

SPECIAL ISSUE 56 FEB 18 JIM SCHOFIELD



SHAPE JOURNAL

THE PHILOSOPHY OF PHYSICS

PHYSICS WITHOUT PHILOSOPHY / IDEALITY / MISCONCEPTIONS OF THE HEAVENS / THE END OF FORMALISM
LEE SMOLIN'S TIME REBORN / PROBABILITY AND PHYSICS / BIG BANG THEORIES / PREMISES PREMISES PREMISES

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The Philosophy of Physics

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Physics

without

Philosophy

(is in trouble)

by

Jim Schofield



Welcome to the 56th Special Issue of the SHAPE Journal, focusing on Philosophy and Physics.

I'll get the first controversial statement out of the way:

There is no Philosophy of Physics!

At least, not any longer.

Having committed myself to the study of Physics some 60 years ago, I chose it as my specialism at University entirely because, historically, the discipline had always tried to both understand and fully explain reality - I was then presented with a worldwide major retreat from such essential objectives, established mainly by the triumph of Bohr and Heisenberg at Solvay some years before, and the gradual acceptance of their Copenhagen Interpretation of Quantum Theory, literally everywhere.

It was, of course inevitable, though I couldn't see it at the time.

The seeds had been set long ago, with our generally pragmatic approach to investigating the physical world, which was only further complicated by the inclusion of Idealism from Mathematics, and of a Plurality underlying all attempts at explaining phenomena.

From its very outset Physics was actually a strange amalgam of Materialism, Idealism and Pragmatism, a distorted reflection of the world which could only prosper while its discoveries could be profitably used. And, the methods of carefully cultivating experimental situations (to make them easier to study), and idealistically mapping pure ideal forms onto studied situations, began to wrest the subject from its explanatory role, from 'Natural Philosophy', and into that of mere technological implementation.

In the end, the old explanations began to fail, and were abandoned for the seeking of equations. Attempts to truly understand reality were jettisoned, and what had been Physics greatest asset was lost.

I am convinced that quantum mechanics is not a final theory. I believe this because I have never encountered an interpretation of the present formulation of quantum mechanics that makes sense to me. I have studied most of them in depth and thought hard about them, and in the end I still can't make real sense of quantum theory as it stands

Lee Smolin, 2005





Homage to the Square by Jose Davila

Ideality

The Promised Land

...or the World where modern Cosmology dwells

Surveying current Cosmology takes us by a well trodden route into a strangely unreal world!

But, it isn't new to most physicists, either now, or in the past, because they always very easily slipped-sideways out of Reality, and into the much more conducive Parallel World of Pure Form, in their sincere attempts to formulate eternal, Natural Laws of Reality.

It was an alluring and thrilling move, for, on the very first step inside the portal to the new World, everything which had taken them there reappeared, but here with a veritably scintillating beauty! And, it appeared both understandable, yet also literally infinite: It was truly the Promised Land.

And, the reason for this was the settled-upon-ground that clearly promised answers to all the innumerable questions about The Nature of Reality. This assumed ground was that Everything-in-Reality was due entirely to a set of fixed Natural Laws, which added together in various amounts to deliver absolutely everything possible. This was initially just assumed, but later was encapsulated into The Principle of Plurality.

It hadn't been found immediately, historically, for studying Reality-as-is had long proved both perplexing and difficult, but things gradually changed with Man's ever increasing control over investigative situations, until finally the state was reached when Reality's variabilities were finally under such control that the studied situations suddenly focussed remarkably into extractable relations, and this was the Key!

Beyond this door spread the whole world of Pure Form alone - Ideality, and our explorers crossed the threshold

into the World of their dreams! Remarkably, this world had been glimpsed long before that point was reached: for it had occurred in Ancient Greece, when simple shapes were idealised, via drawing them, into perfect forms, which, thereafter, proved to be much more amenable to further study, yet close enough to the real versions to be very useful! Indeed Mathematics, as it came to be called, was the first intellectual discipline for Mankind, and set things up for the much later breakthrough into Experimental Science.

So, when the time came, to peer-through that open door, they already knew what they could do there, and didn't hesitate to enter.

Yet Reality and Ideality are not the same thing at all!

Indeed, the forms that occur in Reality are caused by real physical and other properties and effects: they are consequences of real concrete causes. And to make things even more difficult, many such causes are always acting simultaneously, and holistically - everything can affect everything else, things can evolve - you cannot assume eternal Natural Laws at all.

So, in Reality, causes must be primary, and Form secondary - a symptom.

Also, each Form can be caused by various different confluxes of many possible causes - so finding-a-Form can never explain a phenomenon, it can only describe its observed 'Shape'! And, crucially, Forms in Reality are variable: it is a holistic realm. While, all the Forms in Ideality are fixed: it is a pluralistic realm. Things in Reality are real, while those in Ideality are Pure Forms and nothing else.

Purely Formal models, such as Equations, do not reliably pertain in Reality: they are distorted simplistically, idealistically and pluralistically, and each one can relate to many different situations. Forms may be universal, but they are never causal.

So, their use in the real world is limited to stable situations and modified, rigidly-maintained artificial domains (technology): while their use in further theory is doomed to eventually deliver multiple impasses.

In watching a lecture at Oxford University by Nima Arkani Hamed upon "Why the Universe is so Big?", where he seamlessly slipped from considering Sub Atomic Particles to the Universe as a whole, it was clear that he considered that he was using a basis common to that entire range, despite its unfathomable vastness.

And as he went on to discuss the sizes of major constants in his equations, it was clear that to him, they were not arbitrary fixers to bring purely formal equations into line with a tailored part of Reality, but were Universal Constants of Reality itself.

He is, of course a mathematician, and very much an idealist, rather than a pragmatic one. And, his profound reasoning was NOT about Reality, but a deep, deep journey into Ideality as an uncoordinated whole.

And sadly, there is no reason why Ideality should deliver a consistent-and-comprehensive pattern for everything within it. For, as a competent mathematician myself, I am well aware of its formal extensions - into negative numbers, graphical representations, operators, complex numbers and even Quantum Loop Gravity, String Theory and the Multiverse!

So, whenever the investigator can continue to pick out of his bottomless bag of formulae, the right one for a given situation, the lack of unity in the scheme as a whole can be ignored, But, it clearly isn't, as inferred, the sole basis of everything. How can it be: it is only abstracted *Form*?

So, Cosmology is not what it purports to be: based upon formal Mathematics, it deals only in concretely-unsubstantiated Form, and cannot be corrected by experiment. And, with a steadfast Pluralist Stance, and fixed-for-ever Natural Laws, it can never address the true holistic richness of Reality.

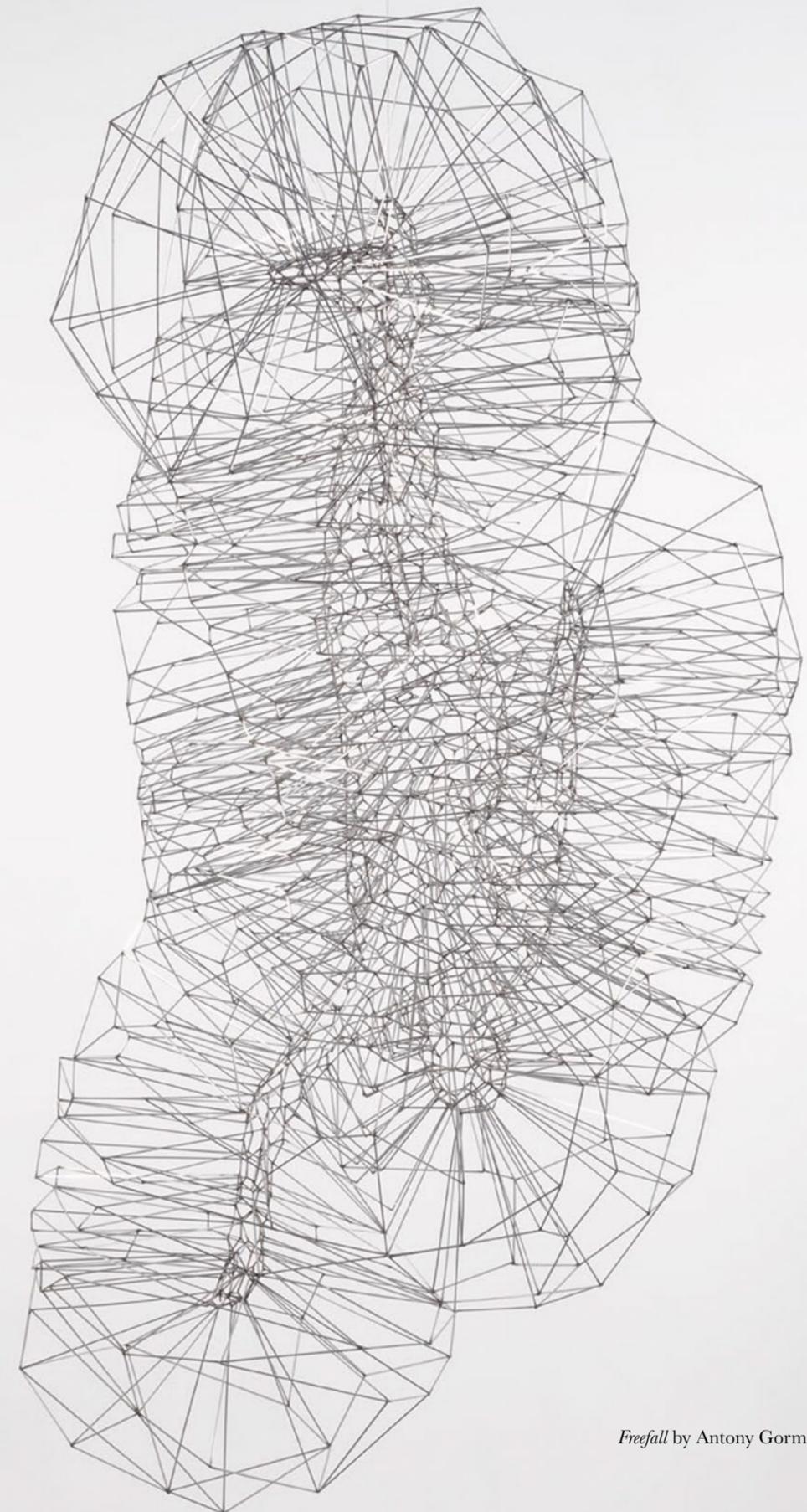
Indeed, the whole approach is totally ill-equipped to ever address Qualitative Change and Creative Development: it worships Stability, for that is all it can possibly see - the rest falls outside its domains of applicability. As all truly significant developments only occur in relatively brief Emergent Interludes, the engines of change are completely unobservable within each and every prevailing Stability.

Stability is taken as the only reliable situation we can study - things must be still, or we must hold them still. The approach views Reality via a series of 'stills', like photographs, any variation is via purely quantitative change only, and delivering no hint of anything other than a mere continuation of the same.

It is locked into a pre-Hegelian, idealistic mode, philosophically, and convinces itself of innovation due to its sophisticated, ever-developing Mathematics and increasingly complex technological applications.

But, from an explanatory view, it is as dead as a duck!

We are at a dead end scientifically.



Freefall by Antony Gormley



The Multiverse?

A Major Misconception of the Heavens

...and everything else too



The article entitled *One True Cosmos* in *New Scientist* (3004), by physicist Lee Smolin and Brazilian philosopher Roberto Mangabeira Unger, is a significant step in the right direction in Cosmology, but their sound suggestions are not as yet sufficient to cure the malady that today infects current ideas in this area.

Nevertheless, it is Mangabeira Unger's *philosophical* contributions that are crucially important and necessary, for they display a clear and welcome outsider influence to dispel the navel contemplation now rife in Cosmology and Physics as a whole.

The main point of criticism is correctly directed at the concept of **The Multiverse**, and their clear condemnation of such a stance as unscientific is certainly correct.

Their arguments upon that position need no added amendments from this particular philosopher and physicist. But, their criticisms constitute only a first and essential step. For, no mention is made of The Copenhagen Interpretation of Quantum Theory, and the massive retrenchment that it caused in Modern Physics, or, indeed, the whole idealist fiasco that is Wave/Particle Duality. The errors exposed are too narrow to account for the major diversion that has been instituted over the last century.

It has to be the case though, that the standpoint these critics describe, must also infer further consequent criticisms, which have certainly not been elaborated upon in this short article.

What is also spelled out, however, is what they call the Newtonian Paradigm, which they see as a method developed for the investigation of local subsystems, which are in Cosmology wrongly applied to Super-systems on a Cosmic scale. But, the errors involved are in fact much more fundamental than that.

For what has become the norm in Science is the isolation, filtering and necessarily rigorous farming of experimental Domains (subsystems), in order to investigate them. And, what is involved, in that, isn't just a matter of taking a subset of Reality to investigate. What is always achieved amounts to a great deal more than a mere artificial isolation of a natural subsystem.

Every such Domain is always significantly *changed* - not only have many factors been purposely removed, but those remaining have also been artificially controlled, expressly to produce an unnatural, yet revealing context - tailored or farmed to clearly display a previously only glimpsed (and, in this special context, easily achieved) sought-for relation. Yet, what can then be extracted is NOT what was acting in the original, unfettered

Reality-as-is: it is always a produced simplification and idealisation of what was originally glimpsed.

Now, this is absolutely crucial, but also, in order to assume that what we finally have in our hands is exactly what was acting in the natural unfettered situation, we have, in addition, to assume the Principle of Plurality. Otherwise, we cannot make all the extensive, consequent reasoning that follows.

For example, what is finally extracted is assumed to be a Natural Law – and ALL naturally occurring situations are assumed to be mere *summations* of such Laws, and also that NONE of these are in any way changed by that process. The Principle assumes that all such factors are both separable and unchangeable contributions.

So, what are the consequences of such ‘beliefs’?

It means that if sufficient farming of appropriately designed and produced Domains are carried out, a whole set of these eternal Natural Laws will be put into our hands to explain literally all associated phenomena. But then, a following step is also crucial! For, it is assumed that all phenomena can be built solely out of these Natural Laws by mere addition. But, it just isn't true! If it were, you wouldn't need technologists at all. Neither would you need experimental scientists to carefully construct appropriate experiments revealing these “Natural Laws”.

So, though I certainly commend the argument about subsystems in this article - it is, as I have explained, a much more important problem that has been revealed, AND must, somehow, be transcended. The crucial underlying Principle of Plurality, which not only sees Reality as analysable into separable eternal Laws, but also sees these as permanent and fixed.

Philosophically, that makes these “Laws” primary, and NOT caused by their context.

This is an idealist position! And, if they do not reveal actual eternal Natural Laws, but instead only actually arrange Domains of Reality to artificially deliver what seem to be such, then, they have not so much revealed, as at least partially *constructed*, what we end up having in our hands.

And, this means that the processes involved – The Newtonian Paradigm – which constitute, in fact, the

standard experimental methods of Science – do not reveal, but only “deliver”, due to the carefully arranged Domains. And, what they deliver are NOT the eternal building blocks of Reality, but useful constructions.

For, we not only construct the appropriate Domains in order to supposedly reveal these “Laws”, but also construct the very same Domains in order to effectively use them. So, the Paradigm is useable.

This is great for experimenters, technologists and product producers, but it is just terrible for those attempting to understand Reality! Ever-better theories are undermined from the outset. This Paradigm does not help us to explain Reality-as-is.

The next criticism in the article concerns the so-called “special nature” of our Universe, when compared with what can be produced by the known set of “Laws of Physics”. Indeed, starting with such Laws, it is considered almost inconceivable how we could ever have arrived at the Universe we now quite evidently have.

So, to attempt to explain this fundamental anomaly, the scientists felt they could do no other than put forward the conception of the Multiverse, for within that, every conceivable Universe is possible, so ours would be included.

Among the infinite number of all possible Universes, produced by random mixes of the Laws, if all were worked out, would, in time, produce ours as one of the set. But, our Universe isn't a special case. It is, indeed, the only one there is.

Comparing it with a set of laws in all their possible configurations means literally nothing.

The whole trajectory of such reasoning is seriously lacking, on so many levels it is hard to know where to start. Everything from the idealist stance of the laws coming first, to the incorrect assumption that they are fixed, and finally to the belief in the Principle of Plurality – they produce results that constitute a mere house of sand! There is no properly reasoned case for The Multiverse: it is merely a formal sticking plaster to cover a real gaping hole in scientific knowledge!

The criticisms involved are not just many and varied, but are cumulative – each one precipitating more, and as



More and more, I have the feeling that quantum theory and general relativity are both deeply wrong about the nature of time. It is not enough to combine them. There is a deeper problem, perhaps going back to the beginning of physics.

Lee Smolin, 2006

soon as one brick is shown to be dodgy, the whole edifice of Physics comes tumbling down.

So, that being the case, major changes in the assumptions and principles we employ must be implemented.

The problem is, “Where to start?”

It can only be at the level of an alternative underlying Principle to that of Plurality, of reductionism - and that, historically, that has always been the Principle of Holism, which is defined by:-

- Everything affects everything else!
- All things are variable, including the relations between things.
- Laws don't determine contexts, but contexts produce Laws!

And, with such a World, only a single trajectory was followed, giving us the one Universe we now have. BUT, any assumption of straight through causality is also wrong. Analysis is *always* a simplification, and universal Reductionism must be a myth!

Lastly, and most importantly, development isn't incremental, but involves long periods of Stability interleaved with short dramatic interludes of revolutionary transformations.

The so called Newtonian Paradigm is only usable in constructed and maintained Domains, and the real changes that occur can only be addressed by studying and understanding Emergences, where all significant qualitative change occurs.

[Indeed, though Unger, the philosopher in this fruitful pairing, clearly insists upon *variable* Laws, he does not see development via revolutionary Emergences, but entirely incrementally, which significantly alters his suggested solutions to these problems. So, to some extent, his attitude upon this reflects his political stance and activities as a government Minister in a capitalist government in Brazil]

One sound conclusion of these writers is that our conceptions of scientific laws do need revising significantly. That conclusion is explained by - “discarding the assumption that the same kind of laws that work on the scale of small subsystems of the World,

will work, scaled up, at the level of the whole Universe.” Of course, as already explained, there is a great deal more to it than that. All our laws are predicated upon differently constructed and constrained Domains. But, if, in addition, they are also included in Hierarchies of Systems in Reality – each with its own laws, then, but only then, would I be inclined to agree with them.

Yet, the initial creation and subsequent evolution of such hierarchies must also be explained, and this can only be achieved by the occurrence of Emergent Episodes – when they happen in society we call them Revolutions - Emergence is not considered here and may even be rejected by these writers.

The point is made by them about how the “Natural Laws” can be used to deliver an infinite number of non-existent Universes, but the “Why?”, appended to this, is inadequate – merely stating that they cannot be applied to things as large as the Universe, for that simply does not cover sufficient ground.

The real reasons are far more basic and explicable!

The Laws extracted by the usual means are NOT the driving essences of the Universe, but simplified and idealised abstractions – arranged for in tailor-made Domains, and not about unfettered Reality at all, they are only about Pure Forms alone that can be extracted - and in so doing defining a different World, in which only pure forms exist, a non-real World, which I call Ideality.

So, the laws we extract, manipulate and even use are merely *Laws of Form* and certainly NOT the comprehensive creators of all of Reality. We have a name for such studies limited to such an abstract world: it is termed Mathematics, not Physics.

And, this must be the most damning criticism of Modern Science: it has abandoned concrete materialism for this formal idealism. No wonder such theories get nowhere: they are not what we assume they are!

Finally, the writers conclude that a new principle must become the basis for a New Science that we require to tackle the Universe. But, as they are not clear what the Principle was that they were assuming, they are not yet in a position to define its alternative. That mistaken Principle was not merely about local subsystems rather than Universes, but about ALL scientific investigations.

The root cause is the Principle of Plurality.

And, the new alternative has to be that ancient Principle, which is both the opposite of Plurality, and also has, in a contradictory way, been the essential ingredient in all the best scientific explanations throughout its history. It is, of course, the Principle of Holism.

What is required is the extension of traditional holistic explanations to also devising, carrying out and interpreting experiments. And we are still a long way from that.

Sadly, in identifying three principles, which, it is suggested, will lead to the way that these writers suggest is essential, include one which constitutes, in fact, the main problem with the current standpoint. For they insist that “mathematics is not a description of some, separate, timeless, platonic Reality, but a description of the properties of one Universe”.

No, it is certainly not!

And we must not seek mere descriptions but causal explanations of phenomena.

So, in spite of a really valuable intention, they end up shooting themselves in the foot.

Time Reborn?

Omissions in Lee Smolin's Stance

Having reached the halfway point in reading Smolin's admirable book, *Time Reborn: From the Crisis in Physics to the Future of the Universe*, I have nonetheless arrived at a major hole in his stance, which he seems wholly unaware of.

For, in identifying and re-naming the weaknesses of what he sees as The Newtonian Paradigm (by doing it in the way that he does), he also walls off the important area of study outwith his re-defined limits - thereby only criticising features of that identified stance, to only-a-subset of the actual possibilities. He leaves out almost entirely these very relevant issues:-

The Dichotomy of Plurality versus Holism.

The options of totally Empty Space or a Universal Substrate.

The Idealism of Mathematical "Laws", as against Causal Explanatory Laws.

And, though he admits of the inaccuracies of his "effective Laws", he doesn't justify their contained Objective Content.

He does not, and cannot, include the Emergence of the Totally New in the processes involved. So his hierarchies seem to be complications rather than wholly Emergent New Levels with Laws that are un-derivable from the prior Level.

And, the causal establishment of Stabilities and their purely temporary nature, is not explained - and finally, of course, why-and-how they inevitably always fail!

Finally-and-most crucially of all, he appears to be unaware of the major flaws in Formal Logic, and the attempts, starting with Zeno of Elea, but vastly extended by the German philosopher Hegel within Dialectics, or indeed, Karl Marx's transformation of that stance into Dialectical Materialism.

Without such necessary philosophical inclusions, the reasoning that is available to Smolin cannot transcend the limitations built into such disciplines from their inceptions. I keep expecting him to launch into some historical context - accounts of Pragmatism, Materialism and Idealism, and, crucially, the still significant role of "If it works, it is right!", in justifying crucial, theoretical techniques! But, in spite of many correct criticisms, he still fails to transcend fully what he is clearly trying to fight.

The problems, which he never addresses are the impasses in Formal Reasoning due to inadequately defined premises, ensuring that the old-fashioned Logic, which Smolin very skilfully employs to unavoidably skirt around the flaws which clearly halt the reasoning, always due to



The Matter of Time by Richard Serra, 2005

flawed or missing premises. Even, the glaring examples of Zeno's Paradoxes when dealing with movement and time are ignored.

And the long struggle of Hegel to correct the inadequacies precipitated by such Dichotomous Pairs, his realisation that Formal Logic was incapable of truly dealing with Qualitative Change and Development, and his means of transcending those limitations, were never addressed.

I was perplexed by Smolin's long and complicated reasoning initially, until I realised his constructs were attempts to criticise the usual Reasoning in an alternative way: that was what he was attempting to do! But it can't be done that way.

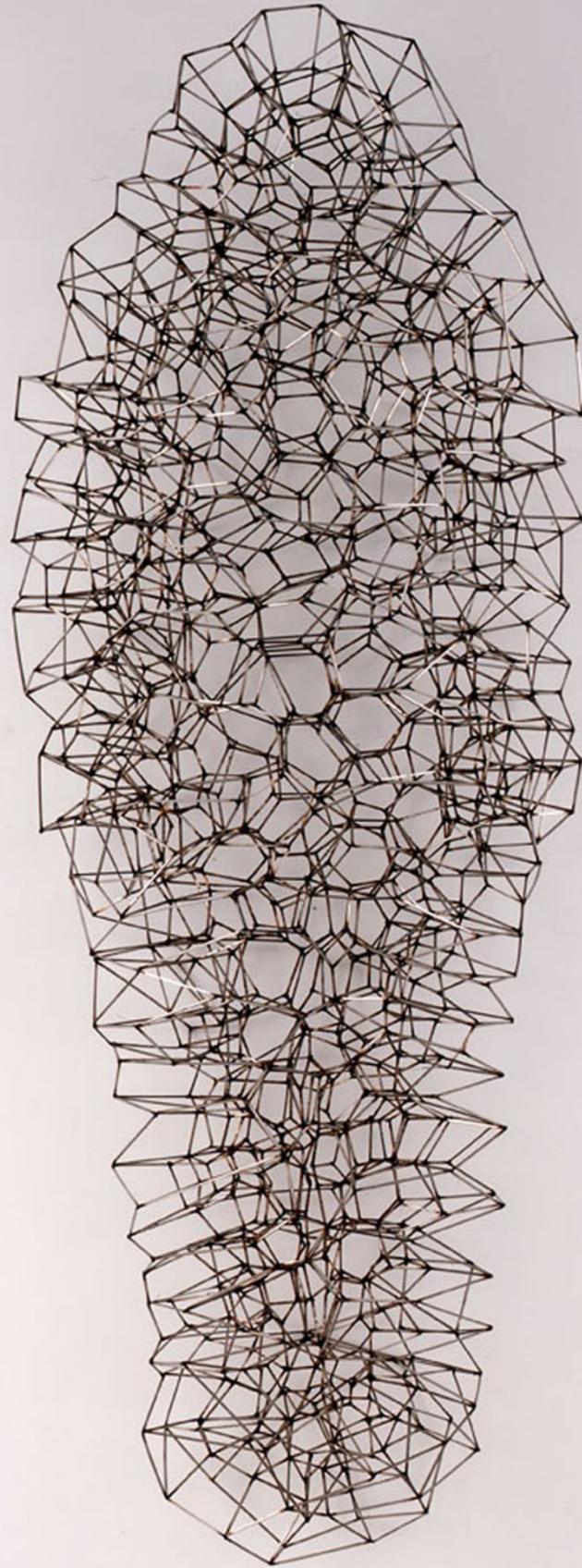
What Hegel arrived at studying Thinking itself, and Marx developed to be applicable in History and Economics, required even further redefinitions, involving emergent qualities in Physics, which Marx and his followers never got around to doing.

And perhaps most important of all. the amalgam of contradictory stances that had been put together historically, was never overtly addressed! And, the key distortions imported into physical law by farmed experimental situations were, involving the suppression

or removal of features to facilitate extractions, were ignored - investigations were carried out pluralistically instead of holistically.

And finally, as the most damning thing of all, the fitting-up of idealised mathematical forms to data from such farmed situations, was passed over without a murmur.

As someone who has written about Natural Selection in such areas I would have expected better from him!



Hive by Antony Gormley

The End of Formalism

Real or Formal Logic?

I have a problem with Lee Smolin's Logic in his considerations of Einstein's Relativity Theories, in his latest book *Time Reborn*.

Elsewhere, I have, previously and correctly, criticised the Formal Logic of the Ancient Greeks, because it treated the Content of Reasoning according to various premises, which were conceived of as being totally-unchanging things - making reasoning more like a Jigsaw Puzzle, with fixed unchanging pieces.

For, that is certain to be wrong: as it depends upon all the content being totally and fully known, and correctly understood, which is not only impossible for any individual thinker, but also for ALL individual thinkers, and, indeed, for ever!

Now, of course this doesn't mean, "Give up now, you'll never do it!", but it does mean that solid, formal reasoning alone is never enough to establish "Absolute Truth"!

And, it also means that the concepts used as a basis for Reasoning will inevitably lead to evident impasses in the Reasoning Process, as Zeno of Elea revealed, way-back, soon after the seeming absolutes of what later became known as Euclidian Geometry were used to erect Formal Logic with the same kinds of certainty!

Zeno's Paradoxes clearly showed that Dichotomous Pairs of directly contradictory concepts would appear as equally valid, within many a particular line of Reasoning, yet only one of them, in any given case, would allow a continuation of the reasoning. But, it wasn't until Hegel's researches into Thinking about Thought, some 2,300 years later, that this problem was addressed, and put down to incorrect or inadequate premises or

assumptions, underlying the reasoning. And, as it later became clear, such impasses are legion within Formal Logic, and always impossible to resolve within the realm and rules of Reasoning alone.

Indeed, the problem was fundamental, and is based upon the incorrect or inadequate assigning of features discovered and appended to things in Reality as permanent and unchanging, indeed, as Absolute Truths!

Hegel realised that such seeming eternal were illusory, and, if always adhered to, would prohibit all natural Qualitative Changes in Reality, and hence its actual development to ever deliver the wholly New! Hegel endeavoured via research into Dichotomous Pairs to transform Logic into a "Science", which replaced certainties with development, and the beginnings of an extensive revolution in Formal Logic; Hegel's Dialectics.

But, the calamity turned out to be much more fundamental! Mankind had found a way to bend aspects of Reality to deliver some of its wants-and-needs, by involving a greatly simplifying set of assumptions. For able and ingenious pragmatists had unconsciously assumed it, with great success and for millennia in prehistory. And that approach assumed that Reality actually behaved as it did, in accordance with a set of eternal Natural Laws, which acted together-but-unchanged, in various quantitative mixes to deliver all possible phenomena.

Thus, the task was to uncover these fixed Laws, and use them to some valuable end! The attitude was then cemented-in-place, permanently, via the achievements of Mathematics, which also subscribed to the very same tenet and methods!

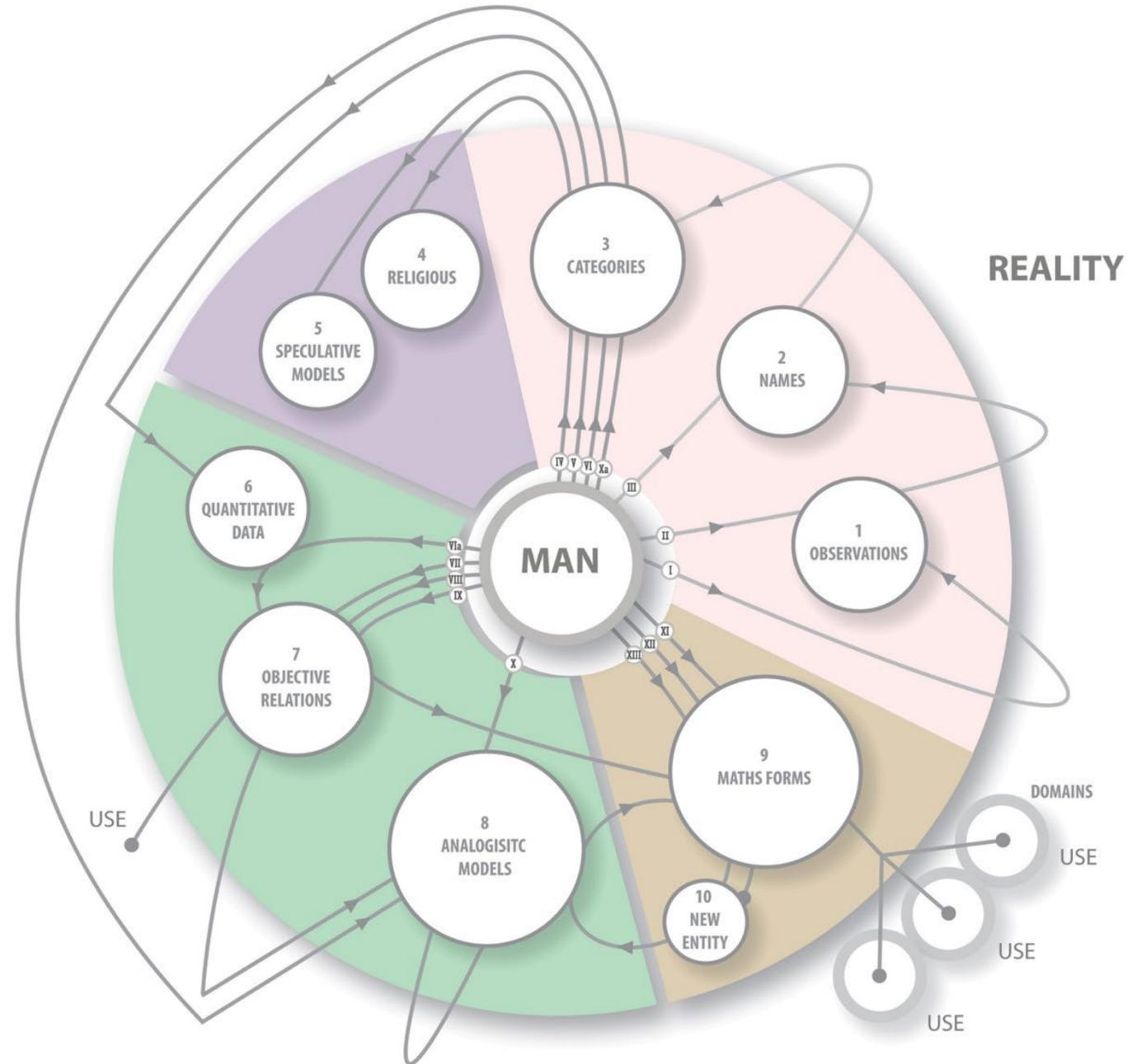
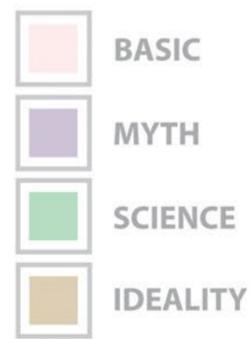
Mankind had found a very fruitful method and exploited it in diverse situations.

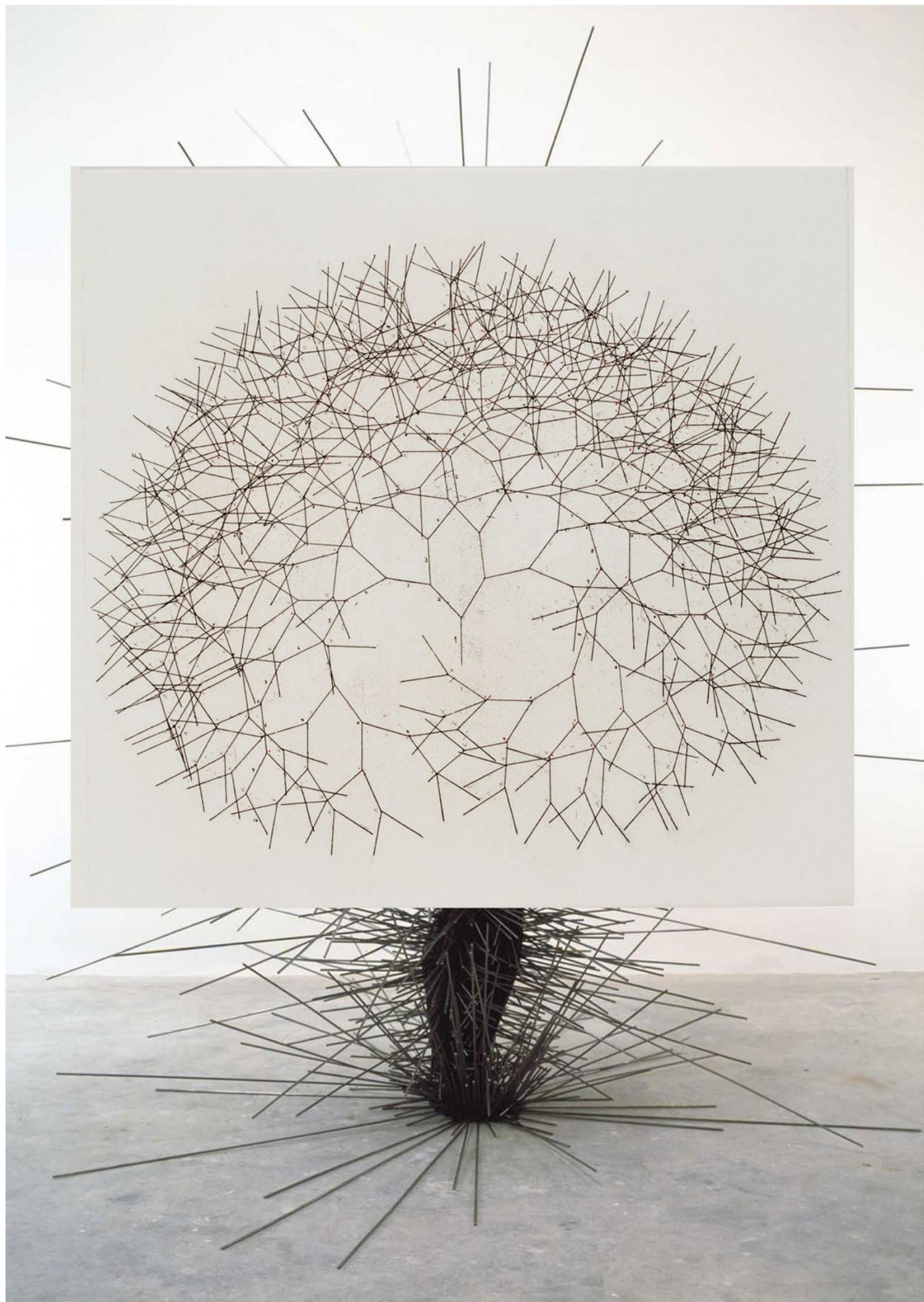
Plurality seemed to be true, but, nevertheless, led to many seeming dead-ends, which were impossible to address without a switch to the opposite Principle of Holism.

So, unsurprisingly, Smolin's description of Einstein's Logic makes it wholly pluralistic! In spite of its revolutionary characteristics, it still seeks formal solutions only. Its premises are fixed, and hence its productions are fixed too.

[And, in case anyone considers this critique to be an excusing invention, I must mention that this Philosopher is an expert on abstraction and how it underpins the history of human understanding, having penned *The Processes and Productions of Abstraction* a decade ago, and is a full-time researcher dedicated to the epistemology of science. See diagram opposite for some idea of the theory, details of which can be found elsewhere in the Journal]

Having spent a great deal of time and effort in giving Einstein his due, Smolin then separates his stance from that of Einstein on what he considers the paramount question: for while Einstein disposes of Time, Smolin does not - Time is Real!





Why does a Probabilistic Interpretation Emerge In Quantum Physics?

We have been using overall-methods since the very beginnings of Measurement in Science. Indeed, not having any sort of access to “causing-components”, at that time, we measured overall features such as Temperature and Density, and found relations between them.

Clearly, the actual Temperature or Density of a particular constituent atom was not accessible as such, neither did such properties simply sum over a known number. Such overall properties were averages of varying contributions, which could well be varying over a wide range - yet sufficiently limited to give firm, overall values.

Now, at the same time, let us consider Mankind’s original commitment to the idea of a Universal Substrate - known at the time as The Ether, filling all of space, and significantly resembling observable media such as Water and Air, for it enabled many of their revealed features to be attached to The Ether also.

Now, clearly, the real-world media were composed of many comprising-units, so that averaging was applied there too. But, in addition, and profoundly, such media could also propagate energy by Wave Disturbances rather than the simple carrying of such energy by individual units to new places. A whole new branch of Science was developed that could explain phenomena in a wholly new way!

Now, such ideas were universally adopted, and proved a powerful new way of dealing with many otherwise intractable problems, but clearly, exactly how the units of the medium could deliver such things, also demanded an explanatory theory too. And, such propagating media could be not only Liquids and Gases, but also Solids, and the means of propagation varied significantly between

these different Phases of Matter.

Now, James Clerk Maxwell was convinced that The Ether was some kind of medium, but he didn’t know what it could be composed of. Yet, he did know that it propagated Electromagnetic Energy across Space. So, he designed a physical model of the Ether, composed of relatively stationary Vortices along with constantly moving “Electrical Particles”, and put them together in such a way that they could deliver many of the known-to-be-correct features. And, it was from his model, that he devised his revolutionary Electromagnetic Equations.

Now, this was a major triumph, in spite of the fact that these components were never discovered. His particular model wasn’t correct, but how it delivered known properties was analogistically legitimate!

It was an example of the long established method of developing theories analogistically: they would always be mistaken in detail, but, nevertheless, delivered a measure of Objective Content - parts or aspects of the Truth. And, it was a sure way of making progress - delivering new partial truths, but carried temporarily in false containers.

But, it was also very different from the alternative that was fast becoming the norm - involving the matching of purely formal equations to measured situations. Usually, the evident pattern in the measured data was compared with known relations within Mathematics, and when a “match” was found, in a General Form - composed of both Variables and Constants, data was substituted-in from sets of measurements to produce a corresponding Set of Simultaneous Equations. And, it was these which would then be solved to evaluate the still unknown constants in the General Form.

So, when these replaced the unknown constants, the sought-for Equation had fitted-up to the data - "The Natural Law had been found!" And, we must critically compare these alternative ways of "Finding The Law", for they are very different and involve quite distinct premises.

Whereas Maxwell started with what the Ether evidently did, and attempted to use known physical features to put together a Physical Model, the alternative could not avoid both simplifying the investigated situation, in order to get what was needed, and then idealising it also by targeting a purely-formal-form to be fitted up to those measurements.

This example represents the turning point in how scientific investigations were thereafter always carried out. For Maxwell's Physical Method was dropped for that closely-linked to the Pure Idealism of Form alone.

So, returning to the problem of the Ether - nobody could even detect that Ether, or any other possible medium, so the idea was dumped! It was thereafter assumed that such a medium wasn't necessary - though waves were still, somehow, propagated.

Now, this always puzzled this theoretical physicist, and this was greatly intensified by the anomalies clearly evident in the Copenhagen Interpretation of Quantum Theory - especially within the series of Double Slit Experiments. For though the use of Particle Theory worked perfectly, part of the time, in other circumstances the projectiles seemed to be taking paths determined by Wave Theory! Now, according to prior Theory this was impossible, so the effort was immediately underway to somehow allow these two contradictory phenomena to "co-exist". Wave/Particle Duality had to be explained!

But, no such explanatory Theory was ever devised.

Instead, a purely formal amalgam of Particle Theory and Wave Theory was developed, in which "Waves of Probabilities" were involved. And, it could be made to work, wholly pragmatically. Indeed, to justify this fix, its perpetrators insisted that Explanatory Theory at this level was now DEAD!

But, the persistence of Wave Equations told me that a medium had to be involved!

Could there be a currently undetectable medium that intervened in these formative Experiments?

And, a possible candidate was soon proposed - a mutually orbiting pair consisting of one electron and one positron! The orbital energy would keep them from mutually annihilating one another. Their charges would cancel, as would any produced magnetic moments. and the joint particle would consist of exactly equal amounts of matter and antimatter.

It would be invisible!

But, it could carry energy, just like the atom, by the promotion of its internal orbit. It could clearly be a Photon! It could also dissociate into its components, if this carried energy were too large - a material explanation for the mysterious Pair Production phenomenon! And when totally empty of any internal load, could constitute a part of an invisible Universal Substrate of "Empty Photons".

Some theoretical investigations were evidently necessary! And, they included the Key Question of, "How such a wholly neutral entity could form a connected Substrate and propagate electromagnetic energy at a fixed-and-fast rate"! And, both of these proved possible, due to the joint structure of the unit, for at very close proximities the charged sub particles in one unit could affect those in a closely-adjacent other. Indeed, they formed a loosely-linked, close matrix at equally-spaced intervals apart - a paving of sorts.

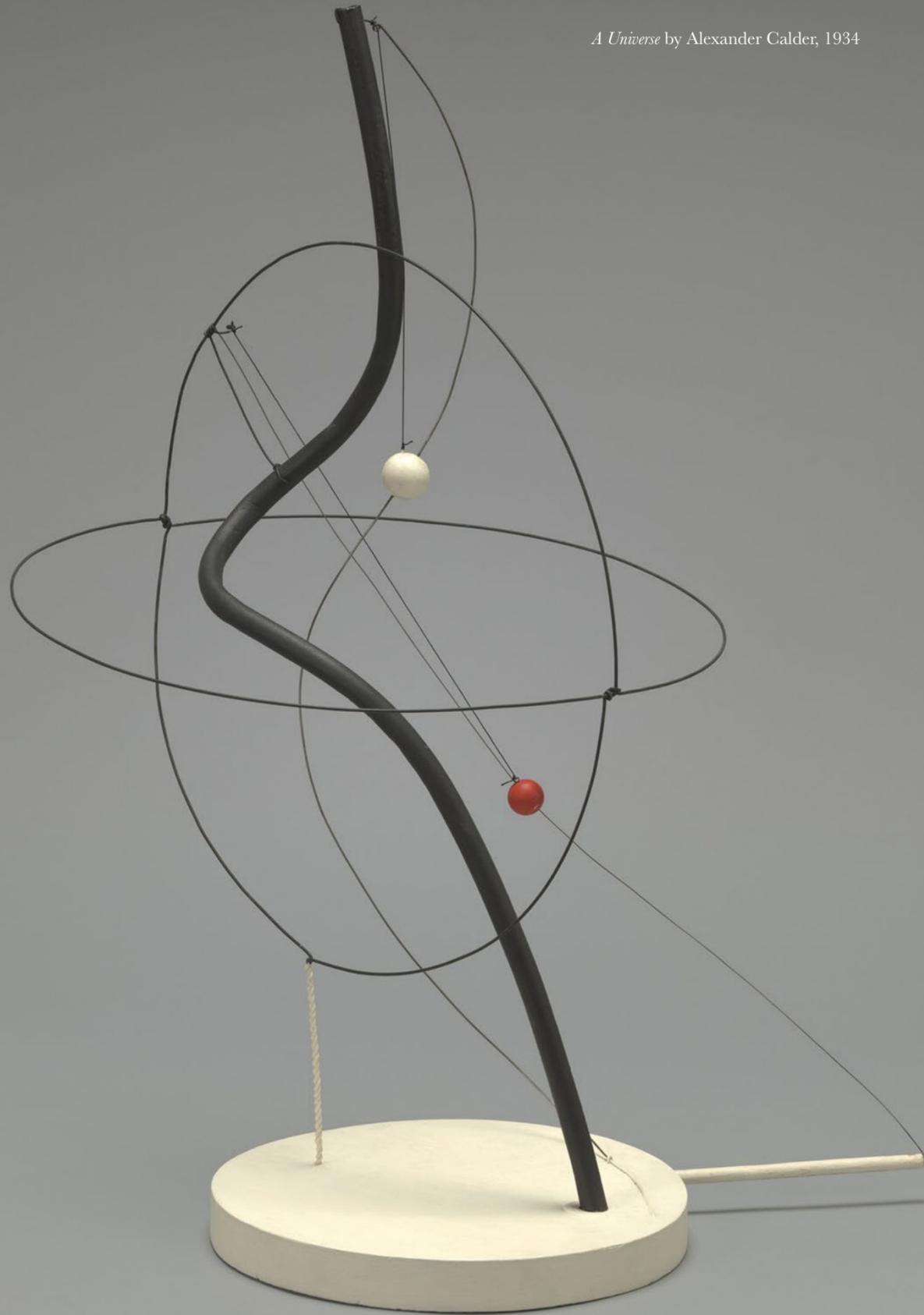
Now, in the Double Slit Experiments, not only did the causing factor move towards the slits, but in-so-doing propagated a continuing disturbance in the medium, which charged ahead of the cause, passed through both slits, and caused a maintained Interference Pattern in the medium beyond: so that when the cause finally arrived, it passed through one of the slits, and on encountering the Interference was deflected-or-not depending upon its path. And, it would leave a dot on the detection screen consistent what that particular journey and path.

[I am summarising several complex theories here, I know - they are all available in full, elsewhere in this Journal]

My Theory of the Double Slit was an analogistic model in the tradition of Maxwell: it is certainly NOT the Absolute Truth, and doesn't purport to be - but it



A Universe by Alexander Calder, 1934



contains more Objective Content than the Copenhagen Interpretation.

And, it doesn't make Form primary as do all formula-based theories.

Neither does it limit its context to a tightly-controlled artificial Domain, and finally, it is no longer pluralistic (as are all formal theories) but holistic, and hence open to correction in the healthiest possible way!

Let us be crystal clear, the involvement of probabilities in Quantum Physics is due to the "field effects" of some Substrate both caused-by, and thereafter affecting the moving cause. Copenhagen is a formal pluralist trick to get a pragmatic means of prediction in a wholly transformed discipline, no longer requiring Physical Explanation.

The appearance of probabilities in the Copenhagen Theory is exactly what you would expect to see if a hidden medium was involved. The effects of the slits, and then the Interference pattern in the medium, would indeed deliver a whole set of legitimate paths and explain the final overall pattern upon the Detection Screen! Even the magical "Collapse of the Wave Function" is easily explained as the complete dissociation of the Substrate Interference Pattern by energetic insertions into that space.

Fitting the Big Bang

as an Event in a Continuing History

In the repeated BBC TV programme *Before the Big Bang* broadcast Thursday 15th December 2011, the crucial question of “Before the Beginning” was addressed, and on first viewing you might consider that the galaxy of cosmological talent assembled to air their different views, represented an adequate spectrum of opinion (they certainly seemed to energetically disagree with one another), and also that among these candidates, as seers of future science, surely one or another must be approaching the Truth?

But sadly, a couple of motifs, included by the programme maker, correctly placed the whole group within a single basic standpoint.

Each participant was given a particularly complex wooden puzzle to solve, and shots of their obviously enthusiastic attempts to successfully dismantle it were always included as his or her voice-over explained their particular positions on this important question.

Another similarly-used visual was of each of them engrossed working on formulae at a blackboard. So it soon became very clear indeed that these scientists were all very able mathematicians who could formulate their “theories” almost entirely in such forms, as in no other! And the occasional “Freudian slip” also confirmed their shared methodology. Quotes such as, “...turning theory into fact by consequent observations” revealed the order in which they all worked, for that quote is true of all physicists since the Copenhagen Interpretation of Quantum Theory, who subscribe to that position and its imperative that all explanatory theories were to be banned as self-kid, and that the ONLY source for Truth was resident in verified and reliable formulae: everything else is deemed to be pure invention!

The “almost-perfect-confirmation” of this stance was put down to the fact that such formulae, and only such formulae, could deliver accurate and useable predictions.

Now two things must be said about this very significant Revision of Science:

First, that in a sense, their distrust of explanatory theory was correct, but not new, and, second, their conclusion was totally indefenceable! They clearly threw the baby out with the bath water, for though they were never the Absolute Truth, developed past theories were certainly never pure invention either. They invariably contained an ever-growing amount of Objective Content, which not only should not be jettisoned, but was in fact the absolutely-essential-basis from which to go forward, and correct the inadequacies of current theories.

And, these weaknesses are not due to impermissible mistakes and bad practice and theorising, but wholly and necessarily inevitable in a fruitful ever on-going process of correction. They were, in fact, the ONLY route towards Truth possible from the actually current position of Mankind at a particular point in its development.

For, Mankind, quite intelligently and effectively, simplified and “explained” as best as it could at any particular point in its own development. They were, are, and never will be GODS, but remarkable apes, which have ascended higher than any other part of Reality known. To throw away their hard won achievements, wholesale, is not only arrogant but rather stupid.

So what is it that Mankind did achieve? What exactly is Objective Content?



Untitled by Anish Kapoor

It is the extraction from complex, holistic and evolving Reality of aspects, fragments or glimpses of that almost-too-complicated overall entity - Objective Reality. But, though always incomplete and full of mistaken formulations and explanations, it, by the scientists own primary principles, took them ever closer to Reality-as-is. It was both entirely legitimate method, and truly brilliant! How could it so arrogantly be dumped?

The problems around the discovery of the Quantum generated dichotomies and direct contradictions which seemed impossible to integrate into any overall explanatory theories.- more than any prior hiccup in Scientific Theorising, the defeated premises and assumptions were among the oldest and most profound that were causing the many colossal impasses.

Bohr and Heisenberg, supremely confident in the mathematics which they had developed for this area of Physics, knew that it contradicted the most basic principles of scientific endeavour - to avoid condemnation themselves they had to defeat the old guard (even if it included Einstein), and perhaps because it included that paramount mathematician, they were confident of victory. For, he also stood on the same methodological ground, and only unsubstantiated belief kept him in the opposing camp.

The abolitionists won the day, and thereafter Theories were not Concepts and Explanations, but merely descriptive Formal Equations! In depending entirely upon equations, they were abandoning the study of Cause for the study of Form, and got away with it because Technology was in no way affected by this change.

The scientists could still deliver equations extracted from experimental data, which could reliably equip users of them to both accurately predict outcomes, and even produce intended products.

“Who needs Explanatory Theory,? If it works it is right!”

And in spite of many, many difficulties since that time, Copenhagen Physics still rules to this day. Mainly, the Copenhageners won because all the scientists involved on both sides had become more and more worshippers of the equation. The majority of them actually meant “equations” when they mentioned “Theory”. They were methodologically all standing on the same ground.

But, that still requires an answer to why they differed so strongly. Well, there is a reason!

When you abandon the traditional quest for Objective Content – the constant attempt to develop both consistent and comprehensive theories over ever larger tracts of evidence, you instead, and inevitably, do the very opposite: you collect equations – all achieved in different experiments within varying Domains of applicability (even when they are about the same particular area of phenomena), and if these contradict one another, which they invariably do, you have NO means of making them part of a single whole. Each stands resolute on its own ground! For each delivers adequately on that given ground why should they worry about other worker’s findings in different (even if only slightly) situations?

This being the case, coherence of such collections is abandoned: it is irrelevant to the main pragmatist ethos. NOTE: At just such a point, I am impelled to reveal the contents of a book, which I received as a present to help me with my difficulties in the area of the nuclei of atoms. The work contained at least 12 major models: all to some extent incompatible with one another, so that when considering the exact same thing you had to switch continually from model-to-model, and equation-to-equation, in order to get the results that you needed. So, how could these experts explain things to “lesser mortals”, who did not directly study their particularly esoteric subject?

It wasn’t at all easy, for the usual pre-Copenhagen methods were wholly banned! They had no choice but to look for clues within their equations, which recurred across many of them, and they then affixed various qualities” to them. Amazingly that constitutes their search for Absolute Truth, it can only be found in their totally reliable equations and nowhere else. So, they take their recurrent sub-forms and give them pseudo-physical (even material) properties, usually as “particles” with new properties like “charm” and “strangeness”, or the truly amazing property of acting sometimes like “particles”, or alternatively even obeying wave-equations as statistical overall predictor-waves.

Clearly, dependable prediction and use had involved the total loss of any real understanding, even of the Objective Content variety. Instead we had perfect predictors that would NEVER have to change: continuing improvement and development of concepts was now dead.

So, after this necessary explanation, we must look again at Kaku, Linde, Priyam Singh, Smolin, Penrose, Nichol and Mersini-Houghton – our “before the Big Bang” cosmologists, and focus-upon their identical mathematical ground.

Of course, they all start from dependable formulae – usually derived from experiment and measurement, but with some added absolutely crucial “principles” such as “Beauty” and “Symmetry”, but then more and more often constructed directly from equation-based speculation of the type described above. And really amazingly, all further experiments are devised as a result of these speculations, mainly as proofs of their correctness.

The Copenhagen Revolution(?) split them off from explanatory theory derived from considering Reality, and instead made them into mathematicians experimenting with formulae.

Their lab was the blackboard, and their equipment was the equation alone. Consequently the ONLY purpose of experiments which they would propose would be confirmation ones.

The prodigious and expensive experiments that were the consequences beggar belief. From the Large Hadron Collider (to prove the existence of the theoretically derived Higgs’ Boson) to the LIGO (Laser Interferometer Gravity Observer) to detect gravity waves from the Big Bang (again derived from equation-based theory alone), we have enormous heaps of dubious eggs in diverse diamond studded baskets, yet they all subscribe to a new pragmatic and, wait for it, *idealist* approach to this area of Science, where laws always came, and still come, FIRST!

Now, to get more details about these experts’ beliefs, I can only suggest that you view the programme, but I, perhaps, should link authors to ideas in case the reader wants to take things a great deal further..

Here are the main participants in the TV programme:

Michiu Kaku - he is perhaps peripheral to these radical proposals, and much closer to the usual standard theory of the Big Bang

Andre Linde - He is the main proponent not only of Inflation, but what he terms Eternal Inflation, which dispenses entirely the Big Bang itself.

Turok - He is Director of the Perimeter Institute in Toronto. He has “Brane collisions in many dimensional space”.

Priyam Singh - He suggests the oscillation Collapse and Bang alternatives as the continuing history, and also says, “I need a new mathematics for this scenario”.

Lee Smolin - He positions the origin of our Big Bang inside a mammoth Black Hole

Roger Penrose - The High Priest of the Standard theory of the Big Bang, now has multiple Big Bangs at ever larger scales, so that the prior case is invisible.

Bob Nichol - To undermine the standard model he is seeking Gravity Waves via his LIGO system

Mersini-Houghton - Some String Theory “solution?”



Feeling Material XXXVI by Antony Gormley, 2008

Premises, Premises, Premises I

A Brief Explanation of the Debilitating Set of Wrong Turns in Science

This series of papers is not a description of a solution to a problem, but a record of the search for such a solution.

It is actually part of the ongoing search for a new Holistic Methodology for Science, and attempts to do this via Hegel's discoveries concerning Dichotomous Pairs of concepts in Human Thinking. For, these had been around for millennia and neither identified, described nor explained.

His task was to find both their source-in-reasoning, and thereafter their necessary resolution. For, each such Pair cropped up regularly, but were never rationally dealt with. Instead, if one concept, in such a Pair, failed to deliver, the reasoning merely switched to the other, and carried on from there. Hegel finally realised that the cause of such a Pair, and their consequent causing of a rational impasse, just had to reside in the common premises of them both - yet they still turned out to be incompatible with one another.

The cause had to reside in those premises!

And, if Hegel, in a given case, could identify what the error or omission was in those premises, which had caused the impasse, he could correct the flaw, and transcend the impasse. It was, of course, much easier said than done!

Dialectical Thinking never is, for it involves abstractions, and these are much easier to invent than to discover: you can chase rational sequences of invalid abstractions interminably, without finding a solution.

So, though Hegel's ideas were well known within Philosophical circles, they simply defeated most thinkers, who condemned them as pure invention, and,

consequently, simply returned to what they had always done before.

The difficulties were, originally, clearly encapsulated in Zeno's Paradoxes, of Achilles and the Tortoise, The Arrow, the Stadium etc., which Hegel boiled down to the mutually exclusive concepts of Continuity and Discreteness (a Dichotomous Pair), yet even here it had remained unsolved for 2,300 years, despite innumerable attempts to resolve it. What finally emerged with Hegel's approach was that if the flaw in the premises assumed (for both arms of the Dichotomy) were both discovered, and corrected, so the Impasse was removed, a mere fork-in-the-logical-path could be decided upon the found-cause, and reasoning merely proceeded upon the choice determined by that revealed determining factor. That had been why a pragmatic decision had enabled the reasoning to be proceeded with beyond an unexplained gap, and its pair of alternatives.

Human reasoning had always been locked into a pluralistic stance for literally millennia, and though it did allow many pragmatic developments to be achieved, such a stance had a limited shelf-life, and was increasingly the major hindrance to further developments.

Let us see why Hegel's brilliant contributions were largely ignored, except for a very small group of philosophers, whose conclusions, politically, were so radical, that they were condemned even more totally than Hegel had ever been.

NOTE: The problem was the universally accepted Principle of Plurality, which had been subsequently formulated to justify the Simplification and Separation of recognised features of Reality, in order the more easily

to investigate causes and devise means-of-use. Basically, eternal Laws were believed to be the driving essences of Reality, so these could, by various means, be individually extracted, in carefully-arranged situations, without in any way changing them by such means.

They were, you see, eternal Natural Laws: they were exactly-the-same in all circumstances, and always had been! Once in our hands, and independent of context, they could be used in various different sets to (ultimately) produce all aspects of Reality.

But, this would only be valid, if and only if, the Laws were eternal, separable and sum-able, without being changed at all by such processes. The definition of this stance was the necessary Principle of Plurality. And, the means to use it in both experiments and their explanations, always involved the control of situations in such a way as to very clearly deliver a particular “law”, which could then be extracted, exactly-as-is, as an unchanging building block in a wide range of other situations.

The assumptions involved essentially-simplified Reality, had ironed out all the mutual interactive changes between contributing factors, and which took idealised versions of simplified real factors with which to interpret complex Reality.

A naturally Holist World, had been forcibly pressed into perfect formal patterns, and then used as totally-fixed in absolutely all circumstances. Clearly, apart from simplification and idealisation, the basic stance was clearly good-old-fashioned Pragmatism: they didn't have rational reasons for the innumerable cases of switching-pragmatically, at all the many unavoidable impasses - caused by their incorrect and incomplete premises. So, in spite of the fact that such a stance meant only a few further rational steps could be undertaken before they, once again, were certain to encounter another Dichotomous Pair and the consequent next impasse.

So, these suck-it-and-see decisions significantly undermined the reliability of the Reasoning involved, which became a patchwork of short sections of reasoning separated by many inexplicable jumps from one to the next.

So-called Formal Logic was peppered with unexplained gaps. And, these were always at the most important places in the trajectory of development involved.

This was just too much!

Hegel knew what the problem was: the pluralist stance was based upon Stability, in which many things did indeed stay the same, and any changes were literally always quantitative. The very state of Stability was such as to inhibit any qualitative changes as they might undermine that state, so, in many ways, the stance assumed that the evident Stabilities were in fact permanent. They may be long-lasting, but they were never permanent. Nothing is.

To understand the real, concrete evolution of Reality, which undoubtedly has occurred in the past, and will continue to do so in the future, it was surely necessary to go beyond Stability (and beyond Plurality) to a World of Qualitative Changes and evolving relations. Eternal Laws were a prejudice of an assumed-to-be permanently established Stability.

Hegel had intended to deal with qualitative changes in a new Logic of Change (what he called The Science of Logic).

Let us be crystal clear what existed, and what was actually necessary. Hegel was presented with pluralistic reasoning, which applied only to the periods of stability, and the stable circumstances dominating it, but peppered with innumerable short interludes, where only suck-it-and-see decisions allowed any progress.

Clearly, without the conquering of these interludes, real rational progress was impossible: So-called Philosophy, and even Science, would descend into local disputes, without any significant breakthroughs. The impasses with their Dichotomous Pairs, and the interludes of truly enormous qualitative changes, just had to be established as a wholly new part of Reasoning.

And this meant a turn to Holism instead of Plurality.

Clearly, the key situations were those where the impasses caused by Dichotomous Pairs occurred. He would do the exact opposite of those satisfied with the then current consensus: he would purposely seek out each and every Dichotomous Pair that he could find, reveal the causing set of premises that had led to both arms of the dichotomy, and find out what was wrong with them. His confirmation of success would be the conversion of a suck-it-and-see guess into a reasoned decision of which way to go, based upon previously unknown grounds.

With enough of these diverse cases, he would have sufficient evidence to establish his required Science of Logic, based upon his revealing Dialectical Method.

But, his own subject of Philosophy turned out to want to remain with its old methods. In fact, Hegel's method frightened them to death! They were proud of their vast stores of Knowledge, and trusted their arguing skills to always be able to weave something convincing upon whatever was being addressed. The major area in which Hegel's stance and method would be perfectly suited was, of course Science itself, but not only was Hegel no scientist, but he was also an idealist, so he couldn't supply this crucial achievement to that important area.

Now, something like this was realised by Hegel's best student, Karl Marx, for though he too was not a scientist, he realised a host of areas where Hegel's contributions would be transforming, and he decided to transfer Hegel's achievements wholesale across to a materialist stance.

Marx applied it with great success to both Economics and Social History, and his discoveries began to “change the World”! But, though he knew it had to be done, he was in no position to do it: his priorities were clearly those concerned with a critique of the Capitalist Economic System, and the political tasks that such a criticism would indicate. But, not a single leading scientist was won over to the new stance, and Science continued for over a century increasingly compromised by its stance and methods, so that in 1927, at the Solvay Conference, the decision was made to abandon explanations as inadequate, and concentrate solely upon description via Forms and Equations, and the totally idealist Copenhagen Interpretation of Quantum Theory.

Here then is one part of the task.

We know many of the Dichotomous Pairs in Science, here are some examples:-

**Electric & Magnetic
Positive & Negative
Attraction & Repulsion**

they actually abound throughout all the Sciences.

Can we approach the errors and omissions, in our assumptions, which produced a clearly inadequate set of premises in this area. Can we expose what is wrong there, and correct them to begin the complete overall of Science?

That is the essential philosophical task in answering the questions addressed in this series of papers.



Premises, Premises, Premises II

How did Mankind both Define and Develop its Ground?

The exceptional Ape that was to become Mankind, did not historically perform a developmental trajectory wholly determined by, and implicit within, Natural Selection alone. No, indeed! For, all the achievements that occurred upon Planet Earth, due to that particular sequence of Revolutionary Emergences, of themselves, delivered the most profound condemnation of the usual underlying assumptions that have defined the progress of Mankind's assumed premises in what ultimately became present-day Science.

Let us reveal that very different trajectory, and see where it leads and determines how we often see our World to this very day! And, it was never a straight and obvious road!

Man did not exist outside of what he studied.

Indeed, as archaeologist, V. Gordon Childe always insisted - "Man Makes Himself!" - never determined by Basic Laws of Reality, but always socially, and at a wholly new Level, delivered by his unique social relations and social achievements, all made possible by both Language and Dexterity - as Frederick Engels described in *The Part played by Labour, in the transition from Ape to Man*.

The process started with the early Ape/Men, who descended from the trees to create a new Lifestyle - that of The Hunter/Gatherer, which was, in turn, radically altered by his "making of tools out of flint", and then, even more dramatically, totally transformed once again by the Neolithic Revolution involving living in settled communities with others, growing crops and tending animals in Farms, and interacting with others in settled villages.

Social features revolutionised everything and put Mankind into a wholly new Level.

Nothing that carried over from the previous phase, was adequate to the new phase.

Mankind was on new ground, not least in its multiple social interactions, occurring literally all the time. And the old, long-settled behaviours of the Hunter/Gatherer Phase, just did not suffice. Everything had to change! And, all that Mankind had, was what he had used for millennia, namely - "If it works, it is right!" - or Pragmatism.

So, that was where they started, in all the new experiences they now had to cope with. and they did very well.

Of course, such an approach actually explained nothing: it just became an ever larger bag of useable processes! But, clearly the obvious alternative to amassing an infinite collection of "Things that worked!", was to begin to ask, "WHY?", especially when some processes looked very similar.

But, Man was not yet equipped to answer such questions, and the wisest person they asked (such as their Chief or Elders) also couldn't deliver, so the search was on for those who thought they knew: and the usual answers were allocated to spiritual "super-chiefs", termed Gods!

Indeed, once again, such answers are still around to this day. And, even among those beginning to get more explanatory answers, there has always been a plethora of unanswered questions that still get that same allocation.

Nevertheless, things were now advancing at an increasing pace. including cities and even Empires, and within only a few thousand years (the Hunter/Gatherer Phase had lasted around 170,000 years), Mankind had added Writing and Metal Working, and by some 2,500 years ago, primarily in Ancient Greece, had begun to study Reality, and both accurately describe it, and represent it in Mathematics, argue about it using Formal Logic, and even attempt the first explanations!

It was at that juncture that the premises used ever since were first-established.

But, most certainly, not yet validated by any essential scientific methods and theories.

And what was achieved then, still pertains to this day, in spite of its woeful inadequacies. But, it didn't make further developments impossible: indeed, on the contrary, it enabled a truly vast range of developments, but via a contradictory amalgam of opposing stances, excused by a still essential Pragmatism. The problems were got around by ever more subdivisions into separate specialisms, bridged by Pragmatism, on one side, and the supposed universality of Mathematics on the other. But, it couldn't last, and the straw that broke the camel's back emerged in Sub Atomic Physics in the 20th Century.

Let us trace that slowly developing catastrophe from Ancient Greece to the present day. Believe it or not, two contradictory descriptions of the Nature of Reality both emerged at about the same time - roughly 500 B.C. The first, adopted in Greece, was The Principle of Plurality which we have discussed. While, in India, what emerged was The Principle of Holism.

Plurality considers that a collection of eternal Natural Laws were the source of all Reality: and these were totally fixed and merely summed in various collections and amounts to deliver all known phenomena. Clearly, this fitted in well with the practice of carefully farming studied situations in order to more clearly reveal sought-for Laws. In addition, Plurality was true in Mathematics, where all features were extensively abstracted and Idealised. While Formal Logic took on Plurality too, though it was and is totally incorrect to do so.

Holism, on the other hand, considers that "Everything affects everything else", so pluralist farming will always change what is being studied: Laws are to some extent variable, and hence always depend upon Context.

Plurality is the basic tenet in the West. Holism, due to The Buddha pertained in Eastern philosophies.

Now, though both are simplifications, it is Holism that is much closer to the Truth. So, how do we get away with it? We only use our extracted law in the exact same circumstances from which it was extracted. And of course, it works there!

But, we cannot use it to understand all situations in which that factor occurs. So, Plurality is fine for Technology, which has taken over, but, misleading in real Science where understanding is required.

Science has been converted into Technology. Understanding is increasingly sidelined!

But, the inevitable dénouement began to creep in towards the end of the 19th Century. Though James Clerk Maxwell had suggested a model for a Universal Substrate, he couldn't detect it, and in spite of the correctness of his Electromagnetic Equations based upon that Model, the continuing failure to detect such a Substrate caused it to be discounted as non-existent.

Also the failure to explain Black Body radiation led to Max Planck insisting that the energy involved had to come in tiny gobbets, which he termed Quanta.

Soon, Einstein was also able to correctly explain The Photo Electric Effect using Quanta too.

The rest, as they say, is history.

Relatives by Tony Cragg

(next)

Bolt by Tony Cragg



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