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## ANALOGISTIC MODELS III

WHY MODELS WORK / HIERARCHIES OF STABILITY / MODELS AND TRUTH
A CROSSROADS IN PHYSICS / THE MYTH OF NATURAL LAW

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*Analogue Computer*

Special Issue 35

# Analogistic Models III

# **Introduction:**
# Analogistic Models III

Welcome to the 35th Special Issue of the **SHAPE Journal** and the third and last instalment of our series on Analogistic Models - at least for the time being.

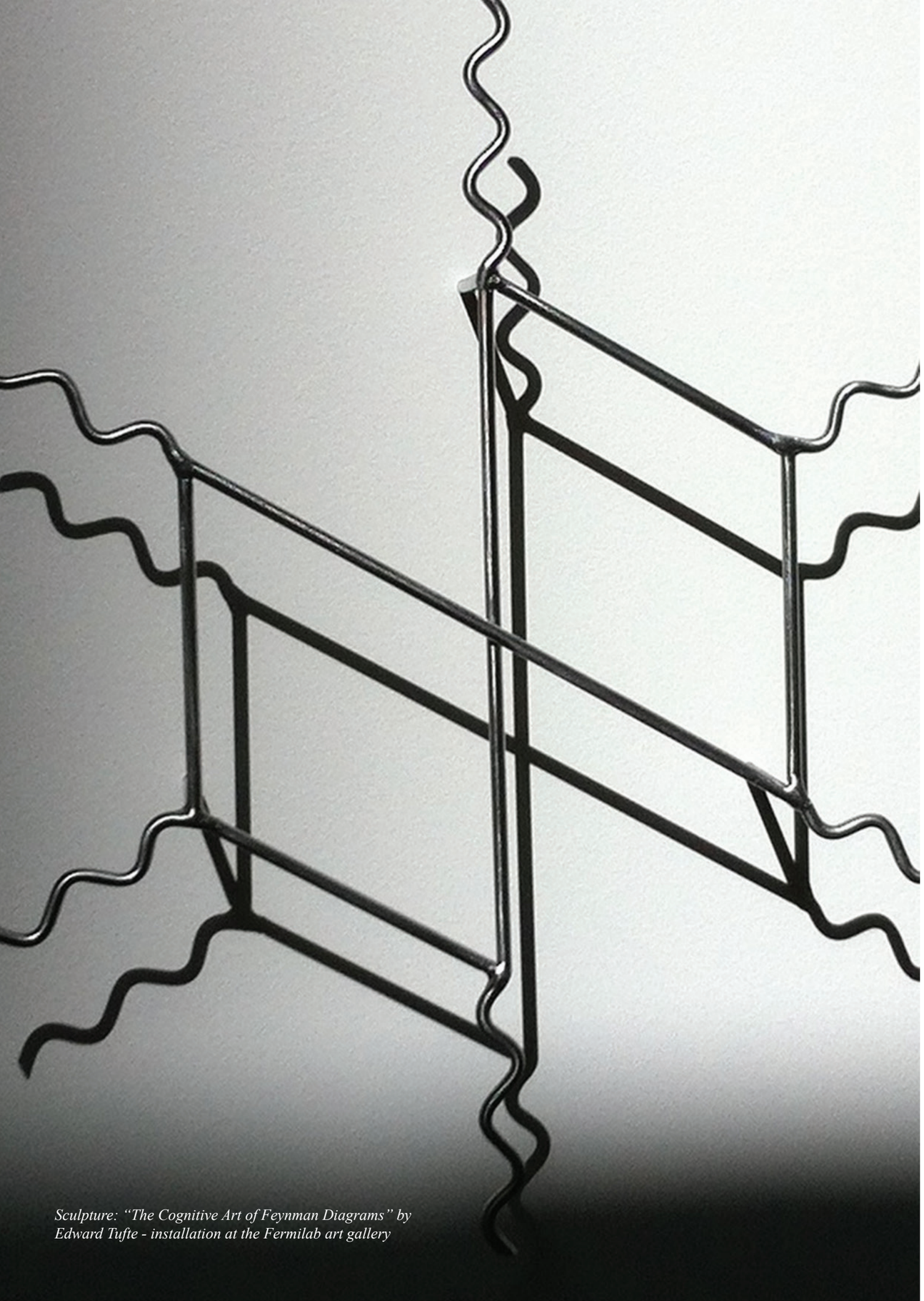
This continued study addresses the making of explanatory models of real-world situations as a means of furthering the understanding of studied areas, and contrasts explanatory models based upon analogy (Analogistic or Analogical Models as they are sometimes known) with those purely quantitative models, based on form alone.

Scientists and Mathematicians build these latter models using data gathered from situations *farmed* to produce particular relations, but not Natural Laws as is often claimed. The relations extracted are restricted only to those carefully farmed and maintained, non-natural situations.

The use of analogical models offers an alternative approach. There is a sound philosophical basis for analogistic modelling, based upon the discoveries of Hegel 200 years ago, which have been brought to the heart of these discussions, due to significant developments in both experimental methods and in holisitic theories in science.

**Jim Schofield** May 2015

*Sarah Sze: Triple Point (Planetarium), 2013*



*Sculpture: "The Cognitive Art of Feynman Diagrams" by Edward Tufte - installation at the Fermilab art gallery*

# Why Analogistic Models Contain Significant Content

Without a doubt the actual content of analogistic models has to be the key to their relevance in scientific explanation. For though they are clearly never fully accurate descriptions, and certainly also are always less than totally accurate explanations of the phenomena they are used to tackle, they are also never totally arbitrary inventions, they must contain something objective about the modelled situation.

Let us attempt to reveal what their contained objectivity can be.

Now, though we can, and do, insist that they are analogues for what we are investigating, they are not, and could never be, 100% accurate – containing a full set of one-to-one mappings, they are intrinsically similar situations, and they, therefore, reflect the common sequences, and kinds of entities and properties found throughout Reality quite naturally.

Perhaps surprisingly though, even artificial analogistic models can also be profitably constructed to aid in the understanding of newly addressed phenomena, as long as the constituents involved are taken from concrete evidence of possible components occurring elsewhere in concrete Reality. The method then is to involve such initially unrelated elements into a model, expressly to deliver the actually noticed properties of the thing that you are attempting to explain. Indeed, even more surprisingly, it is often these kinds of analogistic models that deliver the most profound insights, and can also demolish false assumptions dramatically. I will definitely include the mention of such a model later in this paper.

So, let us start by looking at a series of valuable examples of various kinds of analogistic models.

James Clerk Maxwell's famous model of the Ether (that was then presumed to fill all of the Empty Space in the Universe) was just such an informed and creative construct. He knew about many kinds of phenomena, which he had to explain, and the usual simple (and magical) Ether was just too vague to explain anything adequately for him. So, knowing what he wanted to produce from his model, he brought together (without any evidence) the sorts of constituent that might, if appropriately organised, deliver what hew knew was necessary. He adventurously constructed "vortices" and "electrical particles" into an analogistic model, and from this he managed to deliver his famous equations of electromagnetic radiation.

His model did not by any means reveal the actual form of the Ether, and his constructs didn't exist as such, but his model delivered a great deal more than any of its predecessors, and even more than he designed it to deliver. His resultant Equations were revolutionary.

Now, before we explore why such "ficticious" models worked, let us look at some others. Einstein's Space-Time continuum was also an analogistic model.

Once again, no one could prove such a thing actually existed, but it did deliver what Einstein knew were properties that needed explanation. His famous Theory of Relativity was based upon this model, and many things, in addition to what he consciously put into it, which came out of his constructs have since been confirmed in Reality.

Even Niels Bohr's original model of the structure of the atom with a central positively charged nucleus, surrounded by orbiting electrons in an entity which was mostly empty space, was taken from the Planet-moon systems observed in our Solar System. It was not a true description of it, but yet another analogistic model. Once again, it defined far more than the models that it replaced, and that was again because it contained more real features within its conceived-of forms.

Even later, when confronted with a confusing maze of "fundamental particles", Richard Feynman devised his famous Feynman Diagrams – they were, of course, the most abstract analogistic models, and delivered what no other models could, namely what was called Quantum Electro Dynamics (QED) – the most accurate and useable way of dealing with this amazing Particle Zoo.

And, there is, perhaps, the most audacious version of an analogistic model produced by Yves Couder in his attempt to find a new way of revealing the secrets of the sub atomic world, by modelling it in the Macro World out of unbelievable components. He revolutionised experimental physics by devising and constructing a model entirely out of silicone liquid and various vibrations, resonances and crucial recursions. He managed to create his famous "Walkers" entirely from the above, which was a kind of self-maintaining entity with properties closely comparable to those within the atom.

Finally, the author of this paper, confronted the anomalies of the Famed Double Slit Experiments, decided to devise an undetectable Paving of Empty Space composed of undetectable particles – in fact mutually orbiting pairs, each consisting of one electron and one positron, which, because of their opposite matter types and electrostatic charges, became undetectable in this joint form. Yet, this paving actually fully explained the anomalies of the Double Slit Experiments without any recourse to the flights of fancy delivered by the Copenhagen Interpretation of Quantum Theory, when that is used as the sole dependable source for dealing with all sub atomic phenomena.

All the anomalies fell away! Nothing of idealist philosophy was needed to make sense of what occurred, the new materialistic, analogistic model of Empty Space did it without difficulty. [It was both as analogistic, and as artificial, as Maxwell's model of the very same thing]


## Descriptive Analogies

It is obviously essential to differentiate between ordinary analogies and coherent analogistic models. For, the single analogies were Mankind's first attempts at explaining things in terms of already known, similar situations.

They clearly never were, as such, actual explanations, but more reliable descriptions in terms of something better known. But, the very different Analogistic Models are never mere "found analogies": they are always to some important extent constructed out of elements from elsewhere, but here brought together in order to "explain" a phenomenon.

Interestingly, the old, straightforward analogies still abound in Science, and, in the perplexing areas studied in Sub Atomic Physics, they are very common indeed.

BUT, they never really explain anything, and they don't ever have to be consistent with one another at all. Indeed, they absolutely NEVER are. Each "supposed" analogy has only to fit a single feature at a single time, so attempts-to-explain become unrelated and inconsistent set of such analogies.

Analogistic Models can never be such!

They have to be broader than what is being addressed, and never narrower. So, their coherence and consistency are absolutely vital. The appearance of following the same path as the great Analogistic Modellers is feigned by collections of one-off trivial analogies.

They couldn't be more different!

Needless to say, a barrage of criticism followed, either from the mechanical materialists of the old school, or from the idealists of the new school, with, as a banker, the fact that no such Paving had been physically detected! But, of course, that isn't the point, is it? What is important has to be whether this analogistic model *explained* a great deal more than anything else could.

Now, how can we explain these relative successes clearly based upon non-existing constructs?

Their value is that they are determined by the features in Reality to be explained – and, initially, at least, this can only be achieved by organising what is generally known into a purposely-constructed model, aimed by using real features from elsewhere, into an amalgam, which delivered what was required.

Such a model would never be the Absolute Truth, but it can be both intelligently and intelligibly constructed to contain more Objective Content – elements, parts or aspects of the Truth, than what it replaces. And in doing so, it makes the actual real phenomenon more understandable: and also by crucially revealing things that were absent previously, makes further developments more likely, if only by establishing a whole new kind of model, which allows us a great deal more to consider with some aspects real, and others intelligent placeholders for what has yet to be revealed.

But, why should these analogies even be available?

Why should such similar (though possibly also profoundly different) resonances occur in such different contexts? The answers must be contained in what it is that is similar in all phenomena, and hence possible everywhere in one way or another?

We really have to address the question, "What is common throughout all possible phenomena that always guarantees that such analogies will certainly exist?"

It must be that they are all – every single one of them, always produced as the result of many different, simultaneous factors, which will always come together into overall situations of Stability (if only temporary). Form the possible results of such complexities, when the factors present are NOT separable, eternal laws, but on the contrary, mutually interacting and modifying arrangements, which will finally settle into a self-maintaining overall stability.

Clearly, features will become present which are a result of this higher level of stability, and hence about how such mutually modifying factors arrive at such a state. Such properties will be true, at least at the abstract level, of all such systems. Indeed, when you think about it, it is likely that all phenomena are such!

The search for fundamental particles and their basic eternal laws is therefore a pluralist myth. No matter which "law" you choose to address, it is certain to be the stability reached by multiple factors at an even lower level!

The aims of pluralist Sub Atomic Physics are impossible to achieve, with the assumptions and principles that underlie the entire area of study.

The Principle of Reductionism is clearly based entirely upon Plurality, and hence assumes that Analysis will be always possible, all the way down to its targeted Fundamental Particles. These suggested analogistic commonalities seem to indicate very different relations could be expected to get to such stabilities in very similar ways.

Such things as spins and orbits are likely to occur at all levels, as are things like vibrations, resonances and recursions.

It is very likely that this is what we are settling upon with our analogistic models.

Not ultimately Absolute Truths, but commonly occurring natural resonances, which we term as Common Objective Contents.

# **Hierarchies of Stability**
## and their Inevitable Dissolutions

In attempting to understand Reality, we make certain simplifying assumptions, which simultaneously both allow significant advances to take place, while also ultimately limiting just how far we are able to go on that basis. *All* the gains we make necessarily have this contradictory nature. It is unavoidable, when we attempt to get a handle upon phenomena, and try to explain them.

For, first of all, we have to limit ourselves to graspable areas, either by conceptual simplifications, or by strict physical isolations, or even both. We have no choice in doing this!

If, as the holists insist, Reality is a Hierarchy of interconnected Levels, within which everything affects everything else, THEN, what we try to address is almost impossible. Nevertheless, we can, indeed, make things easier by these self-imposed limitations.

For, by such means, we isolate factors, which are normally both embedded within, and, indeed, modified by, a complex natural context, and hence are delivered of a distorted view (usually either purified, idealised or both) of a single, purposely-targeted contributing factor, which in spite of its drawbacks, is still a step forward, though never ever delivering an absolute gain, for what is revealed is NOT the same as what pertains in Reality-as-is!
And, though all this means that what we arrive at will inevitably be something of a man-made construct, and it will also be a reflected product of Reality, though filtered and formed by our enforced limitations, and this has quite surprising effects upon what we manage to extract and then formalise.

Of course, what we get is never pure invention, for our modifications force us to make Reality, both the subject of our investigations, and also the final arbiter for our extracted formulations. This means that our results will always contain something objective. Rather than revealing Absolute Truth, we have in fact learned how to seek what we might call Objective Content.

NOTE: But to call this a part or view of Reality is also misleading, because you will never make Reality-as-is out of "sufficient numbers" of these supposed contents. They will always be distorted by their isolation, so a simple sum would NOT do it! So, this Objective Content will never be sufficient but will suffice in many suitably tailored areas. Yet, it will also, in the end, reveal I unavoidably inadequacies, and demand a thoroughgoing review of the bases and assumptions employed, in order to get any further.

Rather confusingly, these ways of proceeding can also reveal new methods and techniques, which can be always exposing new things we wouldn't have had access to previously. This, is, of course, the technological aspect of how we investigate and employ what we discover.

Think about it! Though we take situations away from how they occur naturally, we actually deliver specially designed Domains, within which we can predict, and some of the things we can achieve, would be very unlikely indeed in totally unfettered Reality. And, these pragmatic, discoveries-by-chance, give the impression of constant progress, which is certainly not true, if understanding Reality is your prime objective! It merely gives wider and wider access to tailored and accessible data, though if the conceptual problems are not addressed, they will just proliferate studies into more and more separate areas, where exploitable things can be found and used.

Such proliferation is not, of itself, a progress in understanding, but rather only a maximising of the possibilities of successful technology. It isn't actually Science at all! Don't ask a brilliant technologist to explain *why* it is so: he won't know (or possibly even care!).

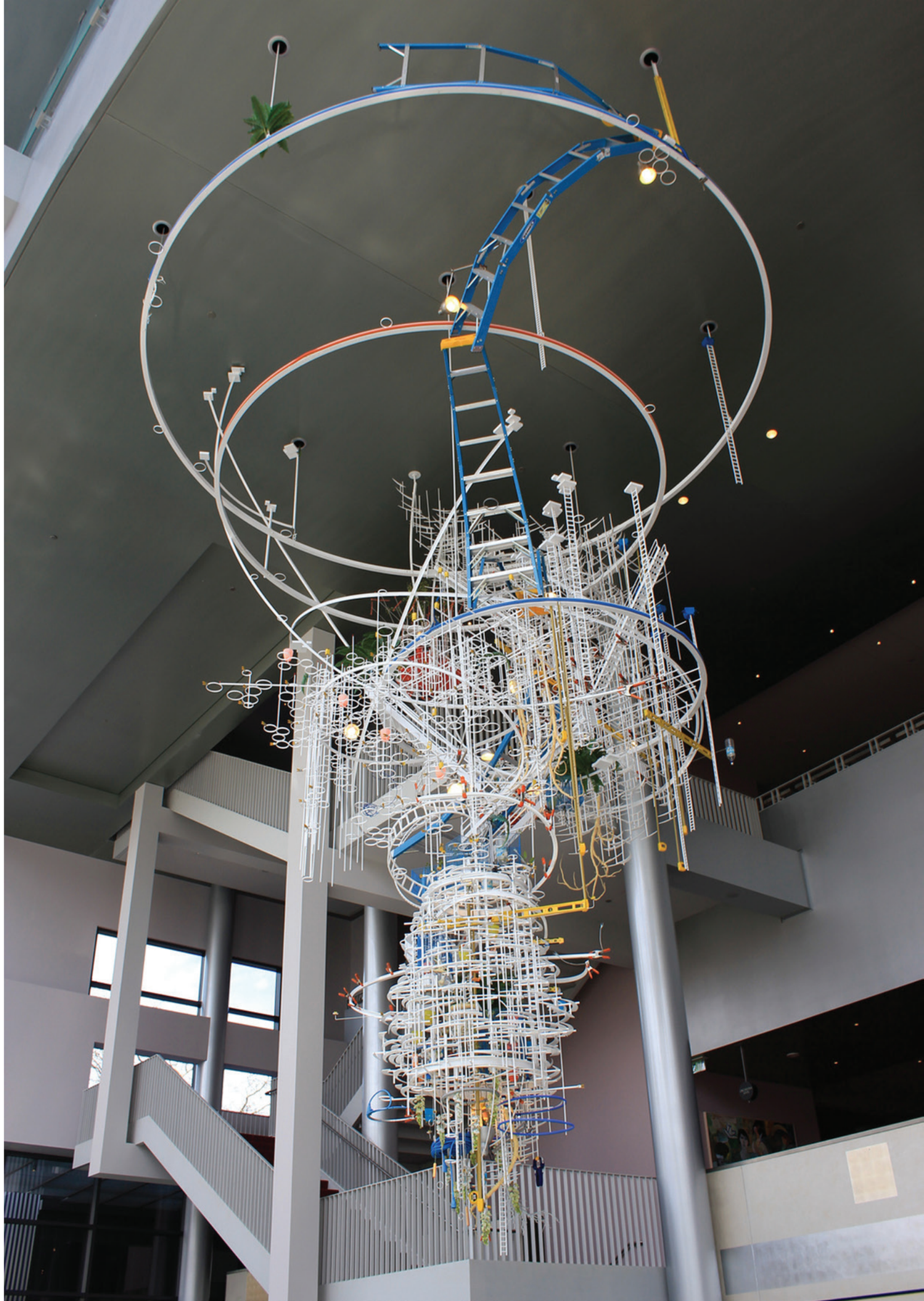
Our methods, therefore, divide Reality up in an unusual way. We, naturally, experience it as an integrated whole – what I call Reality-as-is. But, that isn't what we investigate! Indeed, we are defeated in any direct assault upon Reality by its variability and complexity, so we are forced to modify it, in order to be able to extract anything reliable at all. Experience soon suggested that attempts to limit and control small sections of Reality, in such ways as to remove some, yet control other factors, in order to reveal one or another of its "constituent parts", was indeed possible, if misleading, from an explanatory perspective. So, we gradually got better and better at this "holding still", until we could both display and extract what seemed to be clearly individual components. But, of course, by these means of revealing and extracting, we were dividing Reality into non-natural, and handle-able Domains, each with its non-natural and handle-able main component. We were throwing away what Reality did when left to itself, for what could be done to it, to expose and allow extraction of what might (in those defined contexts) be useful!

Let us be clear: we were forcing a man-made Stability onto a chosen area, which made any analysis much easier, predictions possible, and hence purposive productions arrange-able!

Effectively, in order to get to know the "animal", we first killed it, and, when in that state, we analysed it! It wasn't a *falsification* of what we wanted to study. We could learn a great deal about the sort of things that it contained (especially if we repeated the method with different targets in mind). But, our subjects-of-study were no longer "alive"!

We studied a stabilised piece of Reality, and hence had, in our hands, only presumed-to-be-eternal laws! What else could we assume? No living changes were ever allowed to occur!

NOTE: Have you ever wondered why the Second Law of Thermodynamics is seemingly everywhere to our scientists. Could it be the only way that Reality impinges upon all badly maintained Domains?



Now, these are very important points, for we essentially and necessarily stopped it changing, as it could indeed do, when unhindered and unfettered.

So, though we found out some things by these methods, they could not reflect what was happening in Reality-as-is, and crucially we were totally incapable of delivering any qualitative changes as would occur naturally in Nature – the actual natural development of Reality remained unknown by these means.

Now clearly, this is a very serious flaw. In spite of any real gains and uses that we were able to perform upon our controlled Domains to many very useful ends, we were purposely prohibited from dealing with natural changes.

The trajectories of all natural changes, as well as most complexity of developmental changes were made totally unavailable due to our methods of investigation.

Our Science is a Science of Stability, and thus limited to quantitative changes that did not challenge the given Stability. Though it was a great step forward upon our previous dealings with a wholly independent Reality, we could not deal with the absolutely essential features of Qualitative Change – either locally and trivially, or generally and significantly in the Evolution of Reality at large.

We merely divided-up states evident in Reality into assumed-to-be Stabilities.

Transitions between them were never properly addressed.

NOTE: Would you like a real example of Science?
Stanley Miller enclosed what he presumed were the non-living contents of the early Earth in a closed system and let it rip.
Within one week Reality, all by itself, had produced amino acids!

# Models and Truth
## The Difficult Path via Contradictory Models

The current work on Analogistic Models has not only revealed the indirect and reflected nature of Explanation in Science, (and all the many necessary diversions in the path to understanding), but also has highlighted the inadequacies of the strictly formal – the purely quantitative models, which deliver ubiquitous and universally-trusted equations.

Indeed, for centuries, scientists knew that they got closest to the truth with a combination of these two kinds of models, which delivered contributions from very different approaches, and which always fell well short if considered as sufficient by only one or the other.

Of course, the formal equations were extremely useful, for they enabled the most impressive prediction, which required in such a model, and it allowed these to be delivered for required future situations, and, therefore, facilitated the production of intended outcomes as in devised systems of production.

Yet, taken alone, such an amalgam of equation and use is properly termed *Technology*, and only when the alternative explanatory models are included, could the whole thing truly be termed Science.

And, this was the case over a considerable period of time, for when one was lacking, the other could fill-in-the-gaps. Though this was obviously a pragmatic coalition of approaches, with very different premises, the two-sided attack, consisting of an explanatory, analogistic model, on the one side, and a useable quantitative model, on the other, allowed a kind of synthesis to be achieved. But, it wasn't an integrated system. It was more like switching tools mid-task, when the current one proved inadequate. It was Man at his pragmatic best, disregarding contradictions, if successful uses and explanations could be achieved.

But, neither approach ever delivered the true nature of what was being studied.

The analogistic modelling, though more informative and extendable than equations, were always and inevitably later proved to be "close-to, but not true", explanations of what was occurring, so that a constant review, adjustment and even total replacement, was always necessary to be able to continue to develop our understanding.

Also, considering the fabled Natural Laws, as embodied in the formal Equations, they were NEVER taken from Reality-as-is, but always from Domains that were carefully organised to get as close as possible to a single, glimpsed, and now targeted relation. This local area, or Domain, was farmed and then rigidly maintained to best reveal that targeted relation. And, what was extracted therefrom, instead of being limited to that well defined and maintained context, was instead seen as being a means of revealing a perfectly natural law – independent of that special context.

This joint approach, though critically flawed, was nevertheless a brilliant invention of Mankind. For it, for a considerably extended time period, allowed both the major objectives of such studies to be carried through. Real gains were made, even though neither side was delivering the really existing Truth.

But, these actually constituted what Hegel described as a Dichotomous Pair, for on rigorous comparison, they were clearly contradictory with each other, and even involved distinct philosophical approaches. Throughout many centuries, there were always those who realised this, and attempted to resolve the contradictions with a single integrated viewpoint, But, that never occurred, so, for a very long period, BOTH were kept exactly as they were, and switches between them were made in the most pragmatic way. Indeed, the underlying differences were so significant that "Science" began to split up into a series of "cooperating" sub-disciplines – not only the obvious Mathematics and Science, but Science itself divided into experimental, theoretical and even engineering specialisms – each with its own defined standpoint.

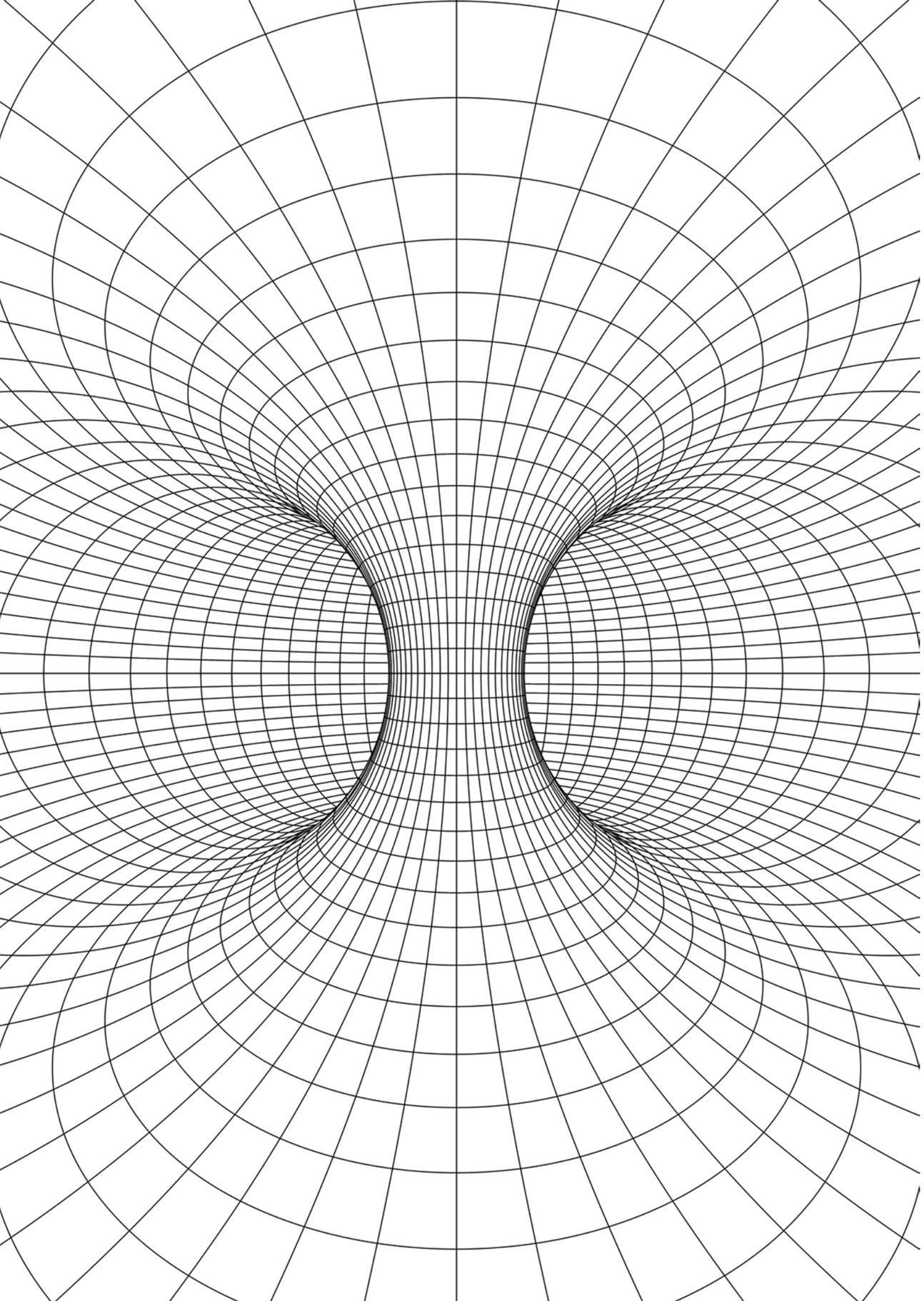
But, we must give extra credit to the explanatory side of any dichotomous pair of definitions. An effective Analogistic Model (unlike a mere formally descriptive equation) also delivers more than the revelation of its parts. It delivers beyond the mere construction, for, as with all sound analogistic models, it can deliver a great deal more, not only predicting behaviours that were not consciously built into it, but also, enabling more general features to be extracted, applicable across an extended range of related phenomena. It truly explains much more than any Equation!

We must always remember that our ultimate objective of fully explaining a real world phenomenon, is always a surprisingly big ask. For, at best, an explanation will be in terms, which, themselves, require similar study and understanding. So, the true scientist would always move on to tackling those too.

It is an impossible task for any animal, even one as intelligent as a human being, who has based his historical success upon just how adept he has always been at pulling himself up by his own bootlaces, so that even when his analogistic models deliver, they will never give the whole story. They will continue to appear to be correct, right up to the time that the contradictions begin to inevitably arise once more.

The justifications for any such model would be undermined when contradictory conclusions could be generated due to the ever more evident inadequacies of whatever simplifications and idealisations had been built into the model.

And, the inevitable impasse would again bring things to a halt.
NOTE: It is important to be aware of the differing foci involved in these two approaches. Both, in an important sense, reached beyond the particular phenomena being investigated. The study of quantitative data, when significantly organised, could reveal an instance of a common quantitative relation – a relation which,



occurred in many unrelated areas, and had usually been studied in its own terms, by a very different kind of investigator – a mathematician. Indeed, that kind of study gloried in ignoring absolutely everything except the Form involved, and had as its most important technique, the easy extraction of Perfect Form. These were always idealisations of what actually occurred in concrete Reality, but were, in their ideal versions, clearly investigatable – independently of any real concrete contexts

On the other hand, the explanatory method did the very opposite, and concentrated upon entities, properties, causes and consequences, and these too displayed features common to a wide range of different phenomena – such as oscillations, spins, orbits and many others. The sought-for causes could never be the same, for each recognised phase would always be followed by very different following phases, and determined by each changed concrete context. The idealisation which, was the essence of studying "Form Alone", was at odds with seeking causes, and every partial success would always, with continued study, demand more investigations, and different and better explanations.

Thus, these two approaches were not focussing upon the same things, and could, and indeed often did, contradict one another. Each type of specialist would ignore the differences coming from the other side, and a Dichotomous Pair of clearly contradictory positions, would not, and indeed, could not, be resolved, but would occasionally bring the whole process to a dead halt!

It is interesting just how these cul de sacs were considered! Yet, the very best scientists were stimulated by them, for they knew that they were at the point where a significant breakthrough could be made. Others, though, became disillusioned, and longed for the seeming Absolute Truth that formal equations appeared to deliver.

In the first quarter of the 20th century, following the discovery of the quantum, these problems led to a major retreat by physicists. They finally decided to abandon Explanation entirely, and concentrate only upon Equations to deal with the most problematic area – that of Sub Atomic Physics. And a major retrenchment brought that area of Science to its knees!

Of course, the participants, involved in this, would never agree. They had an experimental methodology, using ever-higher energy atom smashers, and were constantly supplied with discoveries of new particles, apparently giving them ever more detailed knowledge about the most fundamental area of Science, so they merely upped the speed, and generated more and more of these "Bases of Everything" – though what they were actually producing was the diverse detritus from their effective, forced dissociations. But, it was a dead end! And, as it disappeared up its own defined orifice, it could only keep going by the re-importation of speculation, to attempt to give colour and substance to their increasingly inadequate Formal Laws. No other path was available!

And, Sub Atomic Physics morphed into a branch of Mathematics, with a beguiling mythology – a wonder-world of "Strings", "Symmetries", Multiple Universes, Wormholes, Dark Matter and ever more Probabilities!

Clearly, the question had to be addressed, "How could physical, analogistic methods be re-introduced and properly understood for what they could deliver?" Indeed, the actual Philosophy of all these things had to be tackled. The assumptions which led to these approaches had to be both revealed and corrected, for it had to be these assumed bases that had caused the irresolvable contradictions, and could only be transcended, by improved replacements of those assumptions by something evidently better.

Now, the key, and flawed, assumption for both sides was most certainly The Principle of Plurality. This simplified the study of complex Reality by assuming that everything was caused by entirely separable and eternal Natural Laws. And, if this were the case, all isolations, eliminations and controls instituted in attempting to reveal one or another of these laws would be valid. For, then the manipulation of an area of Reality would NOT affect its constituent laws, but would, if done properly, reveal each one in its pure state, then unmasked from the overall, summed effects of all the others simultaneously involved. Thus, this assumption of Plurality enabled the supposed legitimate "farming" of isolated sections of Reality to reveal each "Eternal Law" in turn. So, this would validate both types of investigation if the Principle were true.

But, as investigations penetrated ever deeper into lower and lower levels of Reality, the pragmatic dualism finally fell apart. And the Dichotomous Pairs of inevitable contradictions occurred with increasing frequency, as were the explanations that attempted to make ever wider and more comprehensive understanding, and strove for not only separate explanations, but also an integrated overall view – it was the most threatened by the new general crisis.

The "Equation-first" people with their inexhaustible source of Form – Mathematics, could always Find-a-Form that could be made to fit a suitably-farmed context, so they refused to question their ground, and insisted that what they had was certain, and could be taken to a conclusion. They, therefore, abandoned the classical approach to explanation entirely, but had to replace it with formally suggested Speculation instead.

So, in conclusion, having diagnosed the weaknesses of the old dualist approaches, and condemned the new idealist alternative, it is clear that a new and better stance and methodology must be established and developed. It will, of course, be a major undertaking, for the rejection of Plurality infers at the very least a turn to the exact opposite – Holism, in an attempt to transcend the impasse currently disabling Sub Atomic Physics. A Holistic Science – both in stance and in new methods is required to be built and used.

# **At the Crossroads?**
## The Current Crisis in Physics

Let us, at least initially, assume that Reality is wholly determined by Natural Laws. For such, after all, is the basis of both Science and the modern approach of many religions.

For instead of an always available and interfering God, the modern consensus in such circles is now more like a creator, who not only made the basic Universe, but also equipped it with a full set of such Natural Laws, set it in motion, and, thereafter, left it to self-develop in many diverse ways.

The scientific version insists that the Universe does not need a God, but nevertheless it delivers essentially the same trajectory of subsequent development *from* basic Laws. The key ingredients are these Natural, and Eternal, Laws. They may not define a God's will, but they deliver absolutely everything that there is! But, to give things some sort of initial energising impulse, it has also been suggested (from available evidence, of course) that an initial Big Bang plus this eternal set of Natural Laws would be entirely sufficient to generate everything now extant – Universe-wide!

So, there is, surprisingly, a universally agreed view, whether it is scientific or religious - everyone seems to agree upon the primacy of Natural Laws! Hence, the "seekers for Truth" have the objective of revealing these Laws, either for the greater glory of God, or for tracing the development therefrom, which has resulted in our present World.

Now, the scientists have a problem! What produced, or alternatively who devised these Laws, in the absense of a supreme being? Or, more meaningfully, where do the Laws of Nature come from? And, on what original entities did these disembodied Laws actually act? Was it just a number of tiny Fundamental particles, or just an inordinate amount of Pure Energy alone, from which all the substances of Realty not only gradually emerge, but also even produced an active and affecting context?

And, even more difficult, "How could such wholly new levels such as Life and Consciousness develop from what must initially have been a small set of Laws, and presumably a small and finite set of substances?" So, how could these crucial game-changers ever occur?

Also, would it not be inevitable that, as the complications grew ever more detailed, that wholly new entities, with completely new properties, and new Laws to relate them, somehow, have come into existence? And, if so, how would all this happen?

NOTE: It is clear why, early in its history, Mankind had to conceive of a human-like intelligence, that would be available, and have the power, to intervene at all these possible turning points, and add the necessary extras. *God* was the answer to all such questions!

For, a Universe that simply was, in essence, its original material parts and their relating Laws that would simply complicate, without creating anything new. And, in turning this around, surely every thing that subsequently developed ought to be able to be analysed into its basic, constituent parts – that were there from the outset as their only possible ultimate source!

This supposition has been the cornerstone of Science since its inception, and could only be supported by the subscription to the simplifying Principle of Plurality.

For, this insists that all wholes are made from parts, and those parts in turn from lesser parts, which, if, and only if, Plurality were true, would be the case all the way down to the Final Fundamental Bases of Everything! AND also, crucially, these never change! For, Plurality makes all of these, from top to bottom, separable, and hence revealable! They can *add together* to give combined effects, but they are never in themselves changed into something else, over time or by context – something qualitatively different. It is the sole basis for *analysis*.

If Plurality did not hold, analysis would be impossible. We would not be able to continually subdivide Reality all the way back to its origins, for in such simplistic divisions we would be losing what was new in all developments.

Yet, it is a necessary piece of "self-kid" in order that Science is believed to be what it is assumed to be. Nevertheless, in local, relatively stable situations, that set of assumptions is then reasonably close to the truth. For there, some sort of stability could be assumed to be true. It meant that we could investigate the World in usually small Stable Domains: we could explain such stable patches all over the place, and consider that Reality was simply their sum. But it isn't!

Not only do we have to include the indisputable Evolution of Reality, where level upon level of new aspects of Reality were, at various times, actually created, but also we ignored the purely temporary nature of all local stabilities too! On the one hand, the whole trajectory of development from the Origins to the cosmos, Life and even Consciousness, but we were dividing a static Reality into small "permanent" patches, which, with that standpoint, could never change into something else.

The question must be posed simply and directly, "Could this pluralist basis ever deliver explanations for such creative innovations as Life and Consciousness?" The answer is an indisputable, "No!" Scientists have been hammering at the Origin of Life for literally centuries and have been unable to create the most meagre sliver that could be called Living Matter. And, with their pluralist stance they never will get even an inch further! Could this pluralist "working hypothesis" ever be used to show how Life developed from non-living matter, and how Consciousness - the self-awareness of certain Living Forms of themselves and their context could emerge?

You must already be clear that this is impossible: they merely rearrange known simplified elements into non-mutually changing patterns, but Life is certainly never that. How can a new *arrangement* of matter suddenly produce Life? What is happening is a radical transformation into something wholly new: the process is creative and transforming, not merely additive.

Thus, it is clear that, on the most important questions facing scientists, Plurality is totally inadequate: it works only, and then temporarily, in either temporarily natural, or man-made, stable Domains. Solutions "outside of the box" are excluded, and hence prohibited!

"BUT", I hear you say, "That standpoint delivers a simplification of Reality, which has been incessantly proved to be extremely useful, and many analyses and predictions, not to mention a whole Economy of Production!"

And, who can disagree with that! But, it is the investigation and use of a farmed version of Reality it has to both limited and transformed, in order to describe, analyse and use it. It is, in its highest achievements pure Technology only. It isn't either real Science or Philosophy: it does not deal with Reality-as-is, or, even more important Reality-as-it-can-become, or even Reality-as-it-actually-came-to-be!

Clearly, the pluralist approach re-defines Reality in terms of separate, stable pieces, which can be observed in carefully arranged situations, but which, because of this isolation and simplification, cannot ever deal with qualitative change. It depends upon what can possibly cause such changes. The only extension of the pluralist position to accommodate such changes, is one of mere "quantity-into-quality", where mere changes in the size of certain parameters automatically delivers qualitative changes, but you have to ask, "how, exactly, can such a development occur?" It is certainly inconsistent with the basic premise, and smuggles in, without any explanation new features, appearing by some unknown process. It is a Science of the static: a study only of stable Domains!

Clearly for pragmatic, local objectives such an approach can be adequate. Indeed, it is currently essential, for there is no obvious alternative. But, to understand a changing and developing Reality, it turns out to be totally inadequate. To reveal those aspects of Reality, which enable real qualitative changes, will need a very different approach.

For many centuries in Science there was, indeed, an alternative methodology. It wasn't then tackling the more profound developments, but it did not depend exclusively upon Form alone as Plurality certainly does. It identified entities and their intrinsic properties, and via these made attempts to explain why things happened in the way that they did.

But, they had two important features. First, they always went beyond the data sets, which were the only source for relations and equations. Instead, they always attempted to *explain things* across more extensive areas of obviously closely related phenomena, and to get anywhere; they had to include something very different.

They used the idea of Analogies!

By relating what they were currently studying to other similar phenomena with recognisably similar features, that they already knew something about, they were able to construct man-made analogistic models, which made some sort of meaningful sense: they, at least, partially succeeded in explaining things, but, of course, never absolutely.

The means employed was relative- it picked up resonant features from analogous situations and made them into "real" elements in the new area, though they were never that! They were in fact models, which contained some things that delivered aspects, parts or similar processes of the "real truth" – but they were still to a significant extent inventions. We say that they contained some *Objective Content*, and were, therefore, a valid step forward in an explanation.

Now, for a very long period these two mutually exclusive approaches persisted together. The formalistic, quantitative method based upon plurality was vital in prediction and production, but was always clearly limited to maintained Domains only. While the Theories (explanations) based upon analogy, were an amalgam of noticed generalities of quality, but which were always temporary gains, and would constantly be required to be improved. Though, at the same time, this version was always much wider than the formal approach: it gave an individual phenomenon a certain context.

The two approaches were both maintained, and used when appropriate. So the miracle of this dualist approach was contained in just how much it was able to achieve compared with what Mankind had been able to do previously.

But, such compromises cannot ever be sustained indefinitely! Whatever the predictors and users said about their pluralist approach, it certainly was entirely pragmatic. To make real progress, it would have to involve explanations that could lead to extensions into wholly new areas. Otherwise, what Science would be limited to would be a vast catalogue of separate laws and their limited Domains of Applicability.

And, both of these were views of Reality standing on one leg – but a different leg for each view. The inconsistencies between them would begin to rankle. As the difficulty of finding appropriate analogues increased, the flaws in the analogistic models became ever more glaringly wrong, and a battle was joined between the two flawed methodologies – the quantitative formalists and the analogistic theorists – the equation people and the explanation people, if you like.

Both of course, were inadequate, but the blinkered yet pragmatic view of the formalists was more and more preferred, instead of the increasingly misleading analogistic modellers.

At Solvay, in 1927, the formalists led by Bohr and Heisenberg won the day, and Einstein and the explainers were defeated.

Now, why did things play out this way? Firstly, neither group really understood the actual strengths and weaknesses of their different methods. The assumptions and principles involved were implied without being overtly conscious by those that used them and certainly without justification, and therefore the battle was joined as to which approach better reflected the Truth of Reality, and at this point a both temporary and false resolution could only go one way.

The reason for this was the discovery of the Quantum, which opened up the most damning can of worms for the “explainers”.

Whereas, the mathematical physicists could always “find a form”, and an appropriate containing context to allow them to proceed, explanatory modellers could not. The formalists could carry on without an explanatory narrative, while those who sought such explanations were floored by the contradictory evidence delivered by the quantum, in a whole series of experiments.

To actually make any real progress the Principle of Plurality, subscribed to by both groups, just had to go. Plurality had to be dumped for the much more difficult, and more demanding, yet also more accurate standpoint of Holism. But this didn’t happen.

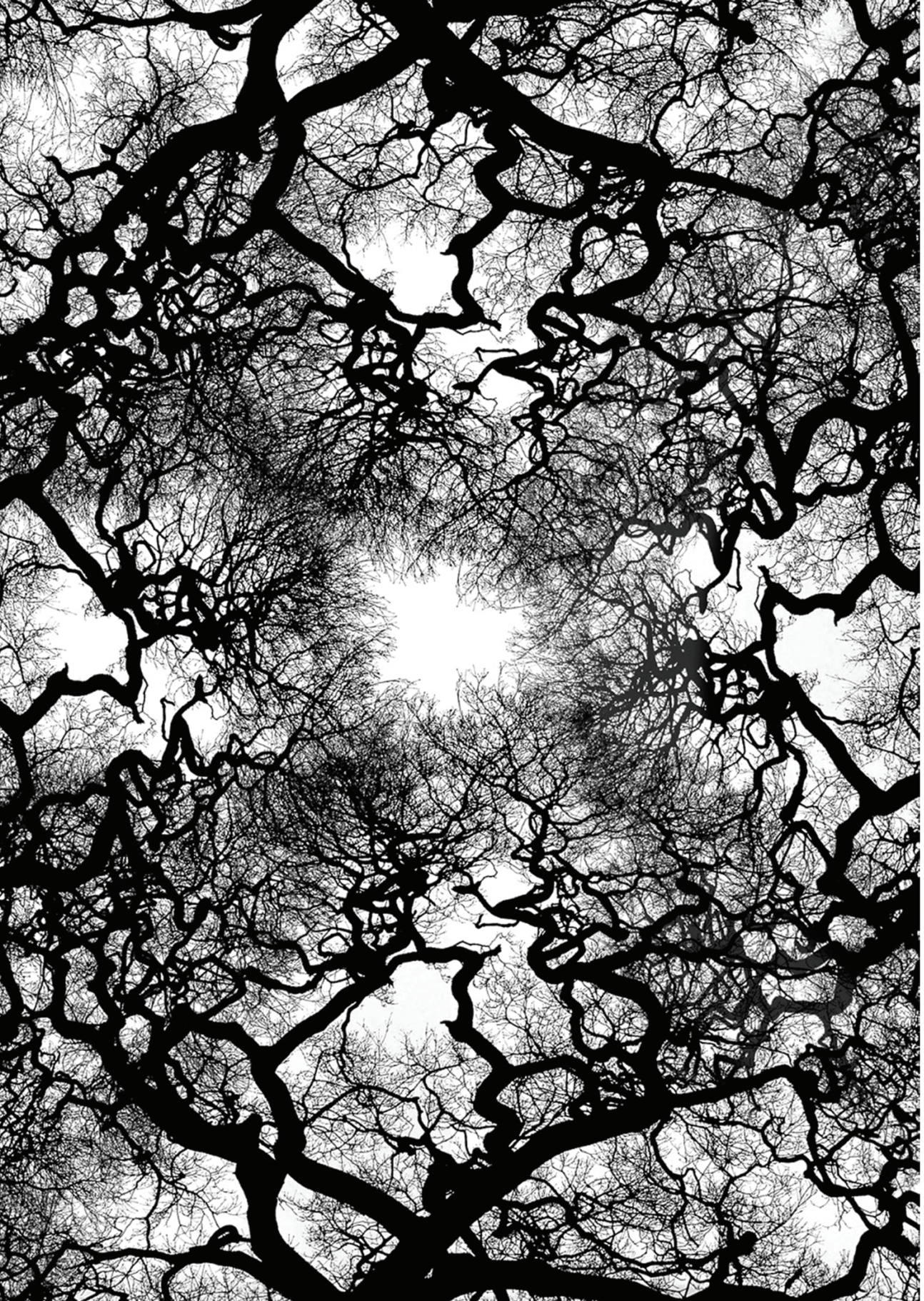
Thus began a remarkable interlude in Sub Atomic Physics, with both exciting successes, and the most insupportable speculations. For, the latter were no longer analogistic and therefore being grounded in Reality, but instead purely formal and hence speculations entirely based upon Form alone.

It was, and still is, an objectionable, aberrant growth, and is clearly getting nowhere – fast! It is the most profound of the impasses experienced by Science, and can only be transcended by a major transformation of the philosophical bases involved. The Principle of Plurality can no longer be maintained.

The world is certainly NOT mechanistically pluralistic, but definitely qualitatively holistic. We have run out of rope with our current assumptions, and they must finally be rejected and replaced.

Of course, we do not start from scratch. For the analogistic approach was, and still is, essential, but our way of considering what we achieved has to be radically altered.

*“Stop” by Michael Coldwell (2014)*



# The Myth of Natural Law

## Do Disembodied Formal Relations Drive Reality?

What really happens when Form is deemed to be the Essence and Driving Cause of our Universe?

Now, clearly it must first be explained what is meant by Form, or more comprehensively, "What are the possible alternative conceptions of this important feature of all Reality?" From the standpoint of this writer, Form is pattern or shape!

But Form can also be concentrated into formal relations, which within a single equation can deliver with suitable known inputs any situation within its range: it concentrates a whole similarly determined set of cases into one all embracing "law". This approach can be extended to affirm that such "laws" determine what happens in Reality. But it cannot explain *why* such things occur!

The belief in such determinations leave the answer to the key question, "Why?", as "Because they obey this law!" Clearly, why it should do so is left completely unanswered.

The time has come for us to pursue the method involved at arriving at such "Laws".

Actual equations are formal extractions from pure, quantitative data, measured in some corner of Reality, but, most definitely, extracted (isolated) from that World into pure, disembodied relations. They are merely (and only) sound, succinct and purely formal descriptions, and, of themselves, cannot *cause* anything concrete to happen, no matter how forcibly we utter the above imperative. What we have in our hands is a mathematical relation only: it cannot explain itself, it merely *describes* what can happen.

Yet, of course, it can deliver something useable: it enables the prediction of consequent states from given values of key parameters. And, this empowers Man to use them to some desirable and intended outcome. In spite of them being totally disembodied, they do both describe and encapsulate the Forms of situations that exist in Reality.

Now, of course, merely inserting chosen values into our relied-upon equations simply gives us a prediction of what will happen if implemented in the source situation. At such a stage, we have merely conceived of a concrete intervention into Reality. So, at that point absolutely nothing has been changed. But, if we can both control and change the piece of concrete Reality to which our equations refers, then, and only then, can we intervene and achieve our objective.

Now, if we take this whole sequence of actions by Man, from the starting point in the study of a piece of Reality, through the taking of measurements, then to concentrating of a whole range of these into a formal relation (an Equation), and finally using it to some required end, we have then managed to come through an interesting set of disciplines, which are NOT a single integrated set but in fact a related series.

The first step has to be effective and continuing control of a Domain of Reality, to keep it pretty "still", so that any relations are both continuing and clearly visible.

This is the Experimental Stage: **Stage A**. But, it is certainly not yet Science! Indeed, people who called themselves alchemists or inventors did this for centuries before. Clearly though, the reliability of the data would only increase sufficiently if the ability to control was developed to a remarkable degree.

Once obtained as a Data Set, the next discipline that could turn it into a single, range-wide formulation had to involve the techniques of the mathematicians.

This is the Formulation Stage: **Stage B**. For mathematicians had long studied such relations in total isolation from their real world and concrete contexts, and had found many fruitful ways of studying and manipulating them entirely within their own purely formal terms! This mathematical expertise was necessary to deliver the "Law" that had been extracted as a mere data set.

Now, using this "Law" was not merely a matter of applying it wherever you fancied. Indeed, even in the seemingly most conducive circumstances, it would invariably fail! In fact the very same skills that had enabled the initial experiment, and the extraction of dependable data, had to be employed again to replicate the exact same conditions. For only then could the Law be reliably employed.

This stage was the Implementation Stage: **Stage C.** This was still NOT the sphere of Science, but of the *technologists*.

So, you must have noticed, this whole set of procedures was possible without scientists, as such, being involved.

Now that is not what we usually think, is it?

And, indeed, many self-professed "scientists" would do all those sub processes themselves, and call the overall exercise "Science", but that would not be true as we have demonstrated above.

So what do *actual scientists* do, which characterises them as different to the perpetrators of the above set of procedures? They study the results of experiments, and their formulation into equations, and then seek to explain *why they are so*! The scientist looks for causes and explanations, for their primary and defining task is to reveal the Nature of Reality. The scientist must contribute to Understanding. Though revelations, formulations and use are important, the main gain from such activities has also to be the ever increasing and deepening of Understanding of Reality, and without the scientist, this simply doesn't happen.

Now, perhaps with some justice, many scientists will protest at this analysis. And for centuries they would indeed have had a strong case. For as jack-of-all-trades practitioners in all the above-described stages, their major motivation was to

understand why Reality behaved as it does. They spent a great deal of time interpreting and explaining their results. It involved many definitions of newly conceived of entities and revelation of their properties, and always a process of explanatory analysis was considered essential.

But, we must not overlook the wholesale Retreat precipitated by the Copenhagen Interpretation of Quantum Theory.

Bohr and Heisenberg latched onto the self-evident widespread nature of the above processes, and having been totally defeated by the theoretical implications of the Quantum, postulated that the "Explanation should be totally abandoned as self-kid", and also that the Scientific Method would henceforth have to terminate once equations had been reliably extracted. They "threw out the baby with the bathwater", and this was because they did not understand the process of approaching true Reality via increasingly better Objective Content. So, they made Equations the driving Laws of Nature, and affirmed that they were therefore entirely sufficient.

But, of course, they were no such things!

Such a blinkered and purely formal stance would merely Collect Formulae. They would merely amass a prodigious Library of Forms and corresponding Domains of Applicability!

For example, there were at the last count I made twelve different and mutually exclusive models of the atomic nucleus – that is twelve different equations that could be reliably used as long as you chose the right one at the right time: hardly a complete solving of the nature of the nucleus. Such a "running away" was, and still is, something quite correctly to be thoroughly ashamed of.

Now, there couldn't be any sort of return to the old theoretical methods, for something vital was wrong with them, as clearly established by the Quantum. For as long as they continued to totally fail with the phenomena involving Quanta, that method had to be banned.

But, some sort of explanation was STILL imperative. So, these "revolutionaries" turned away from Reality, to find necessary answers, and instead relied exclusively on formulae, and the established methods of their investigation – Mathematics.

Finally, this crucial change converted scientists from materialists into idealists.