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SCIENCE
FACILITY

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FORM: PREDICTIVE OR REPRESSIVE
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DOES SCIENCE ASK THE RIGHT
QUESTIONS?**

**RANDOMNESS?
SHADOWS & MIRRORS**

Shape Journal

Issue 23

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Editorial

Welcome to issue 23 of the **SHAPE Journal**.

This issue of SHAPE Journal reflects yet another turn in the nature of a standard Issue of the Journal. Both the Journal and its Blog have developed considerably since we originally conceived of them almost 3 years ago. In particular the instalments of extended papers over a series of Issues has proved to be less than ideal, and we had to institute Special Issues, wherein a topic was more comprehensively addressed by a series of complete papers all-in-one-issue.

But, though highly successful that didn't solve the problem of the so-called Standard Issue, so various alternatives have been considered at length. Today's Issue will test out a different form for such Issues, in that it gathers together in one Issue a collection of short articles and even reviews, which when taken as a set (though certainly not designed as such), reflect better our general and, we believe, unique approach. Many of these kind of papers have been published separately on the Blog in the past, and that will still continue in the future. But, we felt it to be essential to not only publicize the Journal on the Blog, but also vice versa

This short collection does have a common basis and demonstrates it, though they were written at different times for individual purposes. They demonstrate our general approach and its concern with philosophy and method in many spheres of Human activity

The Blog, meanwhile continues with its series on Socialism, and advertises an upcoming Special on Christopher Caudwell's *The Crisis in Physics*.

These are as usual available on our Blog at :-

<http://theelectronicjournal.blogspot.com>

The policy of regularly producing Reviews on our Blog is continuing, so this will indeed continue to happen at regular intervals from now on.

Read and enjoy, and if moved to do so, react! Send us your views for publication in the Journal.

We look forward to such reactions as they inform us of what our readers require. Left to ourselves we will not necessarily produce from our prodigious store of work in the best possible order

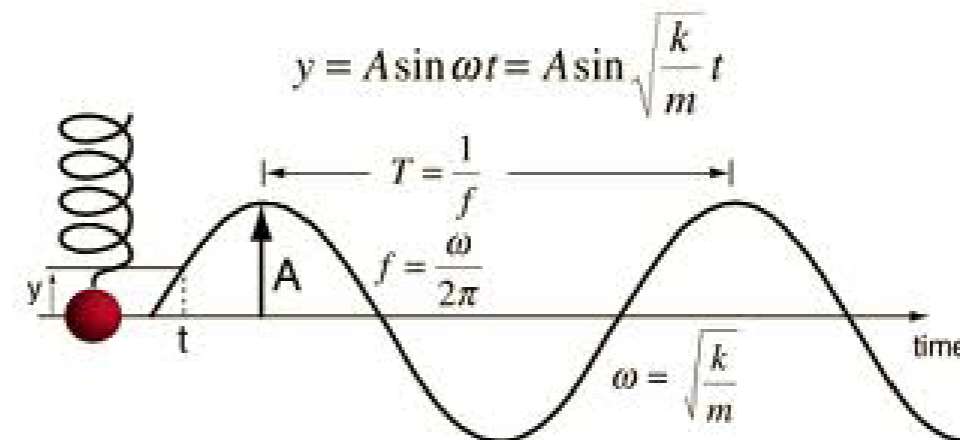
Jim Schofield March 2012

Formal or Concrete Reality (Idealism or Materialism)



The Quark does not explain the Jaguar (or Snow Leopard for that matter)!

The problem with Mathematics is that it doesn't deal with Reality-as-is, but with abstractions from Reality – common ideal patterns occurring in various particular situations where a mutually defining subset of factors has become dominant (**not all** factors involved, notice, but a **selected** closely-interacting subset).



But, such abstractions can, in certain circumstances, be effectively **used** in Reality to predict situations, where a formal relation exists, or has been made to exist. Now, if the above seems contradictory, it isn't, for Form definitely arises out of situations possible within Reality. But notice the word "**arises**" and its direction – **from** Reality **to** Form!

Yet nowhere is any one of these Forms a **singular** and *separable* feature of the concrete World. For, if that were the case, the World would be entirely **pluralistic**, and separable and formulateable **Parts** could always be taken, *unchanged*, from any given **Whole** concrete situation.

But, that is never true! For the mathematician is like a collector, who gathers all such Forms together and studies them entirely in their own formal terms. He becomes an investigator of Pure Form removed entirely from any concrete context, and his Collection is considered to be the crucial Essences of the World.

But the Real (existing) World is not **pluralistic** but **holistic**, and all discernable Forms glimpsed within it are the products of only some of all the contributing and mutually affecting factors present. But, as soon as we analyse from one level to the next one below, we find that same holistic nature always pertains. Thus what we thought we had extracted as an absolute and wholly separable Form dissolves before our eyes, and it is immediately evident that, in that context, it is not absolute but *particularly* produced by many things acting together and upon one another. It is NOT absolute, but produced immanently by its context.

Reductionism generally is a Myth, but pragmatically useful in **particular** circumstances. It is neither continuous nor infinite as we often suppose.

Nowhere can any situation be analysed layer-below-layer all the way down to a set of Fundamental particles and their basic (and eternal) formal relations of interaction.

Now, of course, this position will be immediately rejected by all current physicists, because the assumptions outlined above are the most “solid” and dependable bases that they have.

And, since the almost universal acceptance of The Copenhagen Interpretation of Quantum Theory in the 1920s, they consider that they **know** otherwise!

But do they? Could it not be that they confuse Pure Form – the subject of Mathematics, with Form as glimpsed, or even engineered to be extracted out of concrete, holistic Reality as a “defining Essence”?

It is my contention that such is precisely what they do.

And the consequences are “**dramatic**”, yet also *devastating*! For they believe that Form is primary, and makes the concrete World what it is: they are idealists!

But, at the same time **none** of their engineered Forms are actually eternal. As each situation is further investigated, laws at the initial level are shown to be entirely produced by situations *within* that level.

NOTE: But we must address the recurrence of particular Forms in widely different and causally unrelated area of Reality. The same patterns occur everywhere. Now, clearly, they are NOT primary drivers for in all their appearances they dissolve into very different consequences as we move beyond their limits of applicability. They are merely **common patterns**, which will appear when certain conjunctions come together for quite different reasons to produce a given pattern.

That is why a Form explains **nothing**! It is a description of a pattern, and hence its embodiment in an equation is STILL a description, and **never** a Theory. For a Theory must explain the reasons for behaviour. “Obeys this equation” is NOT a Theory.

Now this standpoint, in spite of the mathematicians’ valid and useful work (when they legitimately investigate Pure Form separately from its particular instances in various contexts), is also, most crucially, that of today’s so-called mathematical-physicists. And *there* has to be declared as wholly untenable.

For it is soon seen as the essential core that *drives* Reality: it turns materialist scientists into idealists, where the law precedes the concrete actuality.

But clearly, that has been our way of dealing with a largely opaque holistic World.

We extract Forms where they are evident, and construct the best possible conditions to reveal those that are hidden, and collect those “driving essences” for prediction purposes.

Yet, as with all Collections, they only really tell us about the collection (as defined) and NOT about the causality of Reality at large.



Shadows and Mirrors (Ways of Seeing: Abstraction)

Mirrors have a lot to answer for!

They are, of course, infinitely better than using your shadow when combing your hair.

But nevertheless they still only deliver a strictly limited frontal view. And though in constructing mirrors, we seek to remove all possible imperfections, in order to make the delivered reflection as “perfect” as possible, it is still only a non living, immediate reflection, and also, always, and inevitably, either reduces or even distorts what we see in one way or another. Imagine only being able to see the world via such reflections: even crossing a road would be something of a lottery.

But, I must clarify!

I am using the analogy of the mirror to reveal the imperfections in how we often are forced to “see” – and that includes *scientifically*!

Nevertheless, this may still seem a very odd way to start a paper about Mankind’s efforts to understand Reality, but it is a good analogue for what we do in science, where we depend enormously on various devices to deliver what is going on, and these are certainly a lot more like a mirror than the integrated range of senses coupled to a coordinating and interpreting brain that are our usual “ways of seeing”.

Such analogues do expose difficulties.

For I have long likened Mathematics to the study of the shadows cast by things in Reality, because it is the Shape or Form that we study. We do not, in that formal subject, ever study the complete object, but only its shape – somewhat like the shadow it casts!

And of course, any particular shape (Form), whatever it is, can be “cast” by a whole variety of very different and unrelated sources. They have the same shape, but not the same cause!

So in Mathematics, we deal with Form *without* Content.

And, of course, that offspring of studying our World was, and still is, very fruitful, for it purposely removes all concrete content (and extraneous simultaneous elements) to deal directly and simply, with a particular shape alone *in its own terms*.

The very same Form could be studied separately from *any* of its possible embodiments in concrete Reality, and the gains to be made by this form of abstraction are indeed remarkable.

For Mankind, in dealing with such a universal representation, learned to deal with such things in very new ways, which could never have even been imagined when all that was available was the particular concrete and complete cases. Something common and abstract to all these cases was instead the subject of our considerations, and we began to do wholly new things with it, when it was looked at from that single angle. We learned to formulate this extraction symbolically, using placeholders for all the actual variables that could occur in its various embodiments: **abstract** symbols were related to one another, and not only for given instants, but to be in a correct relation over a whole legitimate range – an **equation** of these symbols was born!

But, right away, there was a problem.

Seen purely mathematically, the relation did not (and could not) include its **limits**. For in different contexts, the same equation (form) would fail at very different points in what Mathematics always implied was an *infinite* range. For such an *abstracted* equation was a fits-all abstraction – the “shadows” may be the same but what was “casting” them were intrinsically different!

NOTE: This author later defined Mathematics as the study of form *removed* from Reality into a world of its own – the World of Pure Form alone – the World of **Ideality**!

Now, this major limitation was for most uses, far outweighed by other major integral advantages in dealing with form in isolation. For, as long as it was used within a legitimate context and range within Reality, for particular values of a key variable could lead to **predictions** in another **crucial** component.

This was certainly a very powerful advantage, for extrapolations into as yet *unmeasured* areas could predict what had never actually been experienced.

Such equations gave the impression of profound understanding, though in truth, that “understanding” was *only* of the involved Form, and NOT the real World intrinsic and concrete causes.

Now, that was a powerful analysis of what Mathematics was, and what it could do, but it was followed historically by the further careful study of given phenomena in Reality in themselves – not merely their Forms!

And these studies looked for reasons and indeed actual causes for what was happening.

Science was born!

But, as before, we had to find a way of revealing a great deal more than had been available when all we sought was Pure Form alone – the “shadows” of Mathematics!

Content had to be dealt with, and causal explanations found – “*Obeys this equation*” was simply insufficient.

Clearly, we needed another profound property apart from Form (like the latter, delivered something similar to studiable “shadows”, which could be extracted from the concrete and studied in depth).

But, this time we had to be able to “*abstract-out*” Cause!

Once again, we constructed a “way of seeing”, which could indeed help considerably, and the best analogue I can think of is to see this new means as a “**kind of mirror**”, and what we saw by this means, as a reflection of Reality.

Now, as already stated, a reflection is worth a thousand shadows.

It moves with Reality along with its sources there.

But what we see depends on the nature of the “mirror” and where we put it – its reliability as an image reflector, and the appropriateness of its chosen position.

Certainly, if we were to run about with our “standard plane mirror”, studying its varying reflections for all sorts of different position, we would get very confusing reflections.

So, we decided to keep our “mirror” stock-still – indeed to cement it in place to allow no movement at all!

So, though we got a remarkable Technicolor image, and by moving ourselves around we could see a range of its components, as well as seeing all actual movements of the thing reflected, we had limited ourselves to a *particular view*, and in particular conditions – often highly organised to both simplify the situation, and limit the contributing factors involved.

But, let us be crystal clear, what is being described here is indeed the famed “scientific experimental method” – the establishment of a fixed Domain to study. And, once again, by so doing we did indeed limit what we could see, and studied that for answers.

To put this methodology absolutely correctly, we found another way to abstract from Reality by limiting, indeed simplifying, the elements to be related.

But, in so doing, we concreted-in an important basic assumption – that of **Plurality**.

And this ensured a crucial distortion, by our chosen mirror, of the section of Reality being studied. For we assumed, that by our simplifications and exclusions we had NOT *affected* the sought-for relations that were involved, but merely **exposed** them for extraction.

Now Plurality assumes that you can do this: that all relations in a complex situation are quite *separable*. They may “add-together” to give a complex mix, but these individual components are not themselves **changed**: they remain as they are, whether alone or simultaneously acting along with many others.

Thus any means by which each and every component can be accurately extracted will, in the end, explain what is going on, and can be used with complete confidence.

Thus, based upon this principle, and over a given range of circumstances the resultant extraction would be entirely valid: the essential nature of that component relation had been revealed.

But, it, most definitely, wasn't valid,

Plurality is false, and in different circumstances that extraction would be an inaccurate reflection of the actual causality involved.

Our assumption was that whatever we saw was due to a mix of *separable* contributions, but that is not always the case.

Indeed, it only ever even approximates to being valid in stable situations, And though we can get away with its errors by repeating, as accurately as possible, the exact same context, as soon as we have *changing* circumstances, with evolutionary developments of any kind, Plurality turns out to be totally false.

Out "mirror-methods" never work in a period of significant innovatory change.

We thus exclude all development from our banker methodology.

You may ask, "What can we do about it?" And the answer is not to be found in Physics, though Charles Darwin certainly found a way!

FORM: Predictive or Repressive? *(Plans to Reform State Education)*

Does imposed **Form** lead to new **Content**?

Let us, in addressing this question, take the interesting question of the politicians' role in redefining the structure of Educational provision in a country, and see what their actions actually cause to happen. Is it ever what they intend?

Whether the policy makers are rampant Tories, liberal paternalists or committed leftists, they see progress in Education (from their very different standpoints) as being solely a "matter of Form alone", and, of course, they do it always **within** the current social and political set up, and only very rarely as part of a Social Revolution.

By imposing Comprehensive Education, or by the Re-introduction of Grammar Schools (in whatever guise), each group is sure that they will achieve their "social" aims. But is it true?

Do they actually achieve what they intend (or more important still, what they say that they intend)?

They, of course, are sure that they will, because they can look at current or past systems (Formal set-ups) and clearly identify exactly how they maintained certain social inadequacies (or even social privileges) and, by changing them, expect to reverse any unwanted effects.

NOTE: Such misconceptions do not only apply in Education. Another similar mistake has often occurred in Architecture, when designers intended that the nature and layout of areas of residence or work could be made to radically alter the lives of those who used them. But such ideas always did something very different, because such purely **formal** changes could never radically adjust the social structure in which it was devised and carried out.

But they misinterpret the past, and mistake appearances (Form) for actual causes. What resulted from past systems was not what was intended by their inventors and constructors.

The Forms were always, in the end, and *conversely*, defined by the Content, and sometimes they did the exact opposite of what was intended.

In my own period in education (a long time ago) the very anathema of the Grammar School System – the 11-plus selective exams, did allow bright working class kids to get a better education, and even go to University. But, the transformation of these "new assets" into extra resources for the status quo did not always work out as planned, and this influx into the holier than holy citadels of Higher Education, may have recruited more converts to the Middle Class, but also totally transformed most of these prestigious institutions into hotbeds of radical politics – certainly NOT the original intention at all.

And again in my era, the educational theories out of Leicester University on Comprehensive Education – formulated by socially committed labourites and even communists, and introduced nationwide by the next Labour Government, did remove that **dreaded** examination, but also watered down the education based on the prior Grammar Schools, so that the possibilities for the brightest working class scholars were not permanently increased, and instead of dedicated teachers confronted with the majority of discarded youth, with which they often did a great job, were instead given the whole range of abilities in the same school, were soon concentrating their efforts away from the majority, whose education was at times deplorable. Again, changing the structure (the Form) did NOT produce the intended qualities (the Content). It was, I'm afraid, a myth. Indeed, that is not to say that excellent work wasn't carried out. It certainly was, but it was never a consequence



of the Form imposed, and frequently it was frowned upon, because real education isn't easy to assess. High quality educational advances were made, but it was in the interstices of such systems, and the looser were the top down controls, the more successful were the innovators in educational ideas.

Indeed, the only way that Form could determine Content was found to be in repressive control. It could work well in maintaining the status quo, but never in instituting radical progress.

NOTE: As was discovered by the research which culminated in the *Theory of Emergences* (SHAPE Journal 2010) revolutions are always followed by markedly conservative regimes, necessary to maintain the new structure, to stop its conversion into something antagonistic to the new status quo.

So, new Forms, even when instituted within the torrent of major changes that is a Revolution, cannot, as such, be relied upon to foster continual advances. On the contrary, it will most likely be dedicated to the preservation of the new order, and will oppose any wholly new changes.

Valid Uses of Randomness?

Having started considering how randomness occurs as Random Noise (in experiments), and in descriptions of cumulative phenomena such as the Gas Laws, a more thorough-going analysis seems called for, as there is a general assumption that randomness is a reasonable model in many diverse circumstances.

I, though, am not so sure, and believe that we can, and should, expose areas where it is assumed inaccurately, or indeed erroneously. Yet a general and complete treatment cannot be undertaken without first exploring the current range of circumstances and uses of randomness, so initially I will be exploring that range and adding differences to the pictures of use.

I have elsewhere criticised the Big Bang Theory of the Origin and subsequent Development of the Universe for many different considerations, and one of these involved a particular assumption of randomness. In that theory, we had a supposed starting point of a Physical Singularity – a dimensionless dot, NOT in this Universe, but indeed its sole Origin. If such a thing were possible, it could ONLY be perfectly symmetrical, for where could any asymmetries originate from? But NO Universe such as ours could possibly emerge from such a situation. To get our Universe demands asymmetries *from the outset*. The subsequent development of stars and galaxies would be impossible from a perfectly symmetrical expansion. Yet this example is characteristic of much so-called theorising. Asymmetries are smuggled in wherever it simplifies the explanation. In this case the use of terms like “explosion” and “fire-ball” (which in the current world are always asymmetric) enabled a “sleight-of-hand and imported asymmetry “within the nature of the Event”.

My reason for bringing this up here is that such “tricks” are everywhere evident in the way we “fill up the cracks” in our ideas. Our “polyfilla” of explanation is very often randomness and asymmetry. It is extremely handy that enough asymmetry can generate randomness, which is then susceptible to mathematical handling. I have also written at length on the favourite “explanation” that is called Broken Symmetry. In certain circumstances where a particular symmetry is well entrenched, a sudden change in this symmetry – termed Broken Symmetry is brought in to explain the inexplicable change. I was able to show that a proper investigation could reveal exactly why this occurred due to **physical** reasons. Making Broken Symmetry into an “explanation” is frankly the sort of thing done by mathematicians, NOT by scientists.

Now, you may wonder why I am making such a song and dance over a rather clever invention of Mankind. This approach has certainly yielded useful Form, seemingly out of total Chaos, and allowed effective models of the “inexplicable”!

But, isn't that always the case? These are inventions, and as such, though they can be entirely appropriate and useful in certain contexts, they can also be a major temptation to sweep a difficult situation “under the mat” – precisely as I described in connection with Broken Symmetry, where NO proper explanation was even thought necessary and hence attempted.

Considering quite a different slant, randomness (or whatever it is we are actually dealing with) is perhaps too important to be tidied away into a single easy Form.

Perhaps we need to think about it more deeply?

Let us start with the classic model. This is used wherever there are multiple, conflicting factors at work. In such situations, such as multiple and varied collisions of particles, they can, in time, produce a result in which all directions and speeds can be equally represented.

The revelation of the nature of the Brownian Motion showed that “perfectly still” air was in fact buzzing with a kind of random movement. Einstein (I believe) explained that the movements of the pollen grains or cigarette smoke were most probably due to impacts with the incessantly moving molecules of the air, which,

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because of their random nature did not result in bodily movement of the air as a whole. So, we had motionless air FULL of movement. The effect produced so many collisions that the “equilibrium condition” was one where all directions were equally represented, and all possible speeds also present. This “smoothness” of result allowed our models to be used in the Gas Laws. Such a use is entirely legitimate and extremely useful.

But, is it always exactly like that?

The Brownian Motion revealed something of the rate of collisions in any given volume of air, and this also revealed the overall number of collisions was certainly sufficient for our modelled result, but what about Enclosure?

Our Gas Laws presume an enclosed gas, and certainly, in such a space, collisions with the sides of the container impose an equal sharing of directions.

What about NO enclosure at all, as, say, in Space? With no “reversing walls” representing all directions after many collisions, the possibilities will be primarily determined by the initial movements of the molecules ONLY, and then subsequently by the proximity of things to bump into – the density of the Gas.

What if all particles were initially moving in ONE direction only?

How would the situation develop after many collisions?

With no walls to reverse things, a given overall directed momentum, and all potential collision partners generally moving in the same direction, it is hard to see how this general direction could in any way be “cancelled out”. You would expect a different result, where “relative to the population as a whole” we would have random speeds and directions, but with a superimposed general overall movement still persisting.

Let us take another case – almost empty space with very few particles passing through. The density of such being so small, and the particles themselves being so tiny, that collisions would be indeed rare.

What can we say about such circumstances?

Well, if we give the situation truly vast periods of time, it might well approximate to our perfect standard model, but just how long would it take? Such an imagined situation calls up interesting cases.

I always remember, “Stir thoroughly, and wait for equilibrium before measuring!”, in innumerable chemistry experiments.

How about at the very edge of the expanding Universe?

At such a boundary it must behave like boundaries everywhere in our normal experience. It must be basically unidirectional – that is outwards. There would certainly be nothing “beyond” to impose a “return reflection”, and some sort of surface effect must be in evidence.

It must be the case that a Universe of currently finite size must expand owing to this boundary effect alone!

Moving on to yet another situation – Space in the vicinity of a star –in such a situation the nature of any particular volume of Space MUST be dominated by a general flow of material AWAY from the star – the Solar Wind.

We must determine what would occur to particles in such a situation? Surely, in spite of a separate origin of these particles, there would have to be a general movement outwards of anything that was previously present in the given volume. Any particles NOT from the star would be unavoidably wooshed into the same general movement by innumerable collisions.

Let us next take a much more mundane situation and compare an experimental enclosed volume in the Lab with various stages of removing the enclosure, piece by piece.

Using a hot cup of tea as the initial model, the tea, and whatever is happening within it, is kept enclosed on all sides except the open top. All movements within will be bounced back into the body of the tea, except at the

surface where the faster particles heading generally upwards will escape (evaporation).

We would immediately conclude that as only the fastest particles are escaping the tea would get colder and colder. This is obviously true, but by the same reasoning, the general direction outwards and upwards will be regularly being diminished among the remaining molecules.

Does this also matter?

Well, certainly it matters if we move from cups of tea to scientific studies in the Lab. We have to separate the contribution of the walls from the intrinsic contribution of the individual particles We have to conceive of exactly how a population of particles would end up without walls. The walls, after all, make it very easy. They equally represent ALL directions, and therefore, in time, will impose a general equality of resultant directions of the particles. But, can we assume that the population of particles in space can have the same effect?

NOTE: As an aside here we must remind the reader of Relativity, where laws are the same whether a situation is stationary or moving, AND if moving, at whatever velocity.

The very emergence of original directions needs explaining. To attempt this we must assume some initial starting characteristics. If our population was created within the given vicinity by separate and dispersed events, then they would certainly represent all directions equally to begin with, and the following multiple collisions would maintain that pattern. But that is surely a special and unlikely case?

Is it not reasonable to also consider that the particles arrived in our designated volume from somewhere else?

Of course it is!

Again, they could have been created and impelled upon their way by many different events and merely arrive independently in our chosen patch of Space.

Once again, with sufficient numbers and variety of directions of entry, the same sort of random result seems reasonable.

But, what if they ALL came from a single Event – distantly situated?

To arrive at our piece of Space they must all have the same direction of trajectory, for otherwise they wouldn’t be here, but elsewhere. We can assume a variety of speeds, which would cause collisions, but because of the generally shared direction, these would NOT affect this aspect, but only randomise speeds. Surely, a body of particles from a given source with NO external interference could only end up as a very organised set. Indeed, if it was a continuous source (and hence continuous stream), I can only envisage an equalling of speeds!

Note: **The Coherence of a Received Stream.**

Let us consider a single, distant source of particles.

They would presumably be initially set off equally in all directions from that source, so they would diverge continually, always getting further and further apart.

This, of course, is packed with all sorts of assumptions about the nature of the source, but we are speaking generally, so that is all we can do.

The greater the distance travelled, the fewer particles will remain in the same general direction, and the more homogeneous in both direction and speed would the stream become (otherwise they would certainly be elsewhere).I reckon that any collisions within such a stream will increase the speed of the “hit” particle, while reducing that of the “hitter”. In a stream, speeded up particles could themselves catch up and hit forward particles, and be slowed down. So we can envisage an averaging of speeds in the body of the stream, while the leading particles ONLY would only be subject to increases. Later particles would certainly have as many “hits” as “being hit”, so we can see an averaging of speeds taking place.

Apart from precursors at inflated speeds, the stream will be generally uniform in direction and speed. The divergence since creation, more or less prohibits sideways hits, leaving only the basic intrinsic divergence from their origin.

Now, this idealised model should be appropriate in situations like “shooting star showers” (when new). Precursor particles would be scarce and fast, then the main body would arrive – all very similar in speed, while at the end will be the trailers, which were slow from the outset and had nothing behind them to bump them into higher speeds. Any deviations from this pattern would give us pointers as to the real nature of the stream, both in its origin, and in its subsequent history where external interactions would change the nature of the stream.

On the other hand, a coherent stream close to the model would allow quite useful features to be revealed. The above model suggests that any distantly observed stream will be limited to a very small origin position on the producing source. In other words, when we observe such a stream, we are sampling from a very limited area of the source. It would be interesting to see if our source was entirely homogeneous by carefully gathering data from that precise direction as the earth moved round its orbit, as such movement would cause reception from a slightly different part of the surface of the source. In a similar way, a spaceship could widen this range even further, and thus extend detailed study of a region of the surface.

“A Darker Shade of Dark”
“Are we not seeing the trees for the wood?”
 (NEW SCIENTIST (2846) January 2012)

Cosmological Researchers are worried!

They are afraid that cosmic rays will spoil their search for seemingly invisible and indeed undetectable **Dark Matter**, so they position their laboratories deep underground in mines. But, their indirect detection systems give different masses to what they detect (presumed, of course, to be exactly what they seek) – Dark Matter particles. But, whatever is interacting with their detectors isn't consistent over their various different methods.

“If Dark Matter does not exist, it means that our understanding of gravity. On the largest scales is wrong”, is the ringing quote, and here is another **“...undiscovered particles that would have played a big part in the interaction of ordinary matter in the extreme temperatures just after the Big Bang, but now loaf around, having lost most of their potential”**

Now, this latter phrase, whatever its author meant by it, is somewhat similar to how the writer of this paper sees his postulated Empty Photons – to which he ascribes the actual establishment of within-Universe Space – via the long ago active front that extended the Universe following the Big Bang.

For though that phase and those particular properties and roles have long gone, these entities, now empty of transferable energy, but still capable of taking in individual quanta, and by induction, passing them on, are now seen as the universal medium for the propagation of all E-M radiation in so-called Empty Space.

Now, the reader may, with some justice, wonder why these entities have been introduced into the discussion based upon that single possibly “throw-away” quote.

But, there are other reasons and they may be relevant to the nature of Dark Matter.

Various candidates have been suggested for what the sought Dark Matter particles might be.

Weakly Interacting Massive Particles (WIMPS) with a mass of 100 GeV (100 times the size of a proton; and 200,000 times the size of the electron) have become a major candidate, mostly, it seems, because they fit in with astronomers' calculations of exactly how much matter seems to be missing to explain the current Universe.

But, weakly interacting entities of such a size (100 times the size of a Hydrogen nucleus), and presumably occupying most of the Universe (85% of all matter) would surely not be this difficult to spot? And current estimates from several different experiments, seeking these ubiquitous yet hard to see particles, seem to point to a candidate of about 10 GeV.

De Vega (in Paris) proposed a Dark Matter particle of only 0.1 GeV (1/10 the size of a Hydrogen nucleus), and suggested that it was probably a kind of neutrino.

And yet another suggestion is of a so-called Dark Atom – with a dark electron orbiting a dark Proton. Clearly, “dark photons” could promote the dark electrons, and be subsequently emitted when it returned to a lower orbit within the dark atom.

But, of course, all of these assume *moving* dark matter particles!

None assume a complete and stationary paving of the whole Big Bang Universe with these entities.

So the Empty Photons, which are postulated to be of this nature, would not require the same criteria. For they

are effectively stationary, and absolutely everywhere. They are not detected by events, but are supposed to underlie all possible phenomena, and are crucially extremely stable.

Now, what gives them any credence at all is the suggestion that they are in fact particles composed of a mutually orbiting pair of an electron and a positron, and this combination would both explain their undetectability, and have them deliver a considerable amount of undetectable mass overall. But though they are very light indeed, (of the order of 0.001 GeV) their numbers would be prodigious so they just might deliver the 85% of all matter, so far undetected.

We await further evidence from the mines!

Does Science Ask the Right Questions?

I was watching a **BBC TV *Horizon*** programme the other day about developments on Modern Astronomy, and decided (not for the first time) to not only be “all ears” for any new technology and consequent discoveries, but also to make absolutely sure that I related what the participating scientists actually said, to their known purposes and philosophic grounds.

It was, as usual, very revealing!

One world-leader in the field explained at length how the subject is now depended almost exclusively upon developments in Technology to continuously extend and refine their “seen World”, so that the main content of their Science was the dumping of old “descriptions” due to ever new factual revelations – either as entirely never-seen-before objects, or already known entities but now in much greater, and informing, detail than ever before.

The most significant contributions were from “telescopes” of an ever widening number of types, *seeing* many different ranges of electromagnetic radiation, and by the technique known as “false colouring” applied to what was invisible-to-our-eyes radiation, revealing the very different spatial forms by investigating in detail these “images” of each of the many different wavelength ranges addressed.

The moving of their equipment first up mountains, then to very high unpolluted parts of the world, were further advanced by mounting their equipment first into aeroplanes, and then in spacecrafts and even satellites. Such regular improvements guaranteed the delivery of ever increasing detail and complementary information, as the differing wavelengths could be associated with quite distinct sources and processes. And this knowledge could suggest what simultaneous processes *might* be going on.

So **Tycho Brahe** was indeed the prototype for today’s astronomers: his job (and theirs) was to measure and catalogue – a very different purpose to that of a cosmologist, who has to *explain* such data.

So clearly, many conversations were included in the programme with the scientists (cosmologists) as well as the technologists (telescope inventors) and technicians (astronomers) to see how ideas delivered by all this incessant torrent of new data was changing and indeed profoundly(?) developing cosmological ideas.

But though there was regular reference to the current consensus, based upon the concept of the Big Bang, it was clear that the scientists were indeed direct and pure offspring of those colleagues who studied earthbound phenomena: they were, most certainly, of the very same basic philosophy – they *sought* the fundamental and defining **Laws of Nature!** For it was these that made the Universe what it was!

But, the style of Cosmological Science could only be both source and opposite to its earthbound close relative. For the **separability** evident in gravitational forces in space had also been assumed for Science as carried out in the laboratory, but in order to make it work, scientists had been forced to constrain circumstances to a remarkable degree to obtain their Laws. Now, not only could cosmologists NOT straightjacket heavenly phenomena (they had to take phenomena exactly as they were – entirely unconstrained), but, the whole prediction ethos, (which had first proved itself in astronomy, was now **dominating** earthbound science, where it was necessary in *making* what you needed, or maybe only wanted, to happen.

Such proactive imperatives cannot be the basis when studying the Cosmos – you can neither **control** nor *change* that!

But, as with both the first astronomers, and the productive scientists that followed, you certainly can deliver “**what comes next**”.

So, this observation-dominated wing of Physics needed an energetic growth point: an area where progress was being made, and in the climate of modern capitalism, it could only be technology-based, innovation and discovery.



The *active* ingredient in a *passive* subject area *had* to be the constant revelation of the **New**, and clearly, if your telescope could not bring it all to you, then you must somehow find ways of going to better places for a vastly more detailed “better view”. NASA and its Space Exploration inevitably became **THE** most important part of both Astronomy and Cosmology.

Though even the constant flow of breathtaking images was sadly not enough!

A high moral purpose was also deemed to be essential, and it became “The Search for Life” elsewhere in the Universe, and the as yet unanswered question: “Where, why and how did Life first appear from entirely non-living Matter?”

With the target of the revelation of scientific Law as the major purpose of Science, it was expected that somehow Laws would be revealed that, by themselves alone, necessarily and inevitably produced Life.

So there you have it! Even Life must be somehow reduced to eternal, yet *creative* Law.

Indeed, at the **Santa Fe Institute** in New Mexico, USA scientists write ever more complex computer programs, which embody known Laws, and push them to the so-called “Edge of Chaos” to actually produce “Emergences” – the “natural” creation of the entirely New.

But, of course, that is impossible.

It is the same mistake that was produced in all ancient cultures of making a God in Man’s image. It is an essentially idealist method of using Mankind’s freedom to decide and invent as being very similar to what *causes* development and even evolution. But it assumes that Laws are not created by Reality in necessary development, but, on the contrary, Reality (even in evolution) is “created” by holy Law *alone*!

“But”, I hear you say, “what else could they do? If the search for Law is **not** the way to explain Reality, what is?” And, of course, this is the necessary question, but it misses the most important aspect without which our efforts will never be successful – which is surely encapsulated in, “How does Reality create the wholly NEW? If it isn’t driven by underlying law, what allows Reality, in certain circumstances, to create what has never occurred before? By what processes (or something else) do things like Life arise from wholly non-living entities and processes?”

Now such questions have been both asked and answered in the past by religions. But, the bases for all such “explanations” have been shown in every case to be entirely groundless, so what should scientists be doing to address such questions?

What must be investigated and how, to begin to reveal this amazing aspect of Reality?

Is anybody pursuing such a line of study?

The answer is, “**NO!**”

To follow the current consensus standpoint, shared by almost all practicing scientists as “Science”, would certainly be incorrect. The fact that they *believe* it to be correct doesn’t make it so by any means.

For it involves a certain pattern of assumptions and methods, which are indeed part of an overall approach, with certain purposes, but which is crucially narrow and indeed blinkered. The fact that it works, and fulfils their purposes, does NOT mean that it is The Truth, and certainly such criteria do **not** have to include its accuracy as **Explanation**. “If it works, it must be right!” is not Science but Pragmatism, and the most amazing drivel can be associated with procedures, which work, but are absolutely nothing to do with that success. Repeating sequences of actions to predictable ends is not science. It is following a known-to-be-successful recipe only. Science is “*Understanding Why!*”

What is usually considered to be Science, limits what kind of investigations are carried out under the heading of Experimental Science. If the known to be successful procedures are followed, it automatically is considered to be Science, especially if the result of the whole exercise is to enable the extraction of Laws, which later under the same conditions and constraints will successfully deliver accurate outcomes, **that clinches it.**

What more do you want?”, is the usual conclusion.

Well Science actually starts where the above process finished.

Following the gathering of data, and even the formulation of any extracted relation into an equation - a Law, still hasn't explained why all this is the case.

That is what Science has to do!

Now, such pragmatic extractions, which do require an explanatory context, are often given another seemingly profound context. Each such Law is seen as being analysed further by studying the individual Parts, of the Whole, which produced the initial Law. And applying the very same techniques to each and every Part, finding its Law, and going on, level below level, to a final fundamental and final set of entities and laws, is seen as that “**context**”. It is termed **Reductionism** and is, as you will have guessed, never actually carried out! And, to cap it all, these various laws at all these levels are considered to be **separable** – that is that they remain the same in all sorts of complex mixes, and hence what we extract in our carefully contrived and maintained experimental conditions will act in exactly the same way wherever they occur – in all versions of unfettered Reality.

So, we worship at the shrine of Prediction more than any other, and that quantitative law, which delivers prediction, is our main and determining purpose.

We may think that we address change as well as static relationships, but it is invariably only quantitative change – variations in the magnitudes of particular variables that we address.

The much more significant, indeed revolutionary, Qualitative Change – the variation in qualities and properties, and the study of development, and crucially Evolution too, is usually sidelined and ignored – after all, you could never encapsulate such things in equations – quantitative relations: they are about things becoming *something else*. How could that be dealt with symbolically? We may pay lip service to this kind of change, but it appears almost entirely in accompanying explanatory narratives, or *descriptions*.

Hence the real nitty gritty is considered to be quantitative laws and the equations that allow them to be applied in predictions, or as part of productive use.

The demonstrate the real differences, the quintessential *qualitative* type of law is that which **Darwin** described in his idea of **Natural Selection** and used to explain his theory of the *Origin of Species*. And that could never be said to be a quantitative law, nor could it be expressed as an equation.

Now, this clear relegation of scientific explanation to the *descriptive accompanying role* will never deliver a real understanding of Reality as the *Source* for all law, and also for all that is totally **New**.

To scientifically address such questions will require that scientists study what are termed **Emergences**: and these are in fact invariably revolutionary Events of great complexity, with a multiplicity of dramatically contrasting stages compressed into a relatively very short timescale. The classic examples are the Origin of Life itself, events in the subsequent evolution of these organisms, and their remarkable transformation into entirely new and incompatible species, and also, and rather differently, in the completely novel, first-time-ever occurrences, such as the emerging of Consciousness within the Brain.

In addition, of course, these can, and do, happen on many very different Levels, the most evident being in Social Revolutions, and many, many times in Human Thinking.

But, though it seems as if some of these areas are already addressed, it is rarely entirely *qualitative*. Almost all sciences are straightjacketed into the usual assumptions and methods and focussed upon quantitative prediction rather than qualitative Explanation.

Now the task that has emerged here is not merely a new specialism within a traditional if new science – a special subset of another already existing science, which merely concentrates down on a very complex area (in this case “Emergences”), and therefore seen as just a new branch – an extrapolation into a new territory.

It can never be just that!

Indeed, a lifetime of dissatisfaction with the bases of the Philosophy of Science, have to be addressed to even commence such a task.

We have to expose clearly, the nature of **Formalism** (Form and equations rather than Content and causes), and also **Plurality** (the very basis of all analysis, which sees all Wholes as composed of *separable* Parts). And these present major problems for the whole of current Science resting upon these assumptions, which though they can, and do, serve it admirably in the simplification of Reality and the pragmatic use of constrained sub systems, **but**, even more crucially, totally limit their effective use to situations entirely within overall stability.

Real Qualitative Change cannot be accommodated by such assumptions, for they both hide its actual dynamic nature and its trajectories, but they also disable any effective methodologies for addressing such significant qualitative transformations. It is not merely a matter of time before the Origin of Life on Earth will be cracked. With these assumptions and consequent methodology, we can *never* explain such an Event.

The study of Emergences – of episodic and significant Qualitative Change, which doesn't merely *change the mix*, but on the contrary reveals the opposite fundamental imperative to the **Second Law of Thermodynamics** – the **Law of the necessary Creation of New Order**.

And to get anywhere in this we must both radically change our philosophic stance from **Plurality** to **Holism**, and from idealistic essences to materialistic developments – in other words to develop a *Holistic Science*, which can not only deal with stability but also revolutionary Change.