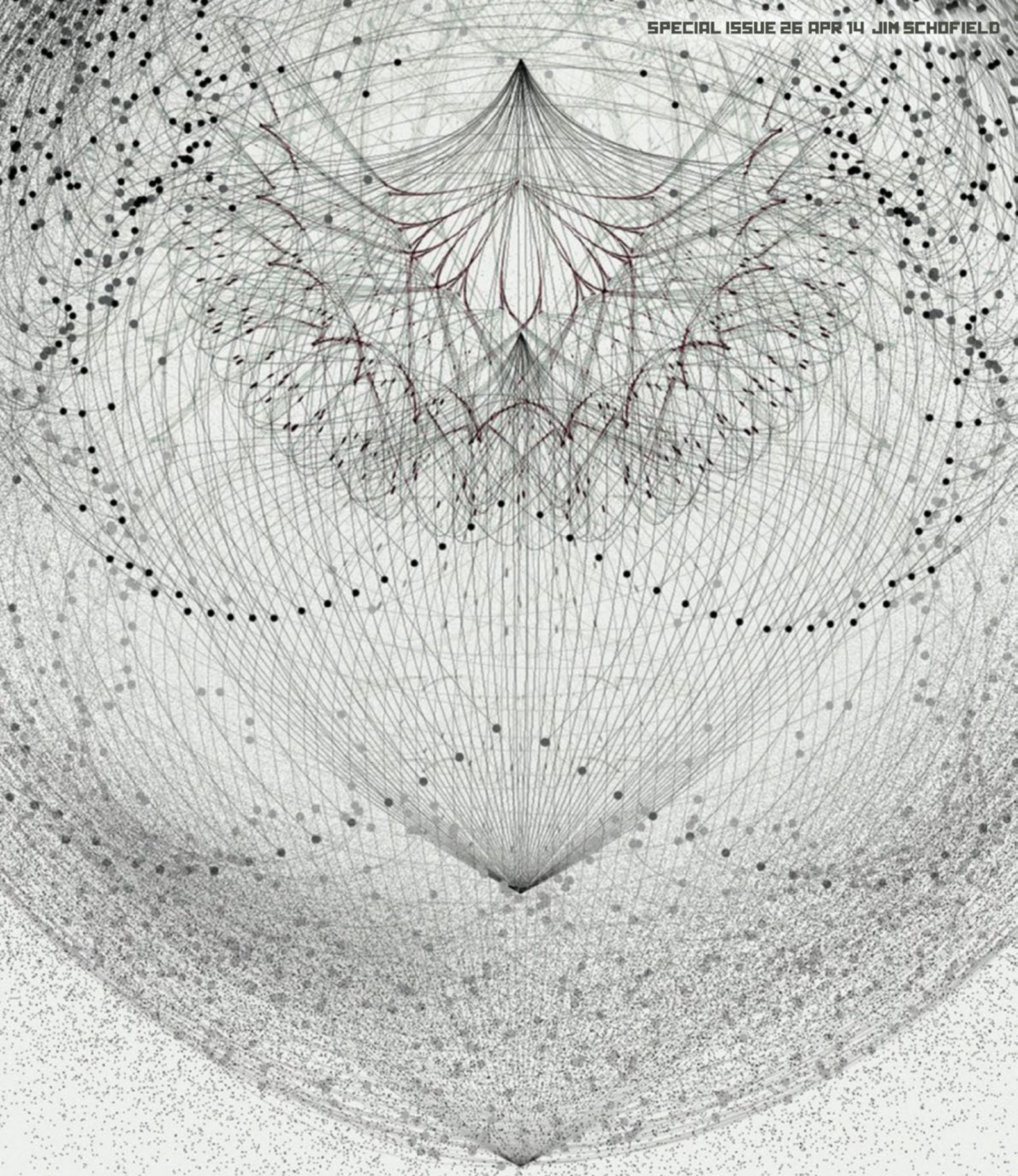
SPECIAL ISSUE 26 APR 14 JIM SCHOFIELD



SHAPEJOURNAL

MATHEMATICAL CHAOS I : A BASIS FOR UNDERSTANDING

WHAT IS CHAOS? / WHAT IS MATHEMATICAL FORM?
ABSTRACTING FROM FORM / MASTERS OF ANOTHER WORLD / WHERE IS THEIR WORLD?

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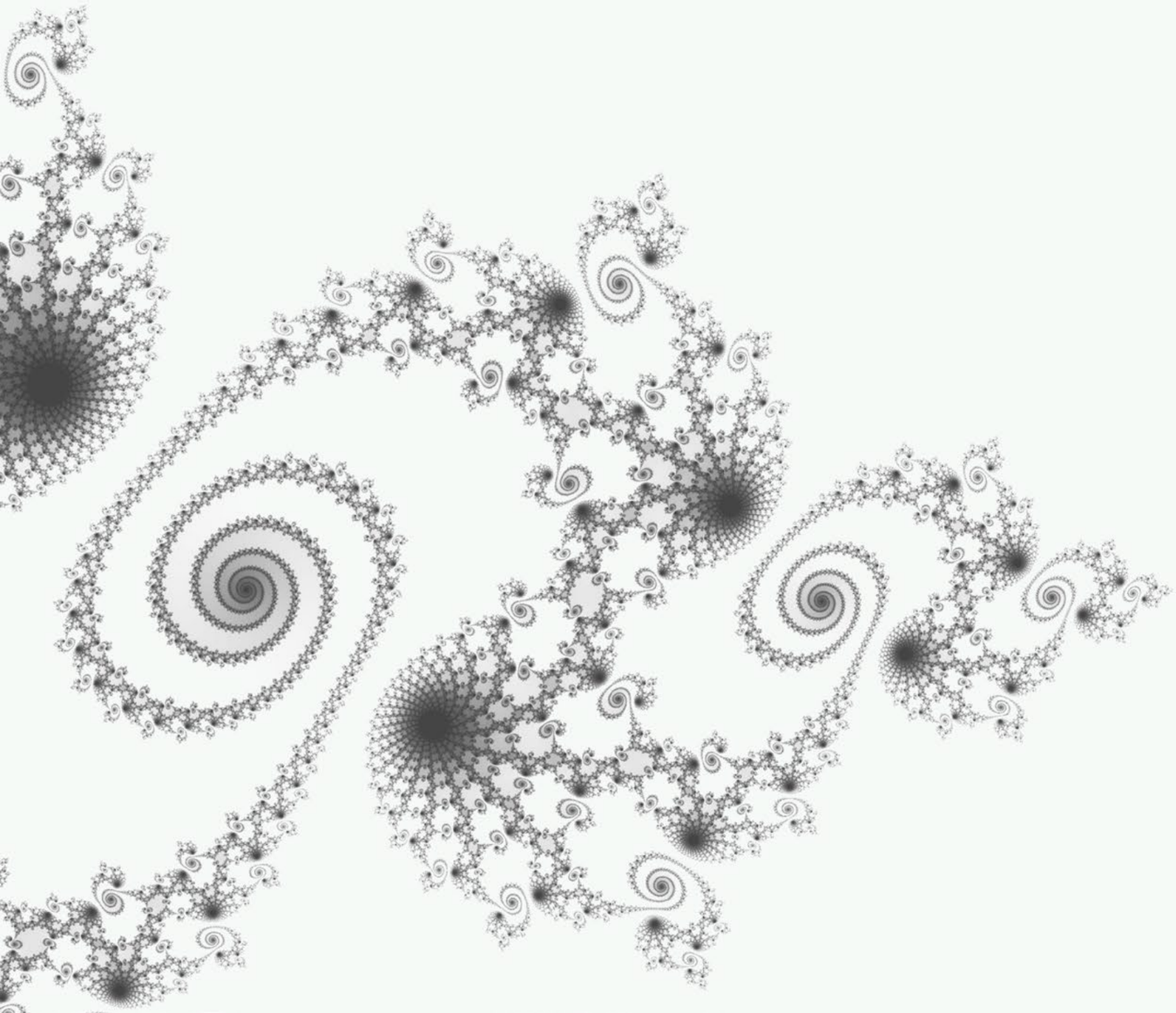


Special Issue 26

Mathematical Chaos I : A Basis For Understanding

Preface:

The two Specials, Mathematical Chaos I & II, indicate important new directions in considering exactly what this supposed areas of Mathematics really represents in the real physical World. For, it is shown to be a formal reflection of Holistic Reality, as distinct from ordinary Mathematics, which is a formal reflection of what we term Pluralistic Reality. And, perhaps surprisingly, this investigation is therefore much more about Philosophy and Science than it is about Pure Mathematics.

It is important because to transcend its present impasses, particularly in Sub Atomic Physics, Science must address its basic assumptions, particularly that of Plurality, and instead attempt to re-establish itself beyond its normal realm of Stability, and into the crucial, creative areas of Development, where Qualitative Change occurs – usually happening in the Emergent Episodes of transformation between Stabilities, where the wholly new emerges and new Levels of Reality are established.

Introduction
Mathematical Chaos: Can it establish an alternative Holistic Formalism?

Welcome to the 26th Special Issue of the **SHAPE Journal**, compiled to address one of the Key Questions in both Philosophy and Science, while seemingly residing solely in the most esoteric regions of Pure Mathematics.

It attempts to find an alternative to the currently universally accepted formalism, and also the basis for all theories in Science, which is dependant upon the usually unstated *Principle of Plurality,* but turns decisively away from this now standard approach, to the alternative that sees Reality as more properly characterised as deeply holistic.

It has become a truly major undertaking, not only because of the difficult problems that have been encountered, but also because of the significant breakthroughs that have already been achieved with this alternative approach.

And, these gains have been primarily in what is usually termed **Mathematical Chaos**. These achievements have been primarily philosophical, for they have questioned the usually agreed ground for this area of Mathematics, by a careful study of the implications of iterative assumptions and methods, NOT, as is usually the case, in pragmatic assemblies, but in the generation of the now renowned Chaotic Forms that they can be persuaded to produce.

But, its status here is not solely dependant upon these researches, but also, and perhaps even more importantly, upon extensive resonances with these forms both in Physics and in Philosophical studies too.

The crucial and revealing studies have been in tackling the need for a scientific methodology, based upon the assumption that Reality is not pluralist but most definitely holistic, yet though this is often conceded, NO feasible methodology or formalism has so far been achieved.

Holism, though probably the more correct view of Reality, seemed incapable of providing Science with any means to rival those delivered by the assumption of Plurality.

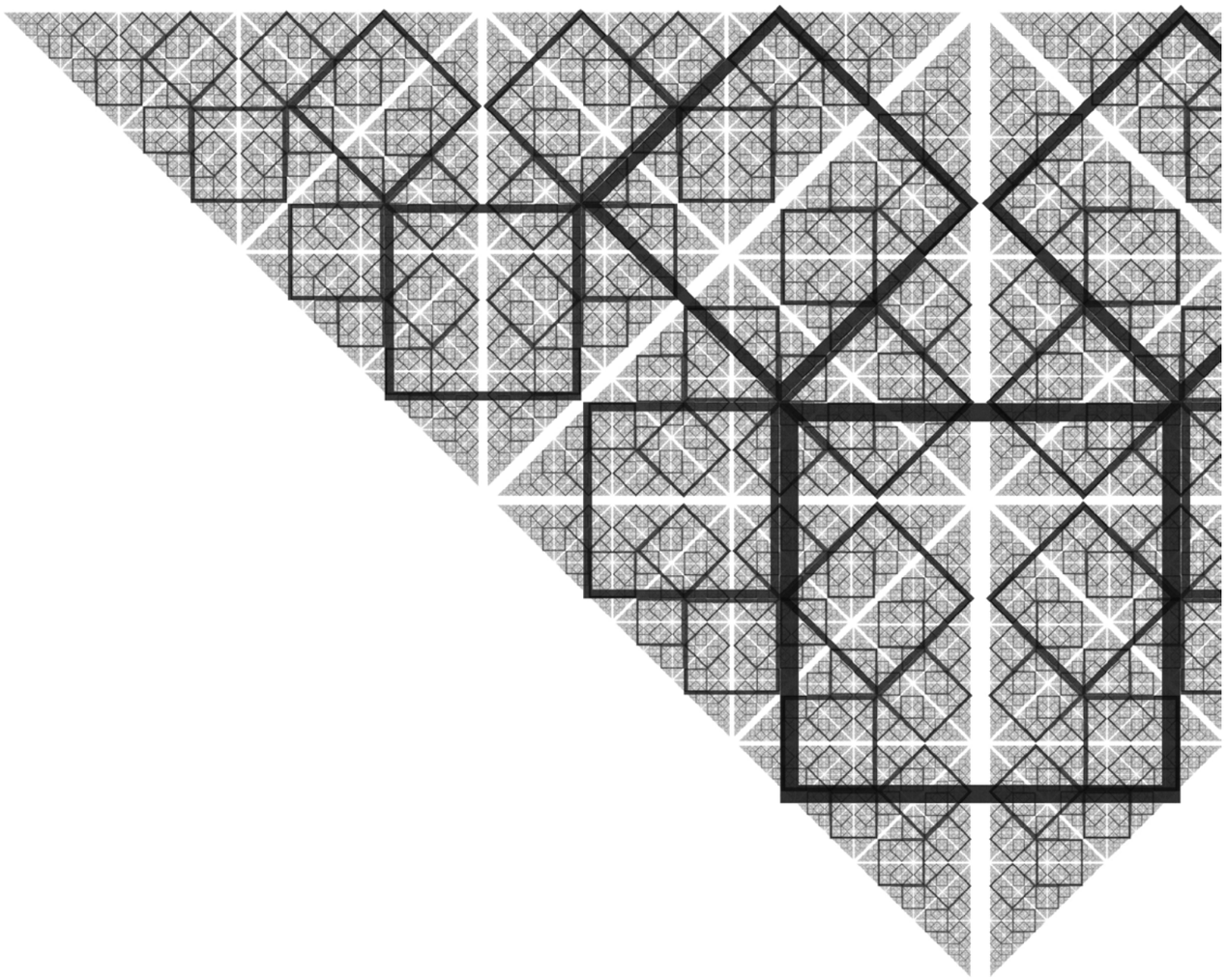
Yet, in this relatively small group of papers, a possible way has been devised.

It may not be what mathematicians want to hear, and the vast majority of physicists, immersed up to their necks in the now consensus Copenhagen Interpretation of Quantum Theory, will certainly be directly opposed to these ideas.

But, in the opinion of this theorist, these papers represent a significant contribution, and lay down a sound basis for further research, and, maybe even a Major Revolution!

Jim Schofield

Apr 2014



What is Mathematical Form?
The Breathtaking Limits of Mathematics

Forms are Patterns or Shapes, but they cannot be absolutely anything, for they are caused by real physical entities with certain properties, and the processes that they become involved in. Yet two important things must be said about these determinators.

First, they are totally absent from any resultant Forms: no causes are ever evident from the Forms that can be extracted. And secondly, the actual nature of things is seen as a differing collection of many simultaneous, causal factors, such that what is usually, and casually, observed is often confusing, and certainly never reveals a simple Form, without a great deal of special controls and various other types of processing, aimed at suppressing as much as possible while revealing each involved, and hidden, Form - one-at-a-time.

But, Mankind has got rather good at addressing these problems, and by both the development of appropriate techniques, AND, the assumption of the Principle of Plurality, has not only been able to extract, idealised Forms, but also abstract them into equations, each of which encapsulates one or another of these “perfectly arranged-for versions”, and these are very straightforward to both manipulate and apply in correctly-delivered situations.

Nevertheless, the complete set of assumptions and methods does establish as true the myth of the constant nature of such relations, so that they are seen as eternal laws. Now this turns out to be a result of the supposed extraction of these natural relations as fixed components in the observed mix, and this would only be true if the Principle of Plurality were also true.

So, each and every such equation really carries all of this with it, but they are nowhere to be seen in their Pure Forms - both the context which made each one extractable, and this basic principle too are certainly not explicit in what we get.

What is finally handled, manipulated and used by both mathematicians and scientists are these perfect, indeed idealised, forms, and without their determinators, they cease to be elements of Reality. They have been processed into Forms, which as such can only exist in a Perfect World of Pure Forms alone, and contain absolutely nothing else!

In formal representation, we are dealing only with these Pure Forms.

Now, something of the unreality of these Forms is shown very clearly by what are termed Singularities. Now, the usual use of such Forms is to substitute in the value of a known variable, so that the equations can be manipulated to deliver the corresponding value of another variable. Yet this is only possible for those parts of the relation, which do not become these Singularities. For these “asymptotes” and “zeros” are actually where the relation no longer holds. Effectively, even in this Pure Form World, certain values are illegal and the relation has surpassed its limits: it is therefore useless for such values of its variables.

Clearly, the patterns from Reality have been entirely removed from that sphere and into a parallel sphere containing Pure Forms only – no physical forces or anything else will have made the transition – merely a relation between quantitatively-changing variables, which are rather surprising in what they actually represent.

For, they do NOT represent an individual, eternal relation, but on the contrary one of a series of possible forms depending upon what remained in the context from which it was extracted.

Indeed, what we get, from measured data, is particular to that context, yet is in no way transported along with it, via the abstraction into an equation We are formally and conceptually unaware of those necessary determining conditions, and we mistakenly interpret what we get as one of the underlying, eternal elements involved. That they are most certainly not! And this is proved conclusively by the fact that they will each and every one fail if the circumstances in which we use then differ from their sole defining context. Also, at first glance, there seem to be NO limits upon the ranges of variable to which the relation applies. But, of course, that is also untrue!

Finally, we must address how such relations are used. They are found to be useable in a wide, and unrelated range of phenomena for helpful mathematicians presented with a new data set by experimental scientists, will dip into their “Universal Bag of Forms” and always find one that fits. So, what is actually going on – both in Reality and in our conceptions of it, is for these things to be assumed to be possible?

It can only mean one thing! Though what we have seems to be a mere pattern, it isn’t! It is in fact a universal pattern, which can exist in a wide variety of areas, BUT ONLY if certain limits of its variable are complied with AND the necessary context is accurately provided.

Now, these unrepresented conditions are surely profound properties of each and every such relation! For, taken formally, it is nothing to do with particular physical entities and situations: their properties and their rules of existence are irrelevant formally.

Yet there are two groups of investigators with entirely different interpretations of what they have in their hands, and hence what they can legitimately do with them.

The above points have made clear the mathematicians view, for they treat these independently of any connections with the Real World: they consider them only as Forms.

While the scientists see them as an exposure of real physical “Laws”, which either drive the particular area of Reality, or are produced by such an area. Clearly, these two sets of “colleagues” see them very differently!

Interestingly, even the purely formal pattern has limits, irrespective of where it can be usefully applied in the real World. But, when a scientist considered the same relation in a particular Real World area, he will consider that its variables represent actual physical quantities, AND that the relation is the pattern of actual physical properties and consequent phenomena. Needless to say, he too will inevitably find limitations upon the possible values of the variables involved, and will regularly experience times when the relation totally fails. He will, of course, look elsewhere for physical reasons for that failure, and will find them too!

Now, it is interesting how these two groups address these different breakdowns (remember there are formal failures AND quite different physical failures). But, only the physicist is aware from his experiments, that one relation on failure, will be replaced by quite a different one, and he is supposed to explain the causality of that transition.

Usually, in fact, he cannot do this (more of this later). So, he turns to the mathematicians, shows them the two Forms, and asks how one becomes the other. The mathematicians are even more inadequate to the task, but being superb pragmatists, they merely hand over a mechanism, where the first equation is replaced by the second. It is entirely unscientific, but entirely useable. It establishes a threshold value of a key parameter, at which relation one bites the dust and relation two takes over. They hand this to the scientists, who use it, with a mental note that they must crack this problem later.

Now, this rather extended discussion has been carried through to prove conclusively that the two groups are dealing with quite different Worlds. The scientists attempt to deal with the real physical World – Reality. But, the mathematicians deal only in Form: their world is the World of Pure Form alone – Ideality.

And, of course, there is regular and misleading confusion by the rules of one World being applied in the other. It is, of course, understandable, for they are not two unconnected pure fictions. They do relate to one another, but NOT in the way they are usually assumed to do so.

Let us take the most common failing. An extracted relation, suitably arranged for by an appropriate and maintained context, is mistakenly seen as a determining Law, and if the actual physical causes are not evident, it can so easily become the basic cause, in itself. That, of course, is nonsense, for it is only a Form, and its physical determinants are NOT included with it, so the only things to be done to take things further are themselves purely formal. The explanatory task of the scientists is handed over to the woefully ill-equipped mathematicians. Do you want proof? Look at the present parlous state of Sub Atomic Physics, which is now a de facto subset of Mathematics.

Let us look at main error number two. If the relation, as a Natural Law, is taken as the only determining factor, how do we explain the fact that it can be used in many diverse, indeed, totally unrelated areas? How can a purely formal relation cause anything in a concrete World, AND produce entirely different things in different places?

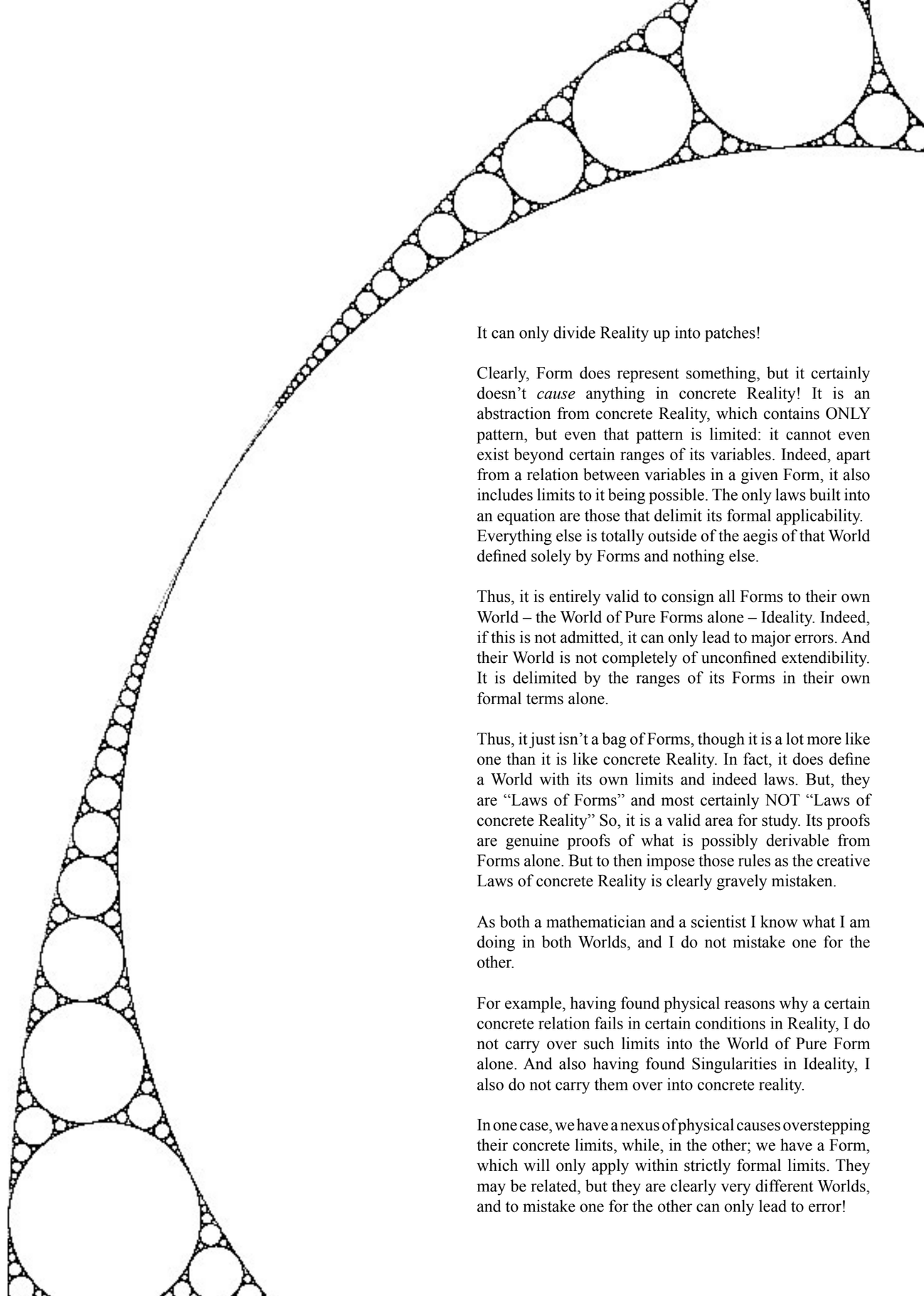
YES! The context – the physical conditions must be the actual determinators!

Disembodied, abstract patterns DO NOT determine physical phenomena. Indeed, it is the various different phenomena in their differing contexts that produce the same pattern. All Forms are secondary, and simply cannot be primary, EVER!

Quite independently of a concrete instance of a given equation, it can only exist, as a pattern within certain limits, and crucially, unlike concrete Reality, there can be NO prediction of where it will go beyond those limits. The relation just blows up – zeros and asymptotes are mere indicators of “beyond applicability” for purely formal reasons

So, all the wondrous manipulations and proofs involving Mathematics can never direct concrete Reality, because every single Form is viable within limits, and means absolutely nothing beyond, and independent of, them. The mathematicians’ “Real World” directed only by eternal formal laws, can only be an unconnected patchwork of individual relations, with absolutely NO transitions to anything other than oblivion beyond each totally isolated legal range. It is a World of only descrete patterns and is certainly not even a comprehensive description of anything, never mind an explanation.

And, if this is indeed true, what are the consequences in making equations the only trustable drivers of concrete Reality?



It can only divide Reality up into patches!

Clearly, Form does represent something, but it certainly doesn’t *cause* anything in concrete Reality! It is an abstraction from concrete Reality, which contains ONLY pattern, but even that pattern is limited: it cannot even exist beyond certain ranges of its variables. Indeed, apart from a relation between variables in a given Form, it also includes limits to it being possible. The only laws built into an equation are those that delimit its formal applicability. Everything else is totally outside of the aegis of that World defined solely by Forms and nothing else.

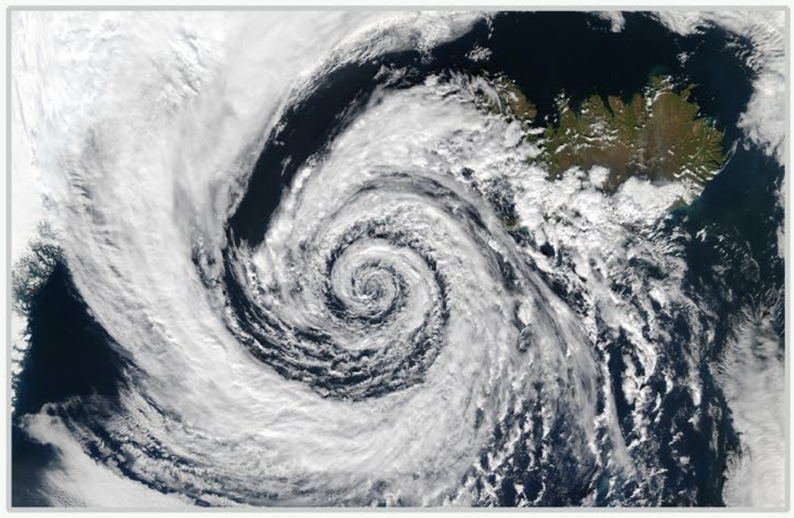
Thus, it is entirely valid to consign all Forms to their own World – the World of Pure Forms alone – Ideality. Indeed, if this is not admitted, it can only lead to major errors. And their World is not completely of unconfined extendibility. It is delimited by the ranges of its Forms in their own formal terms alone.

Thus, it just isn’t a bag of Forms, though it is a lot more like one than it is like concrete Reality. In fact, it does define a World with its own limits and indeed laws. But, they are “Laws of Forms” and most certainly NOT “Laws of concrete Reality” So, it is a valid area for study. Its proofs are genuine proofs of what is possibly derivable from Forms alone. But to then impose those rules as the creative Laws of concrete Reality is clearly gravely mistaken.

As both a mathematician and a scientist I know what I am doing in both Worlds, and I do not mistake one for the other.

For example, having found physical reasons why a certain concrete relation fails in certain conditions in Reality, I do not carry over such limits into the World of Pure Form alone. And also having found Singularities in Ideality, I also do not carry them over into concrete reality.

In one case, we have a nexus of physical causes overstepping their concrete limits, while, in the other; we have a Form, which will only apply within strictly formal limits. They may be related, but they are clearly very different Worlds, and to mistake one for the other can only lead to error!



Abstracting
From the Form/Content Amalgam

We talk of both Form and Content when describing things in the World around us, but when we detect and extract a particular Form from a situation, what are we actually doing?

Of course, in attempting to recognise some distinguishing feature, it is clear that Forms are both common and universal features, in that the same Form can be recognised in many very different, and, indeed, causally-unrelated situations. So, to extract a Form out as a significant identifying factor is a reasonable starting point in our consideration of something new. But, is such an extraction legitimate?

Can we take out such things from an integrated entity as a legitimately separable component?

Well, the answer, perhaps surprisingly, can be both “Yes” and “No”.

For, whatever we are trying to understand will have to be turned into “comparables”, if only to draw inferences from other similar things elsewhere. So, though such dissections are fraught with difficulties, we, as human beings, have to start somewhere, and the most obvious “comparable” has to be Form: nothing else is anywhere near as useful in making informative comparisons.

But, before we do the usual thing, and lay out all the positive things from such a process, let us first make clear the dangers of doing just that.

We should NOT extract Form to be considered entirely in its own terms, because it is due entirely to the content contained within that recognisable entity. It is the various things that are present within that entity, and their effects upon each other, as well as on the containing environment, that make the evident Form what it is, and not something else. So clearly, in separating out a Form we are treating it as if such a process is a detachable property. And, it certainly isn’t!

Nevertheless, we still do it, and with some justice, for though it can mislead us, it can also lead us to the phenomena that we may know a great deal more about, and hence we will be able to perhaps import some of those features into our subject. The point about all such investigations is that they are always imperfect, so that each stage will have to be returned to, later to modify and improve what we are allocating to our situation under study.

The whole process is cyclic and NOT linear!

Having made one pass, we must make of it what we can, knowing that there will be error, and that a return to it after other stages will be essential to clarify the real holistic complex that we are attempting to understand.

So, we do these things, all-the-the fully aware from the outset that they will be imperfect, and be ready, at all times to modify what we assign, as supporting evidence from other aspects is considered.

So, extracting a Form allows us to group many different things by their common Form, and perhaps treat then similarly. For we may, indeed, know a great deal more about another situation with the very same Form, and any extra understanding, of that “analogue”, could well throw important light upon our new study: we may well be able to make informed guesses as to what is causing the same Form to appear in the less well known about situation.

But, at the same time, dealing in Form separated from its producing Content is also bound to lead us astray. The proof is in the simple fact that the same Form appears so widely, without it being produced by the very same causes! And, if we forget this important rider, we may think that Form is primary and alone makes the thing displaying it act in the ways that it does.

Though, at the same time as being clear about how we could be misled, it must be admitted that the investigators of Pure Form alone, dissociated completely from its determining Content, are still carrying out a valid area of research.

For it is the subject that we call Mathematics.

And such studies have the advantage of allowing a thorough study of a given Form, in particular considering how the same Form can be present in very different areas, and thus all the techniques, manipulations and alternative presentations developed for that Form could be used across the whole set. Indeed, mathematicians are the experts in getting the absolute maximum out of a disembodied Form, when considered in its own terms alone. Effective use of a Form is best delivered by such specialists – as long, of course, that you don’t allow them to also take on the explanatory role: for that is impossible without the even more demanding and important study of Content.

For that is the subject we call Science.

But, what are we doing when we extract only the evident Form from a situation? For that Form cannot exist in Reality alone as a disembodied pattern: it must always have an appropriate Content and Context to make it take that Form. So, by doing this, we are dividing Reality up by their separate Forms, which can never exist as such.
We are abstracting from Reality!

Now, as it turns out, such processes are not only useful in attempting to understand Reality, but also in using particular instances of a Form to some useful undertakings.

NOTE: Indeed, a recognition of the benefits of grouping such instances together is reflected in modern Object Orientated Programming Systems (OOPS) for computers, where different instances keep the same name even when new and better definitions are introduced. The benefits of this analogistic grouping are certainly advantageous in such languages and computer programs.

Indeed, without abstraction, we would have to handle every single thing with all its various aspects permanently locked together as an indivisible entity!

No, in order to begin to understand anything, we must first abstract from it, along with many other things those, which can be fruitfully compared.

And, of course, Form is perhaps the most easily abstracted, and then investigated, all of available features.

Indeed, it was the first thing that Mankind managed to deal with in this way, and very early on had produced something as sophisticated and useful as Euclidian Geometry - which is, of course, a very purified and filtered version of Spatial Forms that, nevertheless, have been invaluable throughout History, and even all the way to the present day. So, the trajectory of study of the World will inevitably involve such abstractions, and will commonly lead to many gains and situations, where such discoveries can be profitably used.

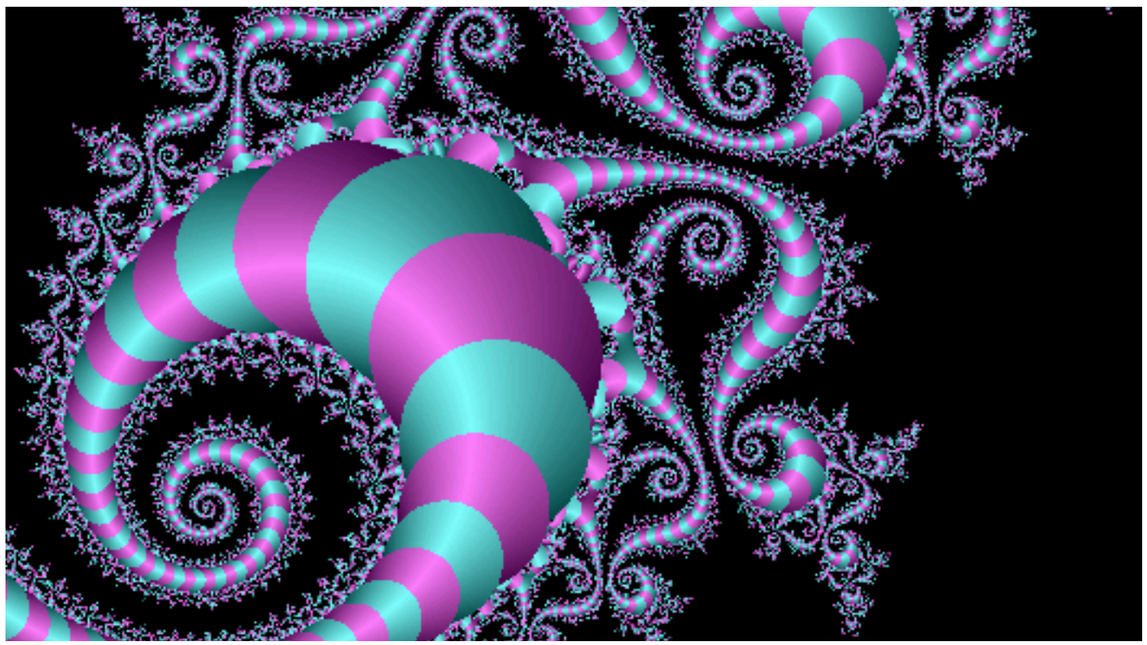
But, as always, such abstractions also always can, and indeed do, lead us astray.

The abstraction of Contents can just give us a List of identified component entities, without, by so doing, showing how they inter-relate to deliver something very different to a mere collection – for the same collection could give us a piece of coal of a living tree.

So, though such abstractions are essential, they are never direct steps towards the Truth. Indeed, the more common trajectory is of a mix of useful things as well as misleading abstraction. And, it takes important crises and even revolutions to get beyond a series of consequent and contradictory impasses, to any real gains in understanding.

So, even at a fairly basic level, we have to learn to take our abstractions with caution, and re-interpret them as soon as possible into an explanation, which fits everything we already know about it along with whatever extras we can discover.

What is Mathematical Chaos?



TASK: Compare a strict determinist equation with its derived iterative forms as to see whether the same points are delivered in the resultant Possibility Spaces!

Clearly, the purpose of such a task would be to reveal the differences between these supposedly alternative methods of revealing the possibilities inherent in the two forms of the same “law”.

Let us make a thought experiment to do the same thing.
For example, taking a law in x & y, if x = 2.3 and we substitute this value into the usual determinist equation, to determine what value of y we will obtain. Whatever it is (say y = 9.2), we will then have a legitimate state of that relation. Having now got both x and y, we could this time substitute both in the iterative versions, to be given another point (say x = 5.7 and y = 9.8). We would then alternate by going back to the determinist version and substituting x = 5.7 to deliver a corresponding value of y.

Clearly, we wont get y = 9,8, for if we did the iterative forms would be identical to the determinist form. The delivered value will be off-the-line, which represents the determinist equation.

So, what the iterative forms seem to be doing is using a “Form” close, in its effects, to its parent determinist law
Well, we know what occurs in the right circumstances – it delivers what we term as Chaos – mathematical chaos, of course, and not random chaos!

Now, what was clearly evident in my commissioned researches for Jagan Gomatam, many years ago, was that the constants chosen for the iterative equations were crucial. Only certain particular ranges gave the required chaotic results: any others deliver forms much like the straightforward deterministic forms. And, I also discovered very interesting results as I drifted the constant(s) through a range of values within a single generated plot.

Now, we have long had a good idea of what different constants (at least of the simplest added kind) do to an ordinary determinist equation – they move the whole form bodily to a different place, while keeping the exact same shape. So, constants can “position” the form (though sometimes, when, say, multiplied with a variable) it will distort the form somewhat also. So, we can always say that it will always, in one way or another, move the relation to a new situation.

So, what is the significance of this conclusion? Well, we know that all relations in Reality do NOT apply everywhere – every relation is dependant upon its context. Change the context significantly, and the relation can either change or even totally fail!

Now, mathematics always ignores this feature generally (for it treats such forms entirely in their own terms alone). They are investigated without any consideration of physical context. Nevertheless, a formal context is unavoidable! For, they cannot avoid the two calamitous

terminators of a relation, the Singularities. For, these are behaviours of Forms as such, which with certain values of its independent variables produce dramatic results – either a vanishing down to zero values, or acceleration to infinities – via asymptotes! So, even the purest of Forms is sensitive to certain values.

Now, can we therefore draw conclusions as to what is actually going on in mathematical chaos from all of this?

For example, could we be moving between different versions of the same Form, when we get off-relation points in iteration? That is the same Form, but with different constants, which move things bodily into a slightly different place, when a pair of iterative formulae take us to a point outside the line of the determinist relation? Could we, in fact, be investigating areas close to the given, determinist version, which might be seen as what would happen if the constants varied slightly – in turn, which in the real World, is caused, if you cam call it that, by a change in the given physical context? Clearly, when we resort to a Form-only context, which we always do in Mathematics, we cannot simply relate changes in the real World to frigs devised and developed solely in that World of Ideality – the World of Pure Form alone!

Now, the pluralist conception of Reality has multiple factors all acting together, though not changing each other, in all situations. But, the holist alternative is that such an assumption is untrue, and that instead many simultaneous factors will undoubtedly affect one another. It is surely a question of what determines the individual factors in the first place! If it isn't some unreachable, external determinator, then they must be determined by what is currently locally present, and hence changeable entirely due to local fluctuations and drifts, when they can, and do, occur.

So, the crucial question then becomes, "By how much?", and also, "Are the changes significant qualitatively?" Now, if these assumptions were true, we could get the whole range from relatively minor changes all the way to major transformations. And perhaps a similar effect might be produced by the iterative method, which seems to move the "current point" to just outside of its deterministic possibilities. Also, and perhaps significantly, we have the fact that such iterative process is definitely cumulative – each pair of values determining the next pair, so repeated iterations could move things far enough away from the deterministic line for a change or even a collapse to occur.

NOTE: On the other hand, there is substantial evidence that iterative processes can be convergent as well as divergent, and even cycle in their wanderings, regularly moving back towards and then away again from the deterministic law.
But, the terminating cases were certainly those that bombed out: These are where the situations homed in very quickly upon the only two singularities that normally occur in deterministic formal relations – the spiralling down to zero, or the accelerating away to infinity.

Now, in the equations Jagan Gomatam gave me to work with, they were models of a beating heart, and seemingly miraculously delivered both Fibrillations and what appeared to be Heart Attacks. But, considering the ideas in this paper, perhaps we were, at that time, seduced by the model. What was actually happening was NOT specific to the human heart, but to Stability of formal relations in general.

Historical Papers: Introduction

Following this introduction are several historical papers, the first two are from January 2010, and the final one is from April of the same year. But they do have the freshness and excitement of recent discoveries or revelations, which unavoidably dim, as new investigations, problems and solutions take centre stage. So, they are well worth including in this series of more recent papers (from March 2014). For, though they address the nature of the Plurality versus Holism problem, as well as the Ideality versus Reality questions, they relate what was at that time the crucial significance of current findings, and because these are not everyday considerations, I feel that those ideas at that time are an ideal introduction to the papers that follow. The turning point in these studies was the realisation of how scientific explanations were abandoned for mathematical formulae alone, and the essential drivers of Reality, so they present a cogent ground for what has been developed thereafter.

Masters of Another World

Review: The Secret Life of Chaos
BBC 4 13/01/10 9 -10 pm

It had, of course, to happen! I had been expecting it for some time, and finally the leading group of Physics TV presenters have all come together to weave an all-embracing view of Reality with a seemingly single voice. The retreat from Science to Technology, and from Explanation to Formulae & Pragmatism, had to extend beyond its Physics and close relatives base, and begins to be put forward as even the cause of Life itself.

Twenty-five years ago when working in one of the Glasgow Universities, I was assisting the excellent mathematician Jagan Gomatam, who was working from the experimental evidence on oscillating chemical reactions in liquids, in order to investigate the Forms of the involved Reaction Fronts. Though he was a mathematician, he was working with a chemist and myself, a computer scientist at the time, to attempt to encapsulate what was quite clearly going in there into the mathematical definition of the complex form that was involved. His co-operation with us was unique. He knew that the primary causes of this phenomenon were indeed chemical, and he also knew that what he was doing was deriving a purely formal model that would help the investigation to progress.

Of course, Jagan was not a scientist, but a mathematician, so he also was keen to address knew forms that, as with all other forms, would be applicable in a variety of concrete phenomena, and his job was to deliver the most general, and adaptable universal form. As mathematics was the study of Form alone, it was clear that his final formulae would not explain the phenomena, but would deliver the best tools for scientists to use in their studies. We could never forget the concrete factors involved and concentrate solely on the Mathematics.

But, such an attitude to Science and Mathematics was not universal among many in both camps. “Why not?”, was their reaction to the above assertion about concentrating ONLY on the formal aspects. “Surely, what we are seeing in these isolated, extracted and abstracted forms are the primary driving laws of Reality: they are surely the essences that make things what they are?”

Just as today’s sub-atomic physicists no longer ask the question, “Why?”, and even condemn it as a metaphysical prejudice, and instead ONLY concern themselves with the extracted formulae, a similar retreat is now happening throughout Science with Mathematical Chaos as the latest excuse.

Indeed, the new strain of “chaotic” scientists is even more pernicious than the Copenhagen School in Sub-Atomic Physics, because, as this TV programme confirmed, they don’t even deliver Prediction! It is argued that even simple equations can deliver situations in which we cannot predict, for we cannot know the essential initial conditions, and without these Prediction is impossible.

This retreat is total, but the way that it is sold in the TV programme is as a Great Advance. But, if we cannot explain, and we cannot even predict, what does this new Science actually deliver?

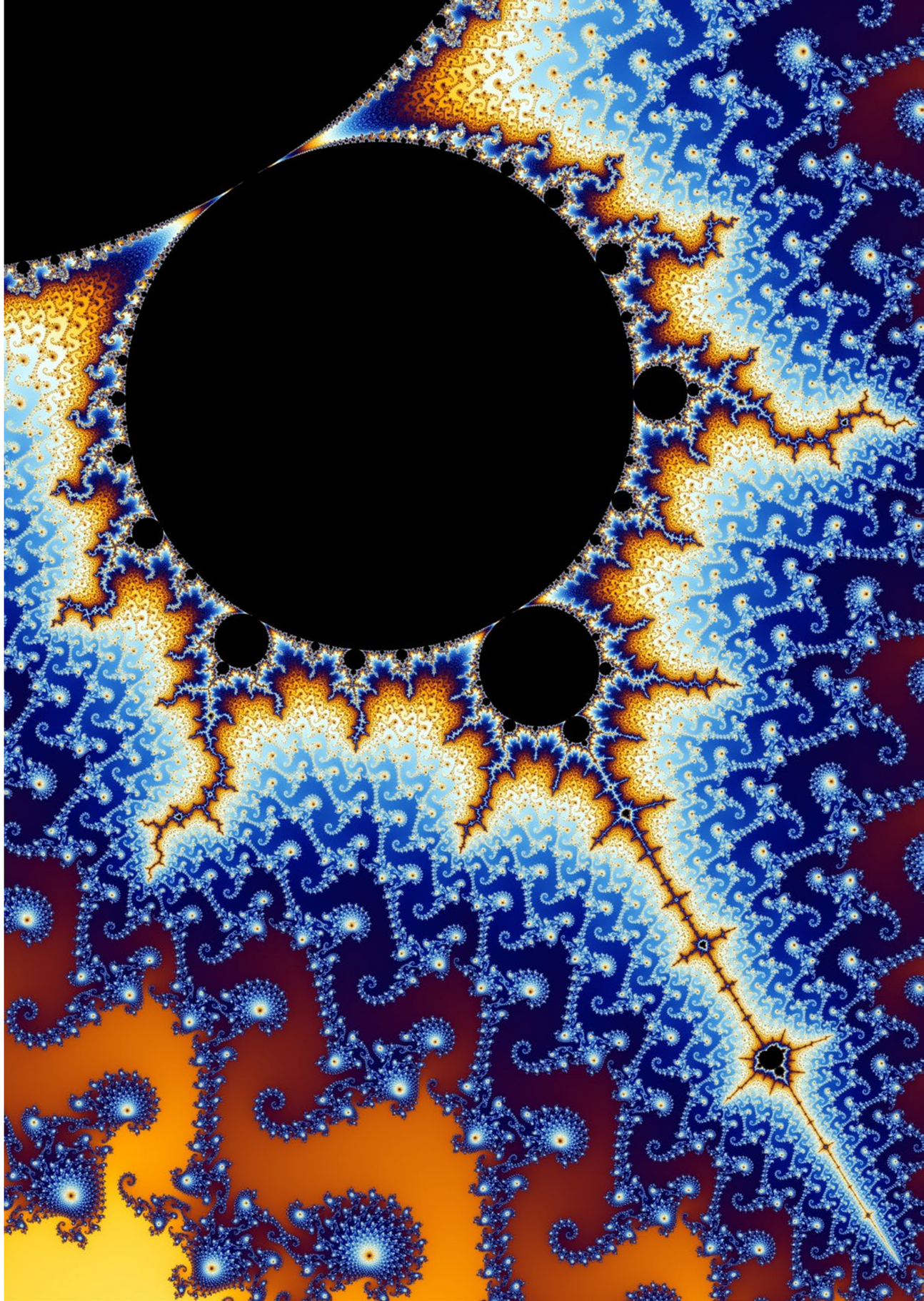
It gives us unpredictable forms, which we can install into our computer programs, and watch the impossible-to-predict things unfolding before us in all their diversity and beauty.

It is more of an Entertainment than either Science or Technology, and, in addition, these believers of the New Science can be shown to lie in their teeth. The “simple” equations are not, repeat not, simple.

The Mandlebrot Set’s equation is written as $\mathbf{z = z2 + c}$, but you may well ask, “What is $\mathbf{z = z2 + c}$?”

Well, having done this sort of stuff over 25 years ago in another project with Jagan Gomatam, I can tell you! It is not a normal deterministic equation: it is an iterative equation, more normally written as zn+1 = zn2 + c, and what it means is that a new (n+1)th value of z can be obtained by substituting in the previous (n)th value of z into the right hand side of the equation. The two z’s are from different iterations. They cannot both exist at the same time. And you will have noticed that to use the form you have to have a starting value of z.

Note: Also did no-one notice that all the images of the Mandlebrot Set were Two Dimensional? How did they get them from the given equation? They could do it because z is a complex number, where z is a + ib, where a is the real part of the number and i is the square root of -1. ib is termed the imaginary part (with b as another real number). By plotting a against b we can get a 2D graph. But why did they not explain this? Might the square root of -1 be considered a give away, and lead to the non-mathematical viewers coming to dismissive conclusions?



Now these chaotic phenomena, which the programme seemed to make general are:

1. Special, and
2. Iterative.

Indeed, they were found by Lorentz and others in equations, which included derivatives (rates of change), and the uncertainty has always been true for this type, as rates of change cannot deliver direct variables without both Integration and Initial Conditions.

Do you remember them mentioning unknowable Initial Conditions in the programme? I do!

I have for many years been criticising “TV scientists” like Kaku, Al’Khalili and Stewart for their unprincipled fantasising about Reality, as a cover for the inadequacies of their methodologies.

A year or two ago, I wrote a rather long critique of a book by two Indian mathematicians, in which they (as a fictional story) told of a mathematical “hero”, who proposed mathematical-type “truth” as the ground for everyday life. It was, of course, total rubbish!

But the stupidity of it was clear for all to see. These “mathematicians” illegitimately use their involvement in Science to attempt to put the stamp of scientific legitimacy upon their false definition of the future of Science in general.

Instead of the wide road towards Truth they are promoting to Essence status are false myths of Elegance and Form, which cannot produce real phenomena, do not explain anything, and now can’t even predict.

Such “scientists” should not even be allowed to pedal such rubbish in prestigious Institutions of Higher Education. They are total frauds!

Where is their World?

Review: The Secret Life of Chaos
BBC 4 13/01/10 9 -10 pm

The TV programme *The Secret Life of Chaos* proffered a "simple" equation, which it then demonstrated could produce "infinite complexity". It was clear that these presenters were showing to the World what they considered was the longed-for, hidden jewel of determinism. The key inference (projected to an obviously non-mathematical and non-scientific audience) was that the generally agreed assumption that Reality was totally generated from essential laws had been proved! Instead of the usual mechanistic results from the usual conceptions of determinism, here at last was revealed a veritable deep richness of outcomes, so intricate and unpredictable, that was even overtly claimed that it would (in time) explain both the Emergence of Life and even that of Consciousness!

But, this proffered "revolution" merely added more weight to the retreat from explanation and understanding that had been gaining ground in Science for a very long time. And it is NO revolution! It is merely another brick in the wall, which supporters of this philosophical position have been using to "wall-in" Reality – tidying it away from the real World, and into the tidy Universal World of Pure Form alone, which is their chosen and comfortable home.

In spite of their "excitement" and "conviction" it was impossible to see any profound insights or explanatory gains that they were so joyously celebrating.

NOTE: They reminded me of a fellow teacher of mine, who used to come out of his latest lesson rejoicing in his triumphant success, only to be immediately followed by a gaggle of totally perplexed students.

Indeed, their position repeated the trajectory of all such programmes of recent years, in "selling" the mathematical determinism of Reality, but very surprisingly without showing any Mathematics! NO detailed maths was revealed – only the products of such maths. The audience was evidently considered too "untrained" to be able to cope with the Mathematics (very difficult and esoteric stuff), so instead they were bombarded – not with proofs or evidence, but with assertions, assumptions and speculations.

The reason I can be so condemnatory is not only that I too am a mathematician, but even more important I am also a scientist, and their arguments do NOT wash!

The crucial revelation was when Jim Al'Khalili was dealing with Benoit Mandlebrot's famous Fractal Set, in which by clever computer graphics could be quickly and easily inferred to be an infinite (yes, infinite!) journey into Forms generated by $\mathbf{z = z2 + c}$. The same sorts of patterns (with minor differences) were repeatedly revealed, and we were informed that these occurred in branching plants and even natural coastlines.

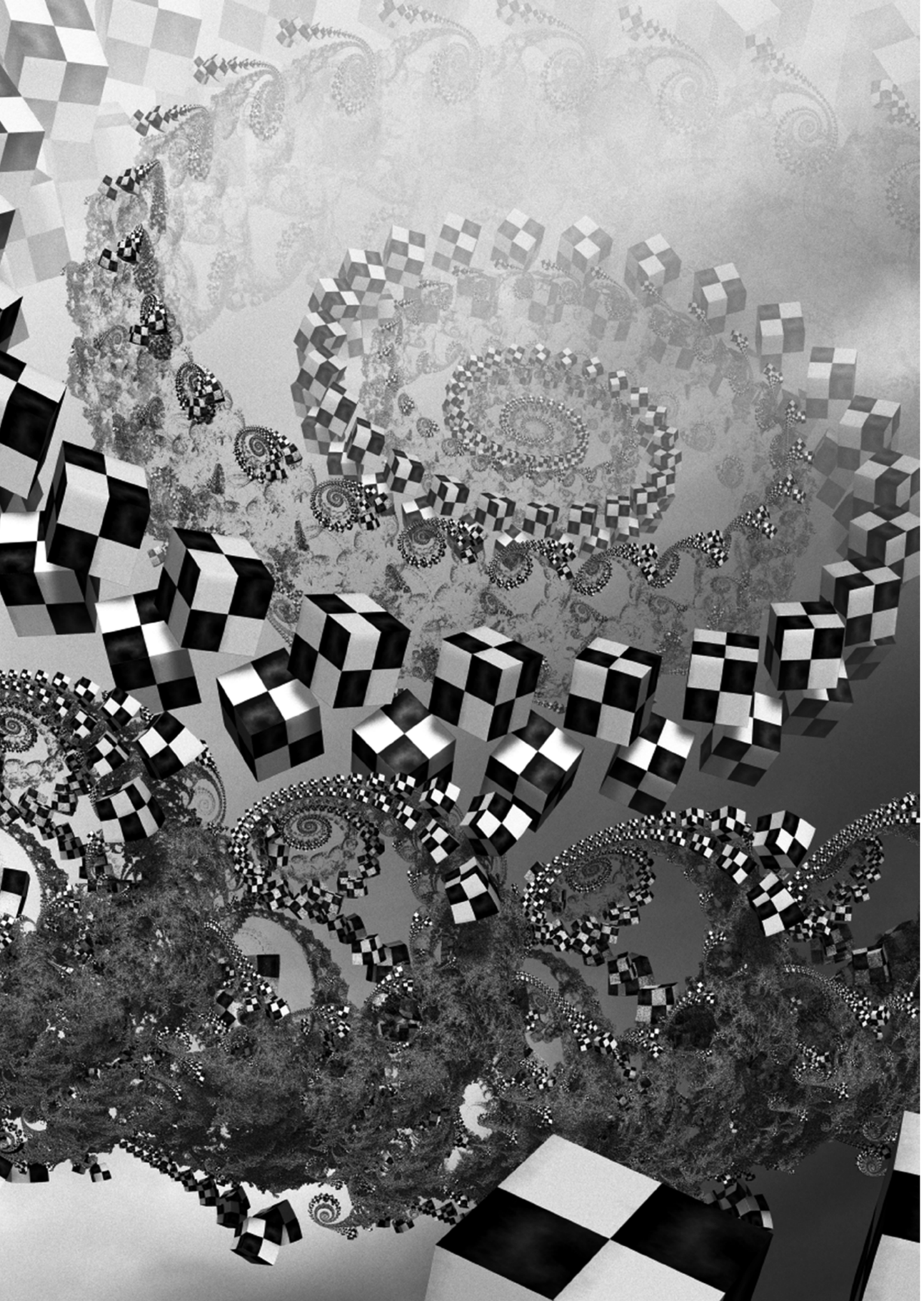
No, they do not!

Or at least, any similarities were not due to the causing action of such a form, but things that were much more concrete.

Such infinitely recurring patterns NEVER occur in Reality. What they actually mean is that something clearly "looking like" these fractals can occur in Reality, but that is NOT the same. They may well be able to "rig-up" a deterministic tree or coastline for use in animations, but they are NOT the same by any measure of means. For, if one was to do the same recurring "looks" at various levels in any piece of Reality, the Form would very soon cease to be appropriate as the forces that deliver the Form would be left behind, and quite different Forms would immediately be evident.

Implicit in their assertion is the belief that what produce the constantly recurring Forms, are eternal, driving laws, which underlie and even cause these features in Reality.
But, once again, they do not! They are only true in the World of Pure Form alone - in Ideality! The rubbish about endlessly repeating forms in Reality is a LIE! So, what were their purposes? What were they so eagerly demonstrating?

It was clearly the actually endlessly repeating forms in Mathematics! And that is very different because it is NOT Reality. It is a World containing absolutely nothing concrete – only Pure Form alone, the elements of which were first discovered within Reality, and which after millennia of failures in both their extraction and use, were finally isolated, extracted and abstracted into totally Pure Forms – Equations. Now, this crucial process not only forced us to always use these new methods when dealing with Reality (methods involving rigid controls and maintenance of Domains expressly designed to enable their use). BUT, all of these purified extractions constituted a Collection, which purposely left Reality behind.



ALL concrete determinations were purposely omitted in order to arrive at an abstracted and pure Form and nothing else. Equations are pure abstractions dealing only with Form, and generalising them for multiple use wherever they “fit”.

Now, this was NOT purposively, or even unavoidably, detrimental! Because they had been wholly abstracted, they could be legitimately investigated within their own rich and yet idealised World. It should surprise nobody that the obvious name for this World should be Ideality, though we all know it as Mathematics!

But, there was another side too. There was also a completely idealist outcome when these people made the assumption that these abstracted relations actually made the concrete World what it is. Disembodied, purely formal relations were taken as the driving force behind concrete Reality. Such conceptions are not new, of course, for Mankind has mostly believed in a non-material God who drives Reality in a different way. Though different, both these ideas are entirely idealist! What else are they?

But, how do our mathematical scientists get away with such rubbish? The World of Pure Form deals only in abstractions from Reality, which have been totally stripped of any concrete elements whatsoever. These are its only substance, and, as was demonstrated 2,500 years ago in Ancient Greece, once these extractions had been achieved they could be organised into coherent systems. Euclidian Geometry is by no means the Truth about Reality, but it did, and still does, constitute a body of coherent relations, which can be organised into theorems and their unquestionable Proofs. Once again, I can speak about such things I was always very good at such proofs. In my youth, I was always very annoyed if I ever got a score below 100% in areas such as Mathematics. So, I am not a critic from the outside, but an expert in such fields. Now, if that completed my C.V. that would not be enough. Indeed, those more than competent at such things are most likely to promote them to being the central features across the whole spectrum of phenomena. There is a major problem with being ONLY a mathematician!

I could go on with this identification and study of Ideality, but I know that it would not be sufficient to demolish these denizens of mathematical Science. Remember, though they claim to be revolutionaries, they are in fact extremely conformist practitioners in their field of expertise. Indeed, their position has actually become the general consensus. Almost nobody disagrees. There may be quite energetic arguments about this theory or another, but on their basic philosophical position they are all the same.

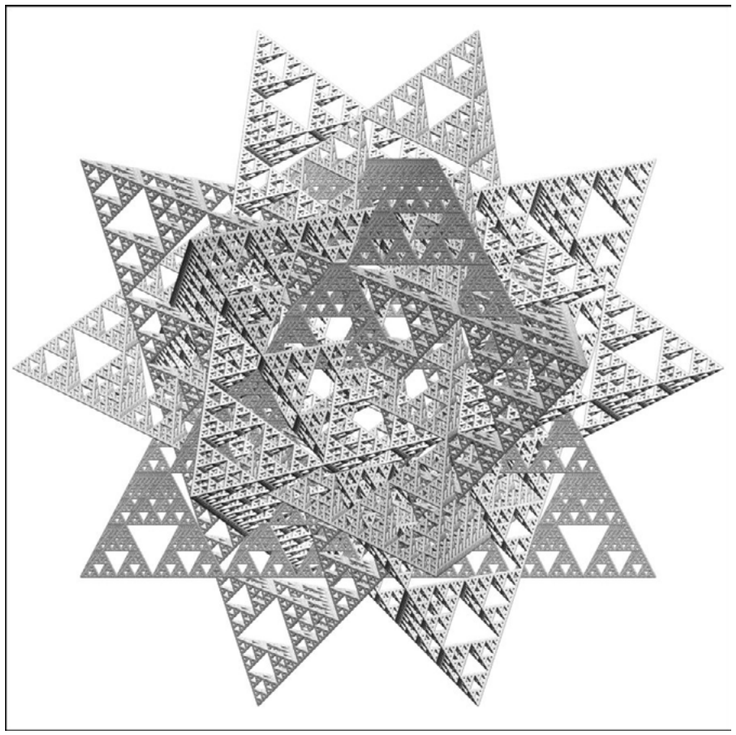
You might think that such a fact might give a great deal of credence to their standpoint, but it doesn’t! All of their colleagues have also chosen to study ONLY this quite separate World of Pure Form, and all their discoveries are valid ONLY within that World. But, surely, however coherent that World has become (and both Gödel and Turing greatly disagreed that mathematics could even be that), it still has to be confirmed by the ONLY final arbiter – Reality itself! And if it is NOT so confirmed, it certainly must lose all credibility as the underlying Essence – the driver – of Reality!

It, as with many other restricted disciplines, becomes a brilliant fiction, and when such constructs are then imposed upon Reality, we must condemn them, and reveal their quite prodigious shortcomings.

Now, this short paper can only begin the task of opposing such false philosophies. But, as this is a many-sided issue, I must go on to reveal other areas in the position revealed by this TV programme. Perhaps the most important is the area of Iterative Equations. Once again I can talk about this area; because I spent a good part of the 1980’s researching these very areas along with mathematician Jagan Gomatam.

He was devising various mathematical models for reaction-fronts in liquids, and in the modelling of the Human Heart based on Van der Pol’s famous equations, so, as the programmer of all these investigations, I simply had to see exactly what was involved, AND what questions did not get answered when I asked them.

A Postscript



This set of papers has a very long history, from techniques used to solve equations in Mathematics way back in the youth of this theorist, via researches with a brilliant mathematical colleague decades ago, to a recent attempt to find a methodology for Science based upon a holistic standpoint. There are, by now, literally hundreds of papers, which brought the writer to this current point.

So, it was no surprise that, on the basis of recent, new discoveries, a new set of papers very quickly rose to sixteen within a very short time, involving some 27,000 words, so their publication as a single SHAPE Special (which was the original intention) was altogether too big (probably around 40 pages). So, it certainly had to be divided up, at the very least, and maybe also structured in such a way as to facilitate a path to these ideas as well as the final conclusions.

The decision was to severely prune the quantity to be published at this stage into just two Special Issues of SHAPE Journal, and maybe more, if it were evidently necessary.

Clearly, this first Issue Mathematical Chaos I, had the task of laying the Basis for an Understanding of Mathematical Chaos, particularly from this philosophical point of view. While, Mathematical Chaos II will quickly follow this first instalment. It is already written and consists of four papers

1. A guided Walk through Ideality
2. Problems of Analysis in Holist Science
3. Stability, Turbulence, Chaos and Revolution?
4. “Through the Wormhole?”

This, though containing fewer papers, turns out to be a bigger Issue than Mathematical Chaos I, but it will be worth the wait. It seriously addresses Holistic Science, and the significance of Mathematical Chaos in that important area.

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