, interludes. And it turns out that both of these are true!

For, while dissociation is an ever present imperative (as the Second Law demonstrates), construction occurs in rare, episodic interludes, yet contains all qualitative development within its short and infrequent Events, which are, thereafter, embodied in long-lasting, stable situations.

Yet Mankind, itself, is so recent and young, that it has only experienced one kind of such Event - Social Revolution, and who would have thought that such total upheavals were the usual means by which real, innovative progress could occur in all things, and at all levels!

So, here is the supreme irony – that the sought-for law is hidden inside what seems to be an interlude of total dissociation. But, of course, the trajectory of these events only begins with a necessary cataclysm!

And, Social Revolution is so clearly only about Mankind, so why should revolutions occur in societies, while never being evident in everything else?

The reason, of course, is that Mankind is the latest of these developments, and its Emergent Events occur much more often than others occurring at more basic levels.

Yet interestingly, the realisation of such episodes was not first raised by revolutions, but in the trajectory of ideas in Human Thought by the brilliant German philosopher Frederick Hegel some 200 years ago.

He considered Philosophy as Thinking about Thought, and slowly began to understand the trajectory of ideas – the emergence of the entirely new within Thinking – all of which could not be other than invented stages, not, it must be emphasized, in Truth, but in the crucial path towards that Truth – and never as a straight, ever-upwards route, but always an unavoidably meandering path, with innumerable cul de sacs and falsely optimistic roads to Nirvana. For though Absolute Truth and its eternal Natural Laws were Mankind's objective, to even approach such an unattainable goal, Man just had to simplify and invent, which was done intelligently and pragmatically, but also inevitably flawed by his useful but erroneous inventions.

These various steps forward would indeed reflect Reality, but never perfectly, though each major gain and its consequent phase of developments would include more Objective Content than all prior phases. Man even recognised the inevitable crises that would occur along the way, due to those insufficient simplifications, assumptions and even overarching principles, which he had produced previously.

For, these would always lead to crises – that were caused by concepts, which, though seemingly true (at least most of the time) were always contradictory – indeed incompatible!

Hegel characterised these as Dichotomous Pairs, and insisted that the inevitable consequent impasses signalled that they were both inaccurate, and could only be transcended, via a vigorous attack upon both to reveal their common flawed bases. He called this method Dialectical Reasoning, and it was the first real breakthrough in understanding the development of Human Thought at a Meta Level, since Zeno's important contributions almost 2,500 years ago.

Yet, though Hegel's contribution was a profound achievement, neither he nor his dedicated followers were able to take it further.

The exception should have been in the major transformations of Hegel's work by Karl Marx, in transferring, wholesale, all of Hegel's Dialectics into a Materialist standpoint.

Though this line of development finally succeeded in informing an intervention in the 1917 Social Revolution in Russia, and ensuring its successful conclusion, that certainly wasn't the end of the now essential next steps.

Just as Darwin's contributions to the Origin of Species, with Natural Selection, had to then be generalised to deal also with inanimate matter, and the whole of developing Reality.

And, the gains of Hegel and Marx were also never extended to the next crucial area – Science. Though it was clearly essential to wed the gains of Science to those of Philosophy and vice versa, and in so doing transform them both, this wasn't done!

Indeed, only in the 21st century have the necessary tasks been taken up, with the Theory of Emergences and Truly Natural Selection by this theorist. Even the dreaded Copenhagen Interpretation of Quantum Theory that had been turned into the unquestioned basis of absolutely everything by the mathematical physicists, dealing with the Sub Atomic Realm, has now been addressed by a successful, alternative explanation of the Double Slit Experiments. Things are finally on the move, but what still requires to be addressed as the essential next step?

It has to be the inferred "Fourth Law of Thermodynamics" – the Meta Law of construction, development and evolution, which happens only in those short Interludes where after a seemingly terminal dissolution of Order, there is an innovative conversion of the produced "Chaos" into wholly new forms of Order.

And, the first vitally important experimental steps have been taken in the work of Yves Couder, the French physicist, who is fascinated by the interactions of separately produced vibrations, involving resonances and even recursion, and has constructed macro systems (strongly reminiscent of phenomena at the sub atomic level), which have these features, so tuned as to gel into stable entities – his famous "Walkers"

Of course, hardly anyone realised the import of these experiments, but, nevertheless, they embody the questions of Order out of Chaos, and construction rather than dissociation.

The answer to this hidden law is certainly in resonance and recursion, and in the Phoenix of creation arising out of the flames of destruction.

Garnering Energy: Resonance

You tap a tuning fork, and hold it aloft in your hand.

The sound produced is barely audible, though it is primarily of a single frequency, determined by the material, its construction and the dimensions of the fork. But, if you touch the prongs you would feel a continuing vibration, long after you cannot hear any sound at all.

You put a large gobbet of energy into the fork when you tapped it, but a large part of that would be communicated to the surrounding air, and gradually "lost".

Now, if you, after tapping it, placed its stem upon a suitably solid surface, the heard sound will be significantly amplified, almost as if you had put extra energy into the air. But, you certainly hadn't done that!

What had happened was that the surface, on which it was being held, could, in some way, resonate with the same frequency as the fork, and the extra energy involved was actually a general dispersal throughout the affected solid, which was focussed from everywhere else in the entity into what could resonate with the same natural frequency as that in the initiating tuning fork.

Now, this is important, for the amplified sound means greater energy in the sound communicated by means of the air in extended contact with surfaces – all oscillating at one of their natural resonant frequencies. The emitted sound energy has been amplified by energy latent within the resonated solid.

NOTE: Remember random energy cannot be so coordinated: it is composed of disturbances that occur in diverse ways and generally cancel out audibly or are dissipated as heat.

The question has to be, of course, "How does all this occur?" When a room is, say, at 19 degrees celcius, what that means is that there is a general ambient distribution of energy throughout that room, mostly stored as oscillations of all the atoms or molecules present there.

So, when a particular frequency is communicated to an appropriate object, which, somewhere or other, has at least a part of it with the very same natural frequency, as the applied oscillation, then the initiating frequency will garner energy initially from the causing source, and then subsequently from all available sources within the object. The object, instead of all its dispersed energy being distributed both in frequency and positions, will instead be focussed upon the parts with the same natural frequency as the initiator.

A musical instrument is a carefully constructed object, designed to have a whole series of crucial properties.

First, it must have built-in vibrator – a tensioned string, say, or a reed, and it should be in immediate and effective contact with the many carefully "tuned" constructed parts of the instrument.

A brilliantly designed instrument will be composed of an excellent range of resonant parts to fit any frequency delivered by the resonator. And, of course the player will not only be providing the best vibrations he can via the vibrator, but will also be making appropriate adjustments to emphasize the required resonant areas or volumes within the instrument.

Clearly, with such an instrument, and the proper playing techniques, whatever is delivered by the vibrator and the player adjustments, will cause the instrument to resonate with the required frequency, as energy is marshalled selectively into those resonant areas.

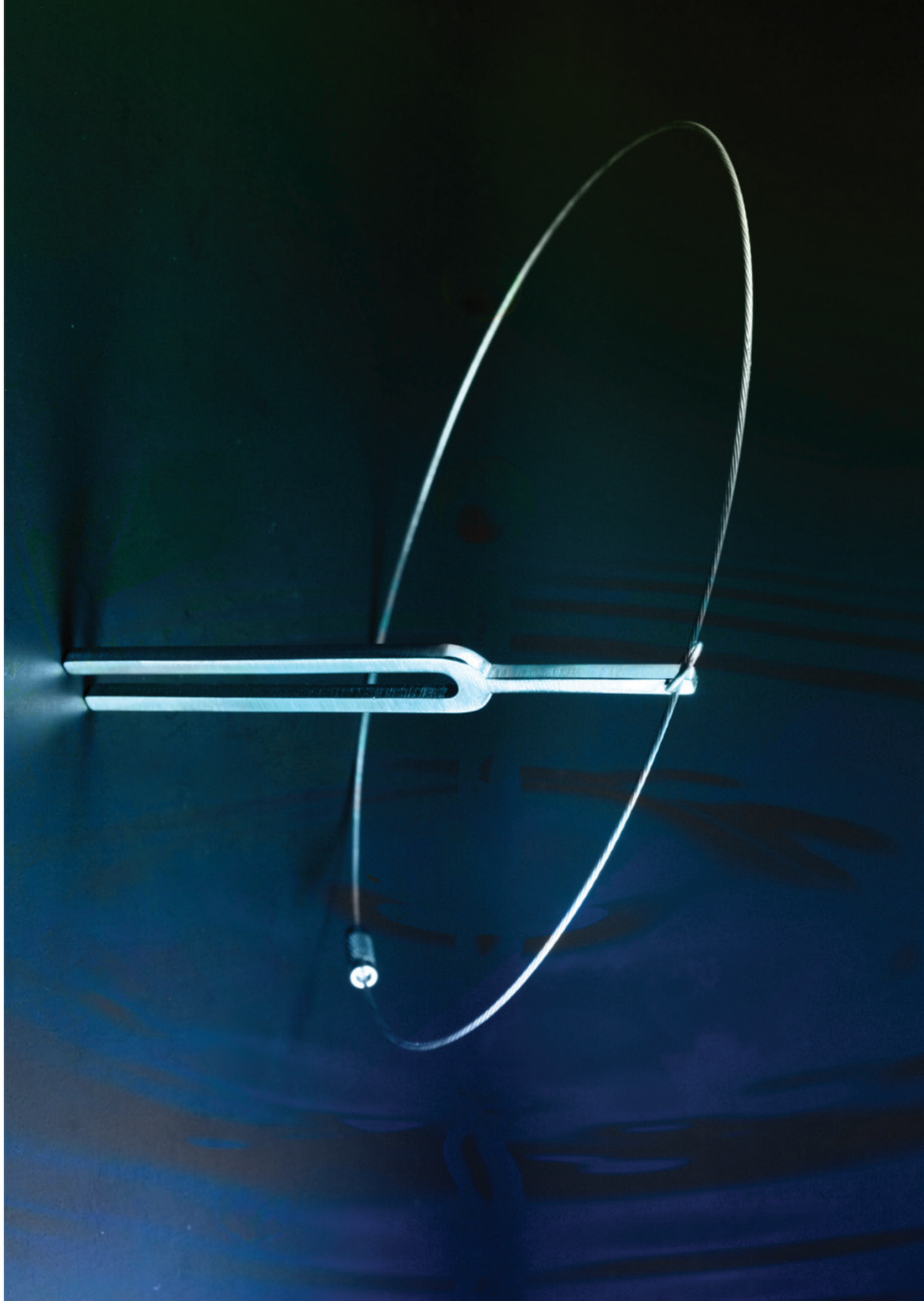
NOTE: An interesting feature of a good instrument is that the vibrator (though being adjusted somewhat by the player (as with the reed on a woodwind instrument, will actually vibrate with its own natural set of frequencies, and the resonator (the rest of the instrument) can then feed back to affect the performance of the vibrator. You have a form of recursion!

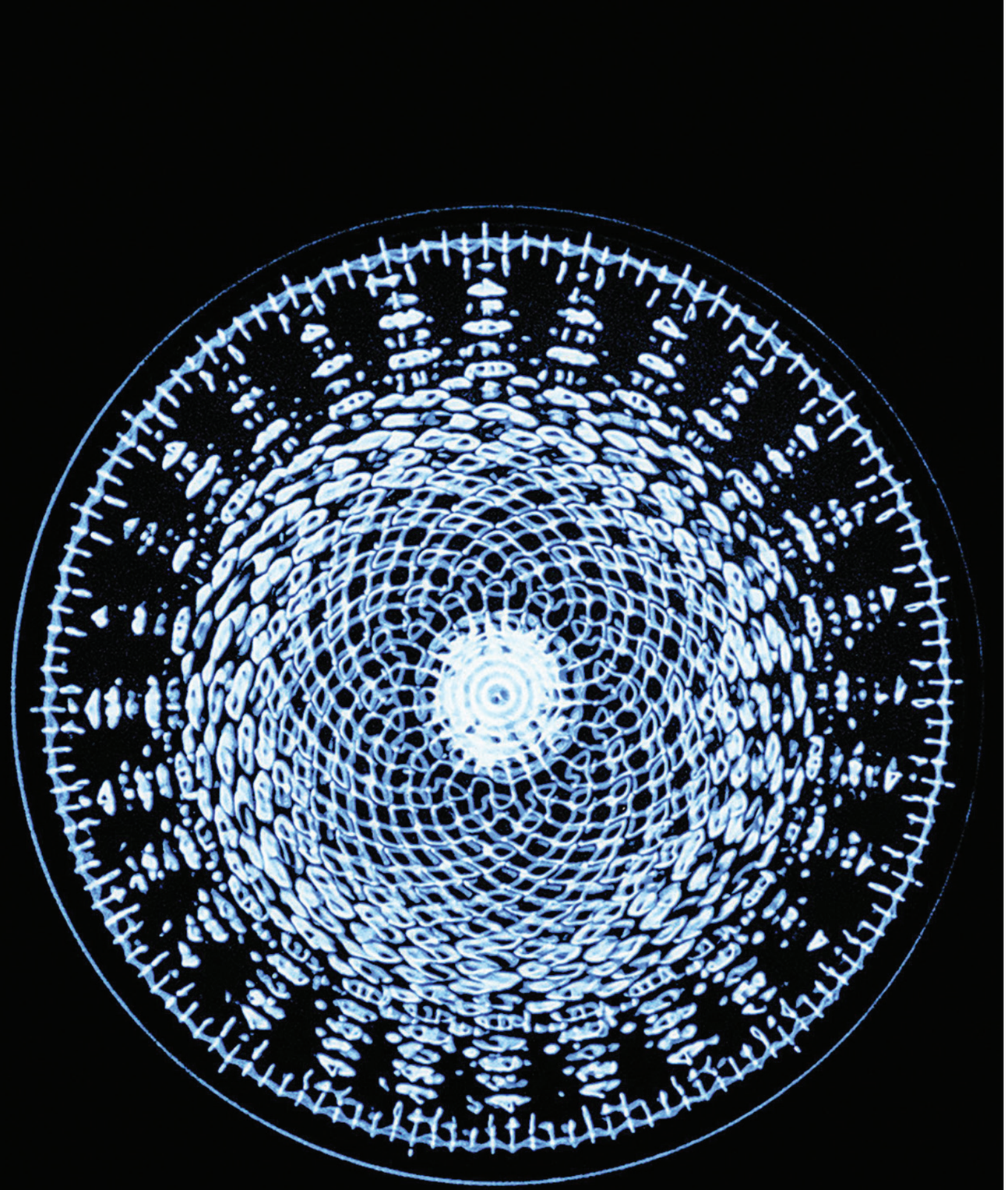
In other words, it is a brilliant means of getting all generated frequencies to be amplified by this focussing of available energy.

Clearly, the loud tones emitted by the instrument has more energy than is being put into it by the pluck of its string, or the vibration of its reed. It has harvested energy from all available parts to focus it in the appropriate resonant parts of the multi-resonant instrument.

More generally, all resonance involves this selection of the resonant parts, and the collection of energy to be focussed in the right parts to amplify the sound.

Now, of course, musical instruments, if they are any good, will have been purposely, and repeatedly, improved in design to resonate over a whole defined range of frequencies, but even so, they will not be equally resonant to all the required frequencies. So, to effectively exploit even lower frequencies outside an instrument like the violin's natural range, that instrument can be replaced by others like the viola, the cello and the double bass.





Now, away from such purpose-built wide-range resonators, almost everything has its own natural resonant frequencies.

A bridge at 19 degrees celcius will have everything oscillatable vibrating at diverse frequencies, so that, overall, none of them is dominant or even evident, in spite of the total energy involved. But, if an army, on the march, attempts to cross the bridge "in-step", that will sometimes be sufficient for a resonant frequency in a part of the bridge to resonate with the same frequency delivered by the marchers, and that part of the bridge will begin the garner all available ambient energy within it to resonate enormously with that part, and it could be sufficient to tear the bridge apart. It is NOT solely the energy of the army crossing it that can damage it, but that plus the garnering of all other energies present into a single resonating part.

NOTE: Of course, the question arises as to why such selective focussing of available energy occurs. What causes this surprising feature? Somehow, a natural frequency will get such energy like a self-feeding development – a positive feedback situation, like an avalanche, for diverse, small and contending (and of course currently non resonating) alternatives will lack this feature: the energy pours into the resonance like water down a plughole.

Now, this can also get interesting when considering events out in space! For, we blithely talk of Empty Space itself, somehow being at a temperature above absolute zero, so something in space must be oscillating, so that in some way, it is a repository of the energy involved. It is hard to see how a totally empty space could possibly have an ambient temperature, unless it too had some sort of content, which could oscillate, and hence act as a repository of energy.

Now, for some time, this researcher (Jim Schofield) has been addressing, and occasionally also solving, certain anomalies in the now consensus view of Reality in Modern Physics, by assuming a generally undetectable, but definitely responsive, Paving of so-called Empty Space. Such a Paving would be, at the same time, both seemingly invisible, and yet capable of holding and propagating gobbets of electromagnetic energy – termed quanta. And, this "would-be-medium" could both store ambient energy, as well as propagating any "above background" inserted amounts generated by various events within it.

Indeed, recent developments have been into how stabilities are related to both resonances and crucially also to the occurrence of recursion – where a source causes an effect, and thereafter that effect causes changes to its producing source.
It is, of course, a holistic way of looking at Reality, which doesn't predicate everything upon one-way reductionism, but includes such recursion, and hence top-down causality, as well as the usual bottom-up kind.

What seems to be important is how the resonance and recursion in complex multi-part situations, can lead to systems which persist – that is they are able to resist further changes, and are usually referred to as being stable.

Now, such situations are common and were originally considered as permanent in their persisting stability. Indeed, Mankind initially considered most things in this way, and one of the greatest inventions in dealing with such things was that of Formal Logic (with its Identity Relation – A = A).

Of course, such an assumption was indeed a good "first approximation", for many such stabilities did, indeed, persist for very long periods, in which they were at the same time less demanding on other things, or susceptible to change themselves than most other possibilities.

And the key to this being the case seems to be the recursive loop, for the usual effect of most changes would always be opposing of that change, so that the reaction was always to take the situation back to its stable state. Stability was a balance of effects acting simultaneously, which also always reacted conservatively to maintain such at balance. Clearly, such possibilities mean that normal persisting situations are invariably stable states of this nature.

Indeed, both scientific experiments, seeking to monitor situations over the varying of key parameters, and their derived relationships, are always predicated upon Stability. While any intervening interludes of major qualitative changes – the so-called Emergences, are usually never even acknowledged, never mind studied! The duty of the experimenter is to maintain the stability of his experiment at all costs, to enable the extraction of quantitative relations within that stability!

Now, it must be admitted that the alternation between stable situations and emergent episodes are very lop-sided in duration. Stability is long lasting, whereas an Emergence is very short – occurring in brief episodes, which are often impossible to follow? "Stir thoroughly and wait for equilibrium!" is the steadfast rule!

Thus, for pragmatic reasons, Science became the detailed study of quantitative changes within Stabilities! Generally, any brief interludes of significant change were ignored or hurried through to concentrate on the following Stability, which could be easily studied and its relationships revealed. Indeed, the characterisation of these emergent interludes was that what were occurring were extremely fast incremental, quantitative changes, within transitory, unstable conditions, which gave the appearance of qualitative changes therein, but which were always soon cleared up by the always-present imperative of Reality towards balance and stability.

It was the Laws that resulted that were considered important! But, that view of an Emergence just isn't true!

Quantity into Quality may appear to be the case, but it never is! AS Pagel proved with his studies of large amounts of data in the fossil record, covering vast periods of time, Species Change cannot be achieved purely incrementally: it is always a Single Transforming Event!

Clearly, we can never tidy away the creation of a new species as a mere return to significant balance! Such changes are vitally important, and our tidying away of such interludes – hides the most significant developments of Reality! Instead of concentrating upon a veritable “”patchwork of stabilities”, it must be the Emergent Interludes that deserve the most detailed study!

Now, we have talked of resonance and recursion, but these can be dissected into mere mechanisms. Clearly, what actually occurs within an Emergence is much more complicated than that, though Feedback in recursion is an evident component of stability. And resonance can be understood quite straight forwardly in musical instruments, in complex mixes of independently caused vibrations it is possible to get very unusual resonances, especially when integrated with recursions.

For example we all know about armies crossing bridges and avoiding a catastrophe by breaking their step. But such a calamity is a “downhill” situation ending if observed correctly, in a terminal event.

But, in other situations, it is the catastrophe that is vital in what it causes to follow!

Major dissociations of stability in Emergences are vital to allow the wholly new to emerge, but such situations require special circumstances: the bridge certainly isn't one of these!

Indeed, by appropriate coming together of multiple vibrations it is possible that a particular stable outcome can be possible, even at a relatively simple level (as in Yves Couder's current experiments) with several oscillations and orbits with separate origins, synchronising into both resonances and recursions, with various energies being garnered produce an unexpected and, in fact, whooly newstable entity as a result.

Yet, such investigations are only just beginning to reveal the much more creative and constructive contents of an Emergence Events. Let's face it; what is a Social Revolution but such an Emergence, though on a major scale.

The new direction for Science must be the Study of Emergent Interludes.

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