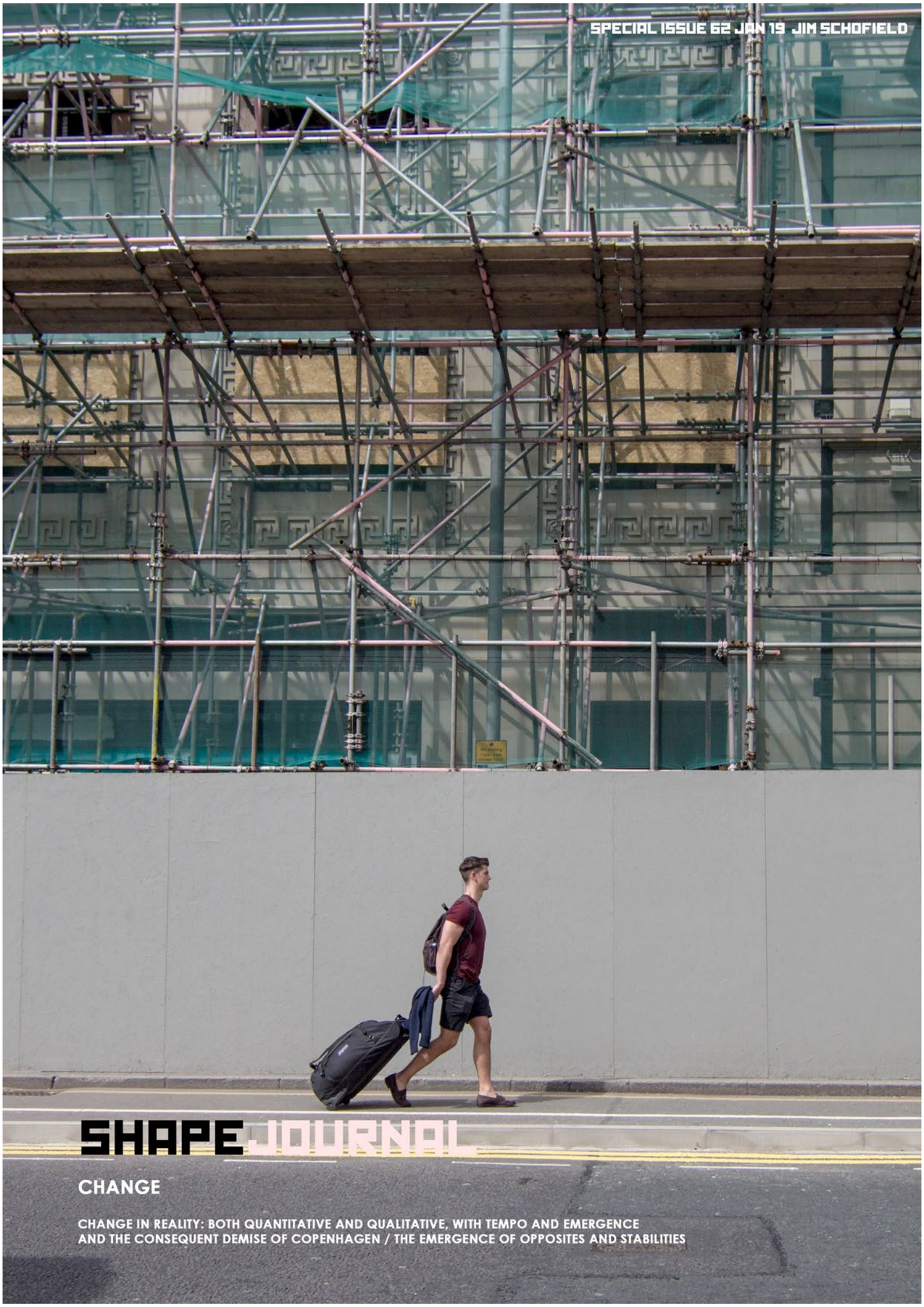
SPECIAL ISSUE 62 JAN 19 JIM SCHOFIELD



SHAPE JOURNAL

CHANGE

CHANGE IN REALITY: BOTH QUANTITATIVE AND QUALITATIVE, WITH TEMPO AND EMERGENCE
AND THE CONSEQUENT DEMISE OF COPENHAGEN / THE EMERGENCE OF OPPOSITES AND STABILITIES

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No Going Back and Going Back, 2017-18, by Michael C Coldwell
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Change

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Change in Reality: both Qualitative and Quantitative with both Tempo and Emergence and the Consequent Demise of Copenhagen

Change in Reality

I: Modes of Change

by

Jim Schofield

Welcome to Special Issue 62 of the SHAPE Journal, entitled *Change*. It features a single essay on the crucial subject of Changing Reality, and our general inadequacy in dealing with it.

Even in the obviously mutable structures we erect, from houses to cities and societies, we fail to notice, address and understand the change taking place. And when we look at the natural world around us, we have even greater difficulty, defering instead to eternal gods or unchanging Laws of Nature, ignoring the incessant flux, its rhythms and its tempos.

To both effectively and completely carry out the usually agreed-to Scientific Objective, which is to reveal the real meanings of Reality, both thoroughly and generally, it cannot but be via a regularly re-iterated set of investigations, if regular improvements are to be included, but also because Reality, of itself, actually develops. And, by now, surely everyone accepts that reality evolves: for otherwise, how can History, Geology and the current overwhelming complexity - from the breath-taking Variety of Life, to its miraculous transformations in Metamorphosis and Mammalian Live Births, which have both naturally arisen - be explained?

Of course, the Tempos, as well as the different kinds of Change involved, will certainly be various and significant - for though some things seem to display constant changes moment-by-moment, others don't seem to change at all for millions, or even billions of years. And thus, it is clear that very different Modes of Change occur from pure quantitative and often incremental variations, involving only the Size or the Amount involved, all the way via Qualitative changes in something's developing nature, to occasional total transformations - often termed Emergences or Revolutions!

Indeed, while historically all such things were normally conceived of as (or simplified to) "totally unchanging" situations, and are still often seen as examples of "Natural Stability" - and though that is an entirely appropriate term - it certainly does not infer that such a situation will remain as such permanently - not at all!

Interestingly, Mankind, whose lifespans are extremely short compared to that of our Universe, initially assumed that almost everything doesn't change at all, and indeed hadn't ever changed: they were assumed to always stay exactly the same. All the animal and plant species were considered fixed - perfectly created by an omnipotent God. And, therefore, as Science developed, the unspoken assumption about its Laws was that they must be eternal too.

The ever-evident Stabilities we see, existing literally everywhere, were taken as the Normal Basic State of all things, and the complexities of Reality were then only due to mere summations of the fixed things that were

possible, and, therefore, only produced by mere quantity or complexity alone. And, the only way to reveal the True Essences of such a World would be to go to Stabilities, where at least the overall situation was unchanging, and carefully remove as much as possible from it, and hold constant everything else, apart from a targeted couple, which appeared to be related in some way. For then, varying one of them, quantitatively, while measuring the other, would enable that relation to be revealed. Now, that relation, as with everything else, was assumed to be a contributing eternal Natural Law, which also performed, in exactly the same way, within all the various complexities of Reality that contained it.

This assumption, though never overtly stated as such, constituted the infamous Principle of Plurality. And, such was not only just a reflection of an implicit reading of Reality, but was always only a re-application of the methods used when-and-where it had first been discovered, in the primary, intellectual discipline of Mankind, Mathematics, developed by the Ancient Greeks (circa 500 BC). For, within that initial discipline, based solely upon simplified Perfect Forms, Plurality did indeed hold, for the Forms handled within it were not actual parts of concrete Reality, but only reflections of those apparent Forms, extractable from Reality by the means available within that discipline.

Now, clearly, we must not just condemn that achievement! It was, in fact, a truly revolutionary development. For, it had been achieved for the first time ever, that Mankind was able to extract second order Abstractions from Reality, and legitimately relate them one to another. They could Reason! And, to do it via what were termed Theorems and Proofs, by delivering further consequent Abstractions, and their inter-relationships, which had become possible for the first time ever.

Now, in spite of its later-revealed drawbacks, this development significantly transformed Mankind's intellectual means, for prior to this. Mankind did not have the wherewithal to employ Reason effectively: indeed, the best they could use was the wholly pragmatic, "If it works, it is right!"

But, the powers released by Mathematics in manipulating Abstractions, were almost immediately re-applied in general "reasoning", to construct what they called Formal Logic, using something closely similar to the means developed for Mathematics, but here applied to Concepts and Argument. But, crucially, in doing so, they had also imported Plurality, and its assumption that the factors being manipulated were forever unchanging. And, of course, such Reasoning quickly became the backbone of many other new disciplines too, and so, while empowering Mankind, they also limited them to a

mere manipulation of fixed things only. And hence, all of them could never deal with Real Development.

So, why did the gains of that intellectual Revolution persist for literally well over two millennia?

What in fact were those gains, and why were they significant?

The situation was strongly coloured by two significant circumstances.

The first was the preponderance of Stabilities all around in the current situation, and their *seemingly* permanent nature.

And, the second was the consummate skill with which Mankind finally learned to artificially-achieve-and-maintain the required Stabilities, in what became known as The Scientific Experimental Method, which was initially used in detailed investigations, but thereafter replicated-exactly when the extracted findings were successfully employed in productive use.

Indeed, compared with pure pragmatism, this still wholly Pluralistic Science was indeed a true Revolution: BUT, surely, only a *technological* rather then a truly scientific one? I stress this because, though sufficient within a certain kind of investigation-and-use, it could never be carried over into a valid Theory. Indeed, it immediately led to the theoretical explanations of what was going on being tackled in a very different way - using Properties, Causes and Consequences rather than via the experimentally-extracted purely formal relations.

But, though seemingly contradictory, these two means were legitimised by, in production, only using the components revealed by the pluralist experiments, and "fitting them together", with the ezplanations, as well as they could. If asking for an explanation, you would always get the truncated Holist Version, but, the technologist would obviously use the Pluralist methods and relations to deliver a desired result.

Now, clearly, even remaining within this "division-of-labour", it couldn't avoid the increasing contradictions being unavoidably generated by this severely damaged system. In fact, they proliferated into repeated crises, particularly in Theory, which was where explanations, and increased Understanding, were supposed to reside: so though the technologists via pragmatism could continue to deliver, the theorists increasingly encountered impasse after impasse, and in the end, abandoned their very purpose, and denounced Explanation and Understanding as no longer possible, particualrly in the "fundamental" Sub Atomic Realm.

Henceforward, they could only describe, and fit-up mathematical means of predicting, using probabilities, at that Sub Atomic Level, all still validated by "If it works, it is right!"

So, the question arises, "What is to be done to remedy this dire situation?"

What changes must be made to return Scientific Theory to its vital and essential purpose - explaining dynamic reality? What can re-establish effective Theory in Sub Atomic Physics?

First and foremost the actual role that Theory plays must be understood.

It has never, nor can it be, about the Absolute Truth of Reality. And, that is also the case for Pluralist formal relations too. But, the latter can indeed deliver the Absolute Truth of Ideality - for Ideality is fixed and Absolute.

And that is what experimentalists and producing technologists actually work within! Their situations are meticulously constructed versions of Ideality, within Reality.

But. to explain things, you have to be in Reality-as-is: and that is intrinsically Holistic!

But as you are attempting to explain something you always do not know enough about, the situations will be primarily suggested by real world analogies, and so deal in *Objective Content* rather than Absolute Truth! And as such will contain enough to deliver a close explanation, but never a totally comprehensive account. It will at some point prove inadequate.

Remember the pluralist equation is only used within the exact situation it was extracted from - so it always works, but has zero explanatory value! The theoretical scientist knows this and always seeks Objective Content, forever seeking to get more of it.

But, in spite of being "more right" than the technologists, they were also blatantly wrong in physical predictions, because they too embraced a collection of false premises, so wedded as they were also to Plurality and Mathematics, they "took the hit" and also turned to Ideality - the world of Mathematics for their future investigations.

Clearly, Plurality as a basic principle of Science must be terminated - in other words eternal Natural Laws, and their merely-complicating summations must be replaced by a fundamental acceptance of Holism, via the effective addressing of multiple, simultaneously present factors, which actually affect-and-change one another, and, consequently the full spectrum of combined effects studied from self-maintained, pluralist-like Stabilities, all the way to Revolutionary Transforming Emergences!

In other words, Qualitative Change and the Emergence of the entirely new finally must now be exhaustively studied and explanined.

First-and-foremost, the true nature of Stabilities, from their initial establishment, via their evidently, long-persisting, *self*-maintenance, all the way to their unavoidable, and increasingly-regular Crises, and, ultimately, to each one's inevitably terminal demise.

Yet, of course, the original historical failure to do this was then indeed inevitable.

You must learn to walk before you can run: and Mankind only made progress, initially, by greatly simplifying and then even idealising Reality by concentrating originally upon Stabilities as the "only" way to access underlying and "permanently-fixed" Natural Laws.

Any alternative Holist Approach would have been doomed to failure! You must explore first where you have a chance of making some progress, and actually achieving something.

Indeed, let us be clear, in the period from the great Intellectual Revolution in Ancient Greece to the initial criticisms of Hegel (a period of some 2,300 years), vast progress had been made, but ultimately at the expense of a terminally-limiting available integrated Landscape (our view is considerably less than Reality).

The Understanding of Reality had been both distorted-by and confined-to an increasing number of separated, subject-areas divided-by untranscendable impasses, dueentirely to the universally adopted Pluralist Approach.

Now, following Hegel's valid criticisms of Formal Logic (he was, of course, an idealist philosopher), there still remained the transfer of his devised dialectical solutions to concrete Reality as well. And, that was proposed by some of his Young Hegelian followers, and begun to be applied, first to History and then to Capitalist Economics by Karl Marx.

Now, Hegel's Dialectics had been arrived at by addressing the logical impasses delivered by Dichotomous Pairs of contradictory concepts, as had been originally revealed by Zeno of Elea, soon after the Greek Revolution, with his Paradoxes, involving the application of both Continuity and Descreteness in Movement.

And Hegel, extending his Thinking about Thought to as many Dichotomous Pairs as he could find, localised their causes to errors or omissions in their defining-premises, and, by changing these, effectively turned impasses into mere "forks in the reasoning"! But, it had still been about "opposites-in-*Thinking*", as Man currently conceived of them: and, there were clearly NO objective means of assessing the correctness of these Abstractions, within Thinking alone.

So, Marx's objective of extending Dialectics into concrete Reality - as its actual source, transformed it, in that its legitimacies could be established *scientifically*, rather than merely rationally.

Science could dispense with Plurality and address things Holistically.

Indeed, as this theorist has shown, the concrete appearance-of and relations-between Opposites can actually be shown concretely within the natural processes of Reality.

Strata - I-III, 2019, by Michael C Coldwell

The Emergence of Opposites

In preparatory work for this theorist's *Theory of Emergences* it was considered necessary, for the period immediately prior to the Origin of Life on Earth, to thoroughly investigate the simultaneous presence, and mutual effects, between many different chemical processes - almost certainly in liquid Water, and in conducive-yet-varying conditions, but also subject to differing run-offs from adjacent land, while also connected to global expenses of water, so, intermittently, perhaps, affected by both tides and ocean currents.

Clearly, if such a situation played a significant role in pre-Life developments. there would have to have been some other kind of pre-evolution *selection*, taking place among these many processes, to ultimately deliver self-maintaining and stable systems of processes, out of what would originally have been a chaotic uncoordinated mix.

Yet, nowhere could such a "relatively-random-mix" be maintained, for it would depend upon conditions, and if they were persistent, the processes, best served by those, would ultimately dominate and a static and limited situation result.

But, if the situation varied sufficiently, with differing run-offs due to volcanic events, or changes in the nature of arriving ocean currents, systems that had been previously established, would be challenged by others, AND, crucially, second-level interactions between the old and the new would also become unavoidable!

And, the assumption of chaos would be replaced by processes effectively competing-for-resources, or even providing-resources for other, different processes.

Both Opposing and Co-operating sub-systems would emerge!

And, such multi-process systems could establish themselves, as effectively stable, due to the actual balancing of opposing processes, and even become that way, as actively, self-maintaining systems.

And, the many then-involved processes would occur in very different amounts, and particular abundances would undoubtedly favour certain processes that would tend to individually become dominant.

This subset would include various different ones, though all benefiting from a given abundance, but would also effectively compete for that resource, and most of these would ultimately decline: but *two* would remain!

The dominant one would be clearly evident, but also those competing ones with similar effects would ultimately be out competed by the primary dominant one. But one sub-dominant one would survive because its outcomes were different enough: and this would cause it to survive, and define it as the Opposite to the Dominant process. It would share the same selecting resource but little else.

A Glimpse of What Comes Next

Now, in addition to the Significance of Opposites, we also have the problem of Stabilities, which must now be properly dealt with, and, thereafter, the much more difficult problem of, first, the devising, and then effectively-using of sound Holistic Methods in Theory.

And, of course, the integrating of all of these, as Modes within an overall trajectory, and which correctly copes with all the transitions between them, in ways that the Pluralist Approach never could.

Finally, the Theory of Emergences, though already defined elsewhere as an overall account of such Revolutionary Events, still must itself, be further developed, in its very differently involved sub-processes in applications as different as the Origin of Life and even a Social Revolution.

The Generality, as it stands, has already been effectively used in the Creation of effective Dance Multimedia Resources, on the one hand, and the Demolition of the Copenhagen Interpretation of Quantum Theory on the other, where they appeared as if totally unrelated areas, and consequently led to that Theory's own further development, even as it was actually being effectively used.

Shifting, 2019, by Michael C Coldwell

Hidden Facade, 2019, by Michael C Coldwell

Stabilities

As has been addressed above, the pluralist assumption of Stability being both the Source-of and Means-by-which Reality could be understood, has been proved to have been mistaken!

But, nevertheless. its effective use in technological developments has still proved very important. And, clearly, it was also an absolutely necessary step towards a real understanding, if only by what it did indeed deliver, by defining what major components were involved in given situations.

But, once its limitations were exposed, and a more basic, if usually hidden, state was revealed, there had to be a detailed exposure of that state, and its regular fixing into a series of long-persisting Stabilities, each one followed ultimately by its unavoidable dissociation into a brief turbulent interregnum, which for every single one, would still inevitably only result producing the next persisting Stability.

Of course, revealing the nature of these Dissociative & Emergent Interludes would not only deliver the True Ground for those following Stabilities, but, in addition, generate the very factors that would always, in the end, terminate every single one of them.

And, the only alternative to Plurality, which could deliver this complex Trajectory of Change, would have to be that of Holism.

Now, what had originally made Plurality into a valuable first step in Mankind's attempts to understand Reality, was not only its long persistences within Stabilities, but also its delivery, via both simplification and idealisation, of what would be the dominant-factors within those Stabilities. Indeed, their very dominance caused them to be promoted to be the "prime causes" of Reality - a move which just had to be wrong!

For, very clearly, the prime causes just had to be those factors, which both enabled both the construction, and later, the destruction of those Stabilities.

But, this though evidently true, doesn't make things easier at all! Instead of the simplifications and unchanging nature of the factors involved, as had been essential in Plurality, we now have instead - "Everything affects everything else!" - and, coupled with every situation involving multiple, simultaneous processes, all of which can and indeed do affect one another, to some greater or lesser extent, we are immediately presented with a very different set of problems, which are totally invisible within a Pluralist approach.

For, how do they affect one another?

Is it merely quantitative, or is it also qualitative?

It has to be both! For, we are no longer dealing with factors one-at-a-time, but all-together, and all of which are qualitatively different from one another.

Now, we do have some clues from Pluralist Science, which does deal with factors one-at-a-time, and tells us what each one, in isolation, does: BUT it assumes that what is found, in such isolations, is actually immutable - it cannot be changed! And, Plurality merely sums fixed-and-summed effects, from simultaneous factors.

So, how can Holism even cope?

There are various effects that can be considered:-

The first is Dominance, in which the rest of a set of simultaneous factors are swamped by one which out-performs all the others, so it can approximately be substituted for the whole set.

The second, assumes that as-a-set they all cancel each other out completely (they are Random) so NO overall effect is evident.

The third possibility, revealed by Hegel's Dichotomous Pairs, as well as this theorist's findings on Opposites (see above) recognises flips to an opposite dominance as things change within the Stability.

While, the fourth, is when a balance of many factors (delivering a Stability) finally breaks down and the Stability ultimately collapses.

The fifth, is both the most-basic and yet the rarest state, as it defines what I have called the Transformative Interlude between Stabilities. and, initially, is dominated by alternate Dissociations and Partial Recoveries, until ultimately approaching A Nadir of Dissociation - total balanced Randomness, remarkably, leading into a state with alternate Constructions, and Partial dissociations, finally resulting in a New persisting Stability.

Obviously, this is an Generality - covering all possible cases, so within a particular case, more details will be available, with the generality as a necessary context for every single one.

Now, switching to the specifics of particular cases, though the above general description will always be upheld, the natures of the set of all the different involved simultaneous factors will, undoubtedly, reflect each particular context, and, not only will the factors involved be different, but their natures and interactions will differ too.

So, though guided by the now realised general overall trajectory, the evident properties, and even the tempos involved, will be different - indeed, sometimes very different indeed.

And, to take something from Karl Marx's treatment of Capitalist Economics, in his book Das Kapital, a large part of its method was in the identifying-and-describing of crucial abstractions, and their inevitable opposites too.

Indeed, as he was a Dialectical Materialist, he did not treat his subjects pluralistically, as did the supporters of that System, but studied for decades gradually extracting, not only the crucial factors involved, but also their dialectical inter-relationships, and possible range of outcomes.

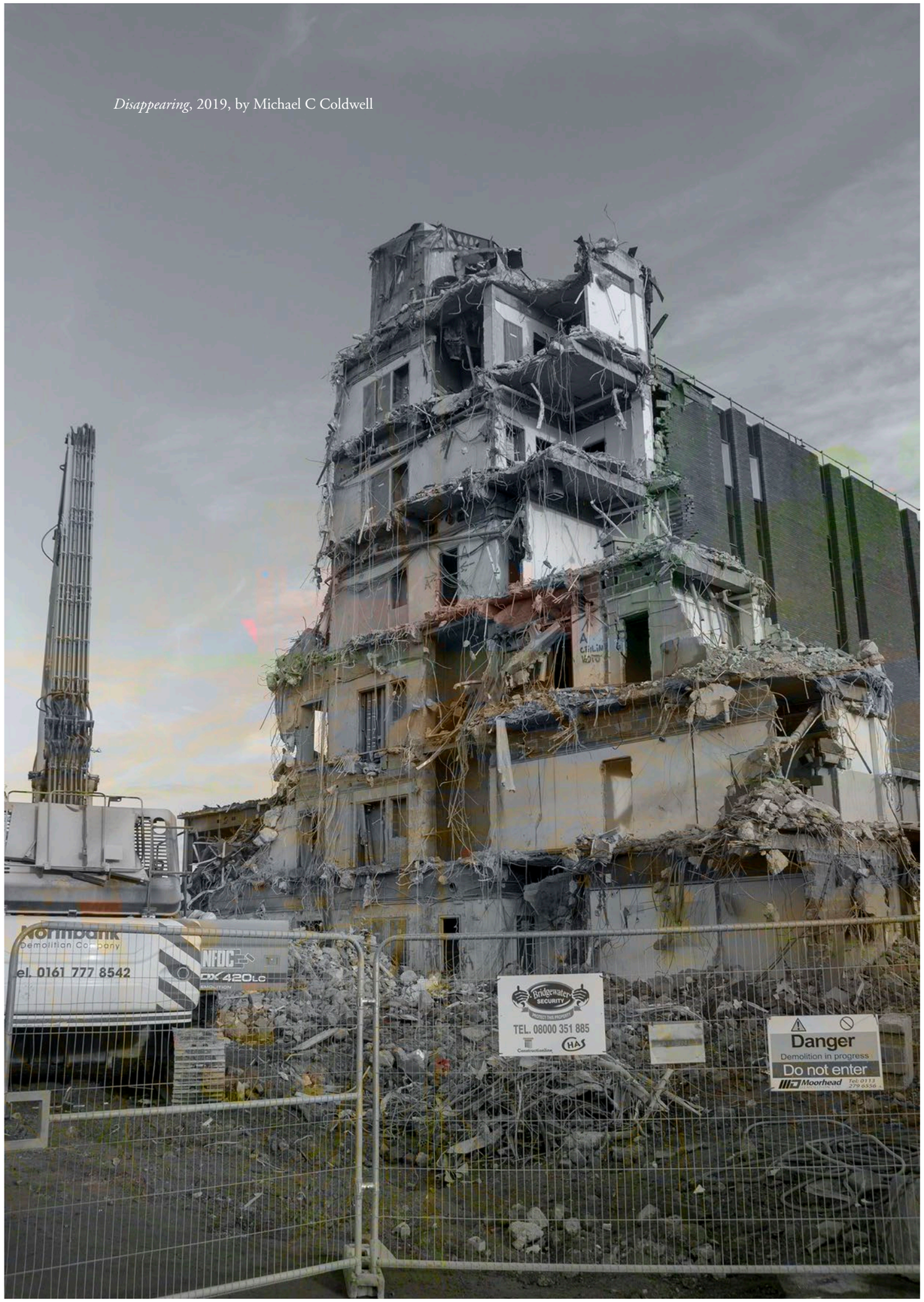
And, with such an approach, he could deal with the recurrent crises of the Economic System remarkably well - though it took him all the rest of its life, and four volumes of his book to approach a then comprehensive analysis. Interestingly, his stance and methodology, though later claimed by many, was not as well conquered by them, as an on-going analysis was by no means continued to be contributed, nor necessarily extended and developed which was, of course, absolutely essential! Capitalist Economics did not, and never does, stand still, and the changes since Marx's death have been considerable.

But, if that particular claim is considered contentious, I have another which cannot be denied. Marx always knew that the union of Dialectical Materialism and Science was by far the most important objective, yet it has never been effectively and comptehensively undertaken. Early in the 20th century, V. I. Lenin responded immediately to the positivist positions of physicists Henri Poincaré and Ernst Mach, with his book, *Materialism and Empirio Criticism*, and pulled back several leading members of his own Party from embracing that stance. But, neither Marx nor Lenin were competent physicists, and that is what was required in tackling the immence monolith that is Science! For, in spite of successes elsewhere, the successful attention to a new discipline area, can absolutely never be achieved by an outsider looking in.

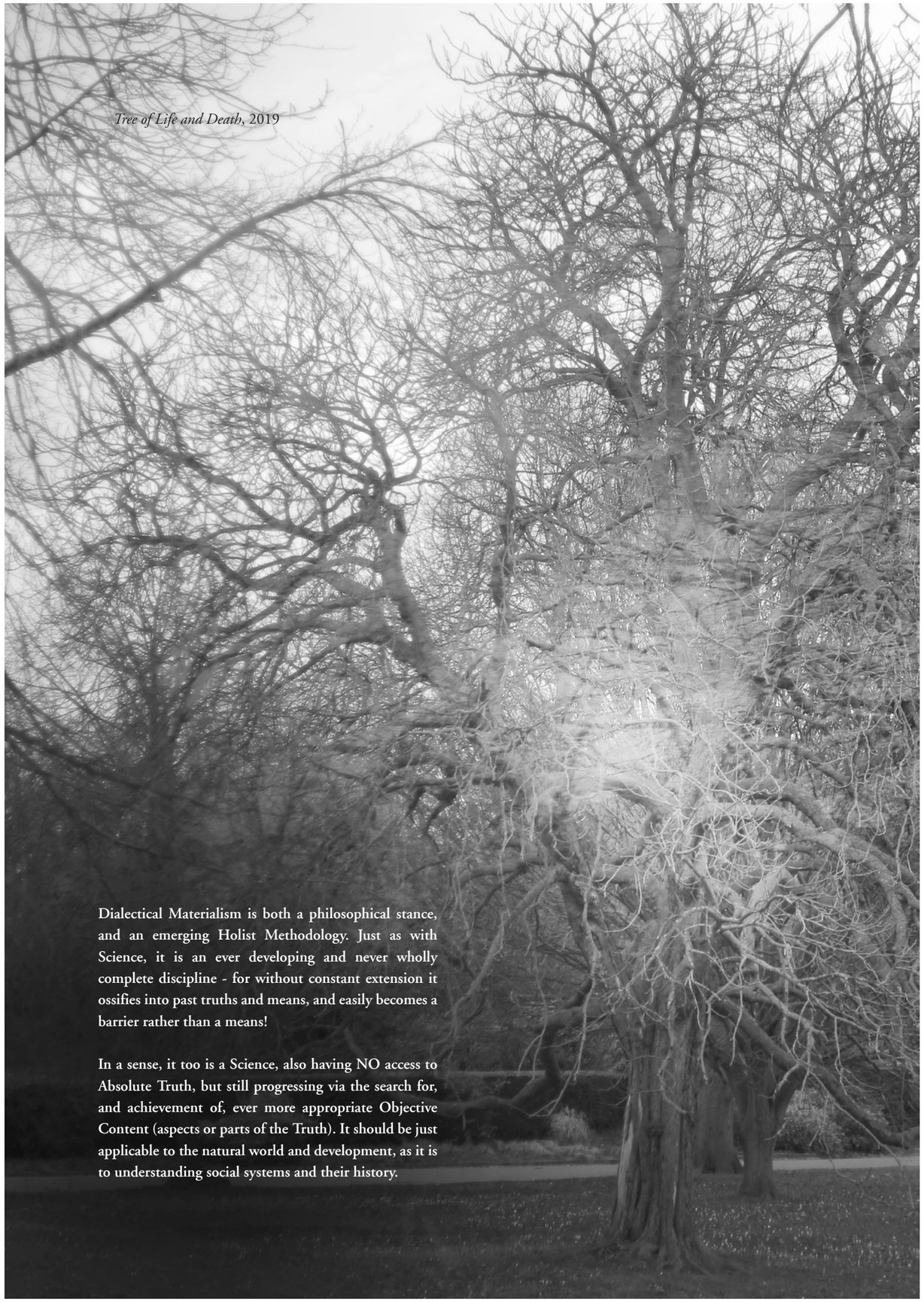
Just as Marx had to do with Capitalist Economics, so with the immensely larger area of Science, it would inevitably require the same sort of time and dedication to even begin to tackle the problems involved.

And a century later, it still hadn't been addressed, until this Marxist physicist's refutation of the Copenhagen Interpretation of Quantum Theory was published on the 100th anniversary of the Russian Revolution.

Indeed, in spite of being a committed Marxist all my adult life, and a fully qualified physicist, it actually took detailed involvement in a whole variety of diverse and surprising disciplines - aiding postgraduate researchers with tailor-made computer software, and crucially an extended period tackling complex problems regarding the study of movement: the use of recorded materials in the teaching of Dance Performance and Choreography, to solve the Dichotomous Pairs associated with movement in both Analogue and Digital Media.



Disappearing, 2019, by Michael C Coldwell



Tree of Life and Death, 2019

Dialectical Materialism is both a philosophical stance, and an emerging Holist Methodology. Just as with Science, it is an ever developing and never wholly complete discipline - for without constant extension it ossifies into past truths and means, and easily becomes a barrier rather than a means!

In a sense, it too is a Science, also having NO access to Absolute Truth, but still progressing via the search for, and achievement of, ever more appropriate Objective Content (aspects or parts of the Truth). It should be just applicable to the natural world and development, as it is to understanding social systems and their history.

The Theory of Emergences

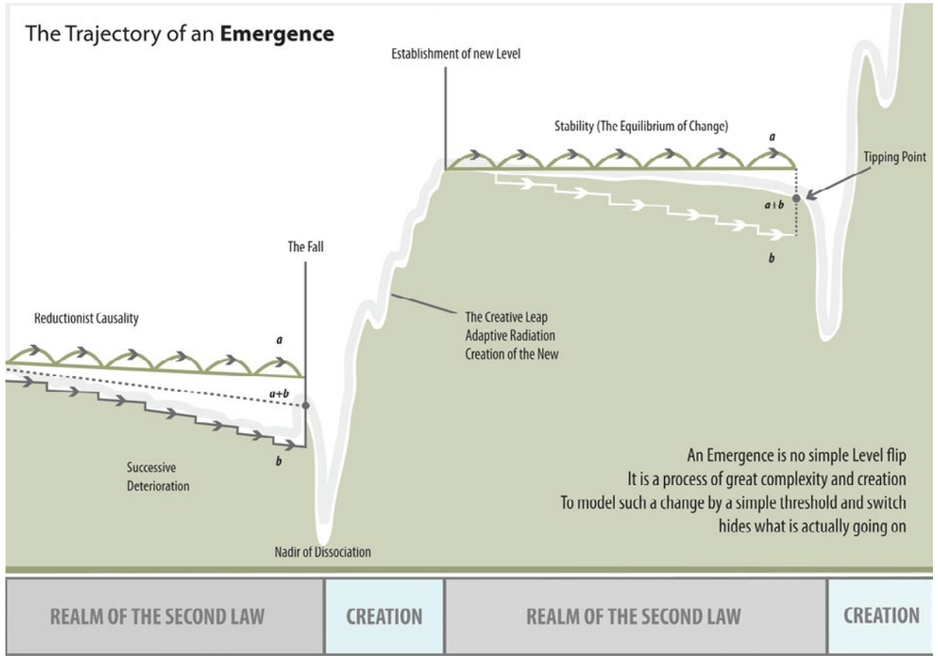
Finally, this academic researcher and political theorist, made a breakthrough within the former, to empower the latter, which was all about the Nature and Trajectory of Change-Over-Time!

It was engendered by a realisation of the damaging restrictions of a Pluralist approach, as well as both the potentials, and the difficulties, of the alternative Holist approach, which finally led to an understanding of both Stabilities, their creations, persistences and dissolutions, over time, and the unavoidable Emergent Interludes, which dramatically terminated one Stability, yet then turbulently gave birth to another.

And, in addition, that this Trajectory of real Qualitative Changes occurred everywhere, and at every level, to alone deliver Actual Development, even though it was always hidden behind-and-between very long-persisting periods of Stability, which gave the impression that these were not only the Norms of Reality, but in addition could alone deliver its understanding too.

It couldn't!

And, the reason for that failure was its focus, via Plurality, upon what were seen as eternal Natural Laws: for they did indeed appear as such, in all Stabilities, both natural and



arranged-for by Man. Indeed, the idea that Laws were unchanging actually became a key Principle in Science, and all phenomena were, thereafter, considered as the mere summations of varying amounts of unchanging natural laws - mere Complexities!

Yet, Qualitative Development could not be denied: so such changes were demoted to being due to merely sufficient Quantity naturally bringing with it changes in Quality. But, that isn't a real Explanation as no causal reasons or processes are involved!

Such a principle deformed Science into a mere puzzle, divining which fixed laws were involved, and how much of each would be necessary. Real Qualitative Change was NEVER causally-addressed! And, the consequence was an unceasing reliance upon formulae, for they could be extracted from experimental data without any consideration of *cause* whatsoever: and very soon the formula "became" the Law.

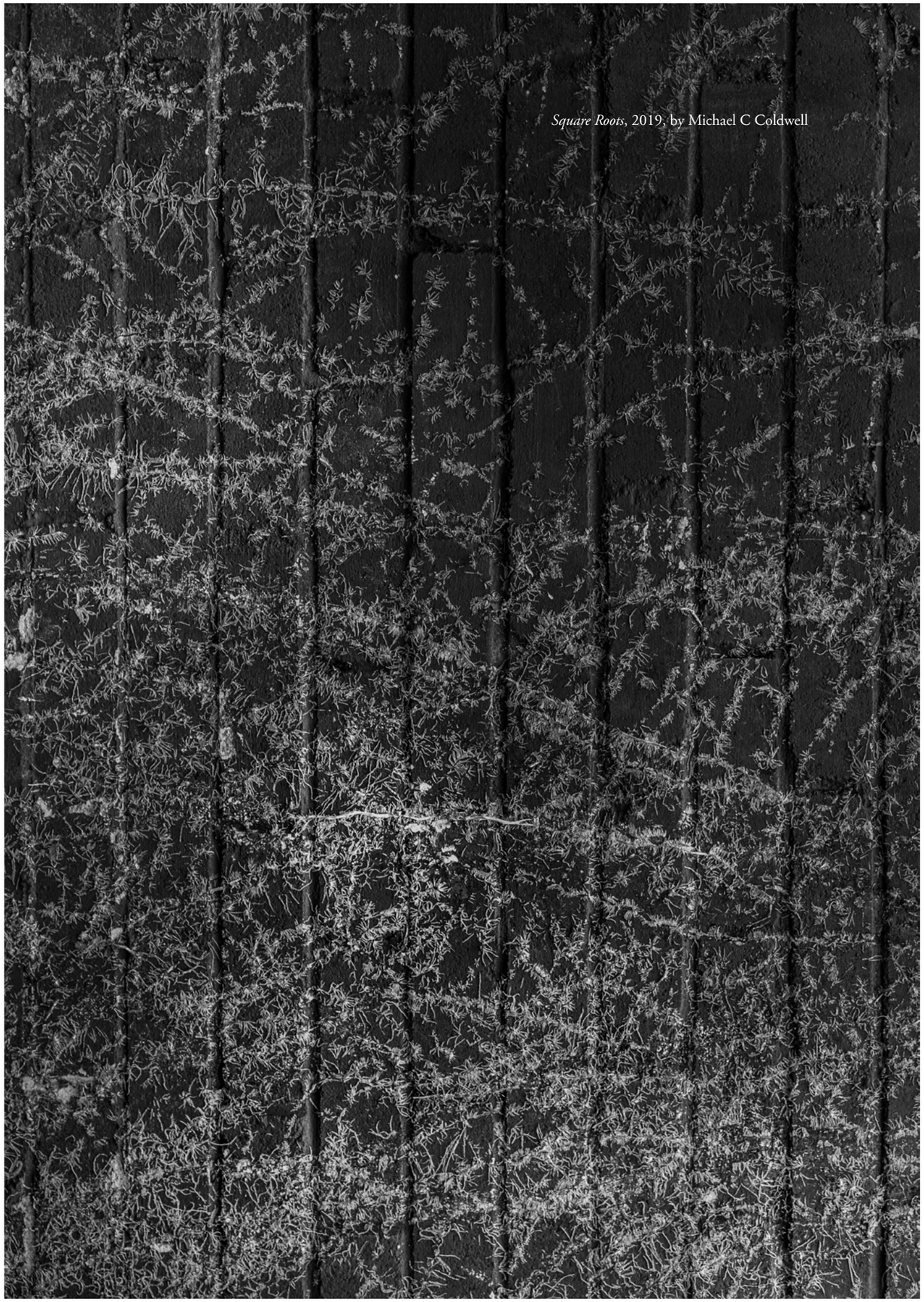
Very idealistic!

But, nevertheless, and surprisingly, for centuries explanations via holistic causality and formal laws had still co-existed, validated by the pragmatist tenet - "If it works, it is right!" But, there was clearly a "bomb" hiding in such a frig, which could, and in the end would, explode!

Now, as referred to earlier, the addressing of these features in Physics has been necessary for a very long time, but finally as they began to dismantle the enabling props of the Discipline, piece-by-piece, first by the abandonment of a Universal Substrate - The Aether, and then by the discovery of the Quantum, which together led inexorably to the total abandonment of Explanations, and instead the sole reliance upon Equations as so-called "theory", but even such curtailments still couldn't solve the problems, and the final retreat was to be forced to involve Wave/Particle Duality and Quantum Entanglement, within the ill-famed Copenhagen Interpretation of Quantum Theory!

None of the majorly damaging features revealed in this paper, and its many antecedents, were even questioned: the "solution" was to consign Causal Explanatory Theory to the dustbin, and promote pluralist and idealist formalisms as the prime movers of Reality. And that is, most certainly, incorrect!

As a one-time competant and able mathematician, who transferred his allegiances to Physics, because he demanded Understanding, I recognise the new consensus: they are mathematicians who have found the infinite expanses of Ideality, enchantingly preferable to the difficulties delivered by concrete Reality!



Square Roots, 2019, by Michael C Coldwell

Emerging, 2019, by Michael C Coldwell

The Emergence of the Wholly New

Now, the reader, with justice, may well be asking just how the qualitatively new can actually emerge from a given un-added-to situation: it is indeed the crucial question!

Of course it cannot be explained pluralistically as the only possible causes then would have to be due to changes in quantities. or, alternatively, new, added components.

But, that is certainly not the basis for the new approach: for, being holistic, everything is as a result of a multiplicity of factors, which can qualitatively affect one another. And, thereafter, a self-maintaining Stability yet-naturally, occurs only when these nevertheless achieve a balance, and hence deliver a particular and continuing, overall effect.

In addition, this idea also explains its self-maintaining ability too, as changes in one factor also cause contrary changes in others: so the balance is maintained. Opposition is clearly vital in playing such a role.

Of course, such effects are not the only ones possible: other qualitatively different outcomes can occur if enough and diverse changes are involved, for apart from recoverable Crises, there can also be overall Collapse of a Stability too. And, in such circumstances, different components from other collapsed systems can come together in wholly-new-complexes - many of which will fail to establish a Stability - while, others will indeed succeed, and in new ways that have never happened before.

And such can be explained by the wholly new *environment* in which it now all takes place: wholly NEW because some of the systems from the prior overall Stability will have survived, and thus, together with the new systems ensure the uniqueness of the new context.

NOTE: This also explains, what is termed top-down-causality as distinct from the usual pluralist bottom-up-causality, or Reductionism.

NOTE 2: It is indeed revealing to look again at the earlier Diagram of an Emergence, with these ideas in mind. as they or their consequences underlie that Trajectory.

Finally, in considering these ideas, it is fruitful to contrast the pluralist Complexity Pyramid of changes with a Holist Emergent Pyramid.

Can you really endow the former with the Origin of Life and Consciousness?

Waves and Particles

Now, to take things further, we unavoidably encounter a truly major gulf between the prior Classical Physics and what is now the universal consensus stance in Modern Sub Atomic Physics.

And, once again, the chosen way forward is another attempt to overcome the mistakes of the past, by increasingly depending ever more generally upon the Formalisms extracted in experiments, and turned into mathematical forms rather than Causes and Consequences.

As with the earlier addressed differences, even these are driven by the many impasses encountered in the classical approach, and "solved" by a deep retreat to Idealist Science.

BUT, of course, the mighty historical achievements of the classical dependence upon Causes and Consequences could not be simply cast aside! The positivist redirecting by Poincaré and Mach with their mix of both formalisms and causality had to occur, not only as a bridge to where we are now, but also to allow attempts at answering the question "Why?", with regard to phenomena, for "Obeys this equations!" would never suffice: some kind of accompanying narrative was essential too.

So, though the new theorists could manipulate their equations interminably at their desks and whiteboards, the rest of society, and even their experimental and technological colleagues still wanted "explanations"! But, given the long established basis of the Science, it proved incapable of doing that. It was, of course, the reason for the Copenhagen "counter-revolution"!

So, the "theorists" had to begin to bring in a few, wholly speculative ideas, to "plug the gaps": and the daddy of them all was "Heisenberg's Uncertainty Principle", which set Sub Atomic Physics apart from Classical Macro Physics, by making "sufficient measurement" impossible at that whole level.

Position and Momentum of particles at this level could never both be simultaneously known!

But, each such speculatively-added premise unavoidably begat more and more! They could, it seemed, by using Wave Theory, apply a wholly illegitimate version of it in delivering Probabilities for Position, if the momentum were known.

But, why on earth should it work? For, using Wave Theory must imply Medium for any waves to happen within, and none appeared to be present!

So, what was it that turned the position of a descrete particle into a wide physical expanse of possible positions? And, how could Waves be involved at all?

There just had to be another speculative addition! Something that added some kind of Random Scattering, but, remarkably, encapsulate-able into some kind of Wave. Now, if you think that they actually found such a situation in what was known about Reality, you would be wrong. For, they couldn't do it! But they did manage to develop a mathematical formulation that could at least be used to deliver it quantitatively. And, as they were now fully committed idealists - that would do.

And, with the current irreparable rift between Representation and Explanation, they could get away with a series of other speculations, which might, they insisted, deliver what they needed.

The catch-all concept was termed Wave/Particle Duality, wherein a Particle could exist in either Mode, depending on circumstances. But, think what that means, from its particle Mode, concentrated at a given point, it could turn into NOT a wave of distributed parts, but instead a wave of *probabilities*, one of which would be occupied at a given time, but you couldn't tell which one it was. You could, however, know all the probabilities, so that repeated events could be calculated as an overall set, and

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hence overall performances “via some unknown path”, could be delivered. The actual switch between Modes could not be delivered, but the possible performances could be calculated from the Wave Equation.

Now, forgive me for not being able to do better than this, but as I struggled to believe the Copenhagen account, I could not but imagine instead how it would all work if a physical Substrate were present! For then, a charged particle traversing a pathway through it, and all the switches it experiences being instead entirely due to already known properties of Waves, caused to occur within such a Substrate, in various different circumstances - such as encountering an interference pattern effect within the Wave, caused by a range of possible diffractions at a Slit Edge also redirecting every Particle.

For then, everything fell perfectly into place! An Undetectable Substrate would enable absolutely Everything.

Contexts:

At this juncture, it appears to be absolutely essential, to re-address a couple of very basic and often unreguarded premises - indeed Abstractions that we find crucial in order to proceed to address real world problems. It is all to do with the purely local, and the obviously extended phenomena, that we encounter in concrete Reality.

And, as the Ancient Greeks had established, to over-simplify certain spatial situations could indeed enable a focus upon particular features of Reality, which could then be more easily made-sense-of.

For example, a single Particle could be conceived-of as existing at a particular point of *zero extension,* located at its centre. Thus, a precise Point, with an exact quantifiable position, could effectively be used in certain useful calculations.

But, there were other important features that could not be so simplified, for they were both involved over an extended region, with differing values and effects across that range.

And, if fixed they were termed Fields, but if moving and/or varying they were termed Waves. And these required some sort of extended repository where they could reside.

Now, in everyday experience, there was a very evident example of such a repository - Water. So with that as a model, the general term was that all of such were Substrates or Media.

Now, some of these were invisible, for they could be Gases, but all of them, though evidently composed of descrete Units, were also intimately-related, initially to their immediately adjacent partner-Units, and hence, thereafter, to the whole system.

The question, therefore arose, as to whether there might be a Substrate that was passively-undetectable, but dynamically both affecting-of, as well as affected-by, various interlopers, occurring within their aegis.

Indeed, exactly what might make them undetectable in a particular, passive Mode, yet when actively affected convert to a very different Mode and produce very detectable results?

Water again proved to be a fruitful analogistic model, via its conversions to, in one direction, static Ice, while in another, to driven Streams and even Vortices. Indeed, by making all the Units of a Universal Substrate mutually-orbiting Pairs of diametrically opposite Leptons, such a Substrate was theoretically possible and hence similarly devised.

A Theoretical Universal Substrate

Now, long before a comprehensive theoretical construction of an undetectable Universal Substrate was attempted, a single already-discovered undetectable particle, was available to initiate, in a simpler way, that much larger project, by first enabling a very simple, theoretical Substrate consisting only that single particle alone. For, it could be theoretically involved-in a new trial explanation of the ill-famed Double Slit Experiments.

The particle involved was a mutually-orbiting pair, consisting of one electron and one positron. which had been discovered in the Tevatron at Fermilab and named by its discoverers as the Positronium.

It was almost ideal! For, it was totally undetectable, and had an internal orbit which could be promoted to carry a quantum of energy.

But, it was unstable!

Now, a Neutron is unstable outside an atomic nucleus, but stable within one. And, I was aiming for the new particle being part of a Substrate, so I assumed that there it could be stable and I renamed it, in that context, as the Neutritron.

And, the method was fully justified, as even with this truncated and wholly theoretical concept of a Substrate. every single one of the anomalies of those Experiments were removed by purely physical explanations without difficulty. And, its inadequacies were nowhere near as important as its quite evident adequacies: it contained more Objective Content than the Copenhagen alternative. An attempt at embarking upon a General Universal Substrate, based upon this one-legged try-out, was justified, but, it would have to address ALL the phenomena currently dealt with by the Non-Substrate and idealist Copenhagen account. It gradually became clear that more Substrate Units would be needed: the Neutritron could not deliver everything.

To detail the whole theoretical approach here would not help this paper's overall objective, but the strategy involved can indeed be described. For, it would be, once again, yet another purely theoretical investigation, and all Substrate Units would also be formed from mutually-orbiting pairs of diametrically-opposite Leptons, which added Magnetons and Gravitons to the current Neutritrons, in order to address Fields and Waves entirely as Modes of the Universal Substrate.

Remarkably; both Electrical Fields and Magnetic Lines of Force were easily explained by a Pair of mirror image Magnetons, formed from Taus and Muons, which because of their different sizes, also delivered Magnetic Dipole Moments to, in addition, provide essential Directions, in the Fields. And, a similar pair made from Neutrinos, termed Gravitons was able to deliver Gravity, by similar means.

Now, before anyone gets too angry, may I remind dismissive opponents that this was a purely theoretical experiment to justify some of the assumptions involved. Indeed, it played exactly the same sort of role as James Clerk Maxwell's Analogistic Model for The Aether, which correctly delivered his world famous Electromagnetic Equations (which everyone still uses). How, do you think, did he manage to achieve that?

Another aspect with regard to Theory-in-General that isn't often mentioned is when relations derived directly from purely physical relational theories, they also lead directly to equations, as distinct from the opposite process, in which data from experiments leads to equations, for these are very different processes indeed. For, within any experimental source, the always deemed to be necessary rigorous and maintained "farming" of the circumstances, unavoidably inflicts the pluralist premise upon the extracted evidence, then when the data is again used to turn a General Formula, direct from Pure Mathematics, into one that "fits" the data, it is also adding in a measure of idealism too, for Mathematics

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deals only with abstracted Perfect Forms alone. While the alternative of going directly from natural uninterfered-with observation, to some sort of relation, though it avoids those pitfalls, still currently never gives a reliably quantitative result.

Maxwell's idea of the Aether was of this type, as was Van der Pol's equation of oscillations in an electrical circuit, especially when it was moved wholesale (that is analogistically) across to an equation representing a Beating Human Heart: and, interestingly, it delivered via the iterative versions derived from that, surprisingly gave both Fibrillations and Heart Attacks, unavailable from the formal equation form of it.

Clearly, there has to be a holistic alternative in revealing natural relations, but apart from these retrospective exemplars, there is still as yet no clear Holistic Method! Yet Darwin and Wallace's Natural Selection explanation of the Origin of Species, and Stanley Miller's Experiment into the primeval origin of Amino acids in chemical developments ultimately leading to the Origin of Life itself, were indeed holistic attempts at dealing with change scientifically.

And, for centuries a holistic explanation, accompanying the extracted pluralist formal equation, was always sought for and found too, and, though they didn't exactly gel with one another, they were both retained, due to the "age-old" pragmatist tenet. But, that remained only until the ever increasing number of impasses became intolerable, and the holist explanations merely became an accompanying narrative, to help the uninitiated, and was increasingly dropped altogether in academic papers.

But, the current situation is clearly fast approaching a total-dead-end! The real causal investigation of concrete Reality has been abandoned, for its reflection in that mirror of Reality which is Mathematics, but which is also a pluralistically distorting mirror - or, even worse, via a Hall of such Mirrors, which is Modern Multi-dimensional Mathematics - and in so doing, fatally confuses the virtual dimensions of abstract formalism, with the physical dimensions of Real-Space-in-Reality.

Modern Sub Atomic Physics indissolubly unites Pluralist Formalism with Technology, totally without Explanatory Theory, and is therefore inevitably doomed as such.

NOTE: The myth of possible direct accesses to Absolute Truth, stand behind both the integration of Causal Explanations with formal representations, AND surprisingly, also its abandonment, as the impasses proliferated.

Clearly, there is zero access to Absolute Truth, but increasingly better access to some Objective Content - aspects or parts of the Truth, which though it isn't an uninterrupted path towards Absolute Truth is, in fact, the only route we have!

Clearly, it has been via the founding premises of these disciplines that they were, and continue to be, so severely handicapped, but, nevertheless, have still been long-perpetuated by the fact that such premises were not wholly wrong, but severely limited to only Stable Situations, which could frequently be achieved, but not always, and hence could deliver - NOT eternal Laws, but only conditional ones.

And, when Modern Physics moved into areas where such absolutely essential conditions were no longer achievable, and hence available for study, the scientists found themselves outside the "back door" in the world as-it-really-is, and totally without the means to study it.

But, they did know how to study stable situations in which their methods would work: so they narrowed their objectives and constructed stable environments in the very extreme areas of Very High Energies or Very Low Temperatures, in ever more expensive efforts to deliver what they needed to "carry on as usual".

And, one result was the Large Hadron Collider. But it was already too late!

They were now investigating a place far away from Reality, studying a distorted reflection, of a distorted reflection, deep deep deep within Ideality. And their "Science" was about a collection of such achievable monstrosities, having nothing to do with dynamic Reality-as-is!

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