



# SHAPE JOURNAL

## THE IMPLICATE ORDER

A MARXIST CRITIQUE OF E E HARRIS AND DAVID BOHM / PHILOSOPHY AS THOUGHT / BOHM'S IMPLICATE ORDER  
IMPLICIT ORDER WITHIN REALITY / BELOW ELEMENTARY PARTICLES / PHASE AND LOCALITY / NON-MARXIST DIALECTIC  
SCIENCE / STREAMS, VORTICES AND ELECTROMAGNETISM / QUALITATIVE AGGREGATE PROPERTIES

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An Additive Mix by Liz West, 2015

## The Implicate Order

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## Introduction:

### A Marxist Critique of E E Harris and relations to the work of David Bohm

by

**Jim Schofield**



*David Bohm (left) and idealist philosopher Errol Harris (right). The connections between these two thinkers were brought to my attention by my namesake James Schofield, and his thesis on the "Dialectical Holism" of the latter. His PhD deals with some interesting Physics and this introduced me to concepts such as Ontic Structural Realism, and set me thinking about Bohm seriously again. So thanks, James!*

Welcome to Issue 61 of the SHAPE Journal, entitled *The Implicate Order*, in which we examine notions of Dialectical Holism in Physics.

This series of papers attempts to draw a definitive line between the philosophical stance of physicist David Bohm, and his rejection of the Copenhagen Interpretation of Quantum Theory, on the one hand, and the seemingly-convergent Idealist philosophy of Errol Harris on the other, and to do so from an emerging Marxist standpoint in that crucial area.

It is, and has been, very important because of the total lack of a Marxist critique of Copenhagen, via a clearly explained and explanatory superior alternative stance in Sub Atomic Physics. Indeed, this key absence has been so important that it has even frequently disabled the Marxist stance too, even politically!

For, these seemingly obscure questions always were of paramount importance from the time of Karl Marx's split from Hegelian *Idealism!* For, without the conquest of Science by this new Materialist stance, it would be crucially disabled in everything else that it dealt with.

Marx knew it, and intended to deal with it, but he was a philosopher and an academic historian, by training, and ill-equipped to tackle such a wide-ranging discipline as Science-in-general.

In addition, his historical studies with the new standpoint immediately required the conquest of Economics, as the touchstone for the tumultuous, indeed, revolutionary changes that were so important in the developments of Human Societies throughout History. His initial task, therefore, just had to be a very different treatment of Capitalist Economics, and the change turned out to present him with an enormous undertaking, recasting the whole of that subject from an entirely different and wholly new basis. This took him the rest of his life, and Science in general was never addressed by Marx.

The dangers of this crucial omission were realised by V. I. Lenin, when key members of the leadership of the Bolshevik Party had begun to show great interest in the positivist Physics of Henri Poincaré and Ernst Mach, which was understandable because of this evident hole in the Marxist stance.

Lenin knew, immediately, that this was serious, and he immediately set about a refutation of the Positivists in his book *Materialism and Empirio Criticism* - which successfully pulled Lunacharsky and others back into the fold, philosophically! But, he too was no physicist, so the hole was still not filled, and hasn't been ever since.

Clearly, to this Physicist and Marxist that vital task is the most important in contemporary Philosophy; and this is already well underway. But the long standing historical

omission of this undertaking could not but encourage committed Marxists to seek a world-class physicist who strongly rejected the Copenhagen stance, and the increasingly dominant candidate was David Bohm.

Indeed, in my youth I too sought answers with Bohm's alternatives, but the problems in Science were extremely well entrenched and surprisingly old.

In spite of Bohm's Materialism, there was with him, as with all scientists, a very long-standing Idealism, imported via Mathematics, and a Plurality via Abstraction - yet also and surprisingly *Holism* via Explanation, all amalgamated via the crucial glue of Pragmatism. This uneasy mix actually underpinned the whole of Science, and Pragmatism alone allowed a switching between different areas of study, where different assumptions "could work".

And, of course the co-existence of these directly contradictory stances was not realised by those involved: they considered a "seemingly-contradictory-appearance" as being due to as yet not-fully-understood-areas, which would, later, be removed by new Knowledge.

But, that would never be the case, whenever this unaware amalgam prevailed.

And, the differences between Einstein and the Copenhagens, and between Bohm and the rest were all due to this congenitally-contradictory, assumed Amalgam as Basis.

So clearly, Bohm has to be dealt with, as vitally as Lenin had to deal with the Positivists, but this time *fundamentally*.

## Philosophy as Thought

### *Idealism Lives!*



If you thought that Philosophy had been rescued from Idealism (which is solely about Thinking), by the wholesale transfer of all of Hegel's Dialectics to a Materialist basis, then you are sadly mistaken.

That was, of course, Marx's ultimate intention, but he, by no means, directly either completed-or-even-targeted that enormous task, for he was chiefly a historian (an academic discipline) and not a scientist - a physically investigative approach.

And, in addition, even more crucially, he did not publish a comprehensive account of his own very significant developments of both a Holist-and-Dialectical Method for the whole range of Theoretical Researches, nor of any thorough-going, Investigative/Experimental Methodology - applicable everywhere, either.

He did though both make and effectively use such methods truly brilliantly, but never "spelled-them-out" to facilitate more general and effective use by others. And, though you are supposed to be able to extract all of these very different methods from his effective uses in major works such as *Das Kapital*: that certainly isn't at all easy via such a work, but are also impossible across a wide variety of disciplines, which will certainly involve their own unique difficulties, and which, if they were adequately addressed, would most certainly also greatly extend and improve both Marx's contributions and further empower his approach.

But, the by-now-well-established, and still universally-employed methods of Formal Reasoning, always situate such questions within purely-discussional-set-ups, which, alone, will never break through to where Marx

had reached, and without the crucial extension of that revolutionary stance to The Sciences, no alternative means of application could be possible to complete Marx's necessary Philosophical Revolution.

One can very easily be misled, even by those who seem natural allies, using terms such as Holism and Dialectics, but who are actually only working to their own definitions of such terms, and who are nowhere near Marx's own crucial approach, often actually negating the purposes which impelled Marx to go the way that he did.

And, perhaps surprisingly, those professing-to-be-Marxists do exactly the same thing, while still-using, in-the-main, non-conductive and non-dialectical methods.

Their offerings may look like some of Marx's work, but if they are addressing situations never either previously encountered-or-addressed by him, they should most definitely retrace the very-same-steps to the necessary philosophical base, that Marx himself had to train himself to do! For presented with the necessity of a comprehensive analysis of Capitalist Economics, his necessary re-equipping and detailed applications took him the rest of his life. He effectively had to re-write the whole approach for a different World.

And, ever since Marx, the main outstanding and essential task had-to-be the application of these ideas to The Sciences - and, the proof that this has never been addressed, is clearly indicated by the still-regarded-as-separate, and the ever-increasing number of disciplines (and ever-increasing specialisms within those) - all of which are arrived-at, via the totally-opposite pluralist "solutions" due to the seemingly terminal impasses caused

by flawed premises, along with a totally inadequate method.

Before any dedicated and committed Marxist begins to demur with this account, may I briefly describe my own struggle in my qualified specialism of Physics.

I knew from my very first term in a Physics Degree Course at Leeds University that what I was being taught was wrong. All the Professors and Lecturers, in their lectures, plus all the postgraduate Demonstrators, in the laboratories, were delivering the Copenhagen Interpretation of Quantum Theory, and it didn't *explain* a single thing!

It was purely descriptive, and mathematical, so that if you asked "Why?" something behaved the way it did, in the magical Sub-Atomic Realm, no explanation was ever forthcoming. Instead, I was given equations based entirely upon Perfect Mathematical Forms, and that was considered enough.

It never was!

For, having been the star mathematician throughout my whole career in the "A" stream of my Grammar School, I had switched to Physics because I actually wanted to understand things, not just manipulate formal descriptions and establish abstract formal relations. To give you some idea of my abilities, I was entered for 7 "A" level Exams instead of the usual 3, and, in the usual two year period of study, I passed them all! Though I frequently attempted to get real explanations at University, I got none. So I regurgitated what I was given, and got my Honours Degree.

Needless to say I turned my back on Physics, eventually changing my field to Computing, which I taught myself, and managed to get back into Higher Education teaching that subject. I finally ended up in a Professorial Level post in Goldsmiths College, University of London.

But, the very best of my time had been spent helping postgraduate researchers with their work, particularly in Computers-in-Control applications, so I took early retirement and returned to that task with a still-working colleague - an expert in teaching Dance Performance and Choreography. And, it was in solving problems in teaching movement via recorded footage that a very old and very famous example came up.

It was related to the philosophical paradox revealed by Zeno of Elea in using Continuity and Discreteness in problems concerned with Movement. After a period of intensive research we ultimately solved it and won a British Interactive Video Award for our *Dance Disc*, and my colleague got her PhD for her brilliant work on that project. My contribution was as much philosophical as it was technological, and the method I had used to solve the problem was both dialectical and holist.

I was re-invigorated by this and spent the next decade writing and demolishing the Copenhagen Interpretation of Quantum Theory.

Only then had I become a real Marxist!

I am currently reading a PhD thesis on philosopher Errol Harris's lifelong attempt to use a "dialectical holist" method to "finally unify Philosophy and Science" - which sounds very close to my own aims - but included absolutely none of Marx's crucial developments, and even excluded his absolutely vital transfer of the whole stance to Materialism.

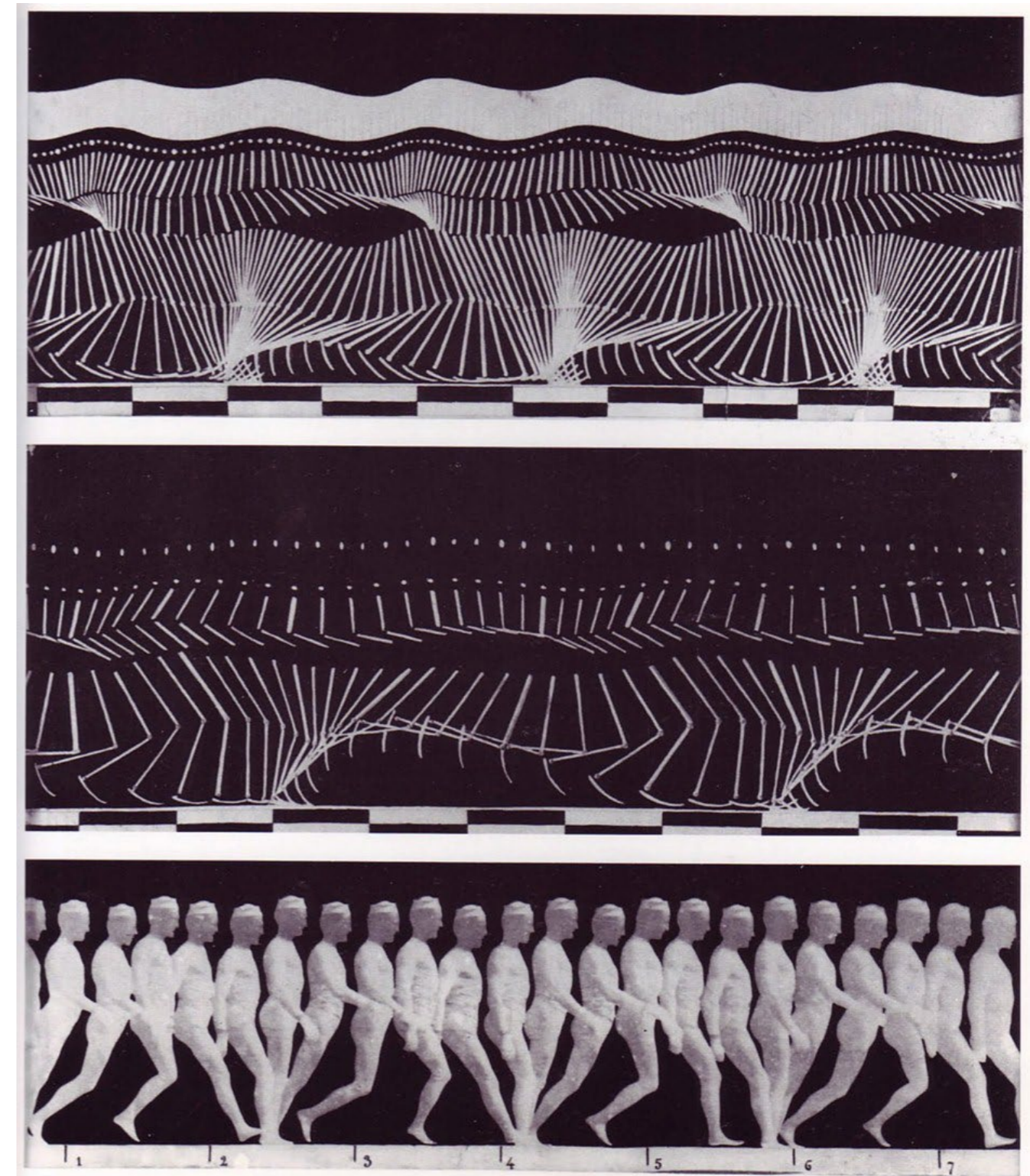
His "Dialectical Holism" was still wholly Idealist and Hegelian!

In addressing such questions, it is very easy to see why people forget how Science emerged historically.

For, all the necessarily-involved philosophical problems, in dealing with Reality, could never be transcended without a systematic, investigative study of concrete Reality itself, involving directed experimental investigations, in order to confirm or deny all the conclusions of Thought alone - no matter how many "scientific ideas", and even "definitions", were brought into any "serious-intellectual-discussions", they alone would never be enough!

For, without both the resort to confirmation in concrete Reality, AND a developed and relevant methodology, absolutely NONE of the outstanding problems could ever be adequately addressed.

Indeed, all such undertakings, without these vital developments, have not only failed to fulfil the initial reasons for doing Science, but have, instead, contributed to the exact opposite, wherein the pragmatic fit-ups of Modern Sub Atomic Physics, have persuaded many



*Continuity and Discreteness in the early motion studies of Jules Etienne Marey, 1883*

## “ontic structural realism”

- = an ontology consisting of structures, “patterns” or “mathematical models”
- in short: *things are out, patterns are in!*
- but my concern is their scientism

## Two Forms

- ESR: All that we *know* is structure
  - Agnosticism about ‘objects’ → humility
    - (J. Worrall, 'Structural Realism: The Best of Both Worlds?', *Dialectica* 43 (1989) pp. 99-124)
- OSR: All that there *is*, is structure
  - (J. Ladyman, 'What is Structural Realism?', *Studies in History and Philosophy of Science*, 29 (1998) pp. 409-24;
  - S. French, 'Structure as a Weapon of the Realist', *Proceedings of the Aristotelian Society* 106 (2006) pp. 170-187.
  - J. Ladyman et. al., *Everything Must Go*, OUP 2007)

*A couple of lecture slides provide a brief glimpse of the new Idealism taking over philosophy  
Ontic Structural Realism sees pattern and structure as primary (before matter)*

philosophers to accompany that doomed orientation in Physics, via its “Ontic Structural Realism” reflection in Philosophy. The Copenhagenist tail is definitely wagging the philosophical dog!

Yet, the actual task required would never simply be a one-way transfer. The New Philosophical Stance needed Science, as much as Science needed the New Philosophical Stance.

Indeed, this writer, as a committed Marxist, throughout the whole of his adult life, never had the wherewithal in his youth to tackle this task until presented with a seemingly totally intractable problem in teaching dance, of all things! (see NOTE above)

Indeed, a satisfactory resolution of the impasses involved was not even revealed for a further 2,300 years, after the Greek Intellectual developments, and Zen’s critical Paradoxes, until the German philosopher Hegel finally determined that the problem lay in the inadequate premises always assumed for any pair of directly contradictory concepts. And it was using the same methods as Hegel, but, of course, linked to concrete solutions in real world technology, that I not only solved the involved problems, but also enabled the final realisation of what was required in applying such a stance to Science in general.

For many decades, I didn’t realise I could not only defeat Copenhagen Interpretation of Quantum Theory philosophically, but in doing so, I could begin the task of finally wedding Marxist Dialectical Materialism to Science, saving Science and Philosophy from the regressive Idealism plaguing both.

That task is now well on the way, though there is still a great deal to be done, and I’m sure we shall meet staunch resistance.

## What is Bohm's Implicate Order? I

(The other) James Schofield (in his Ph.D. Thesis) commences his account of Bohm's Implicate Order with the following point:-

*"whereas relativity theory entails continuity, strict causality or determinism, and locality, quantum mechanics requires non-continuity, non-causality and non-locality"*

So, Schofield sets the "sole grounds", within which these approaches are to be judged - that is by their clearly opposite "criteria", which are all man-made concepts, and immediately (and unavoidably) recall the Paradoxes of Zeno of Elea where the contradictory concepts of Continuity and Discreteness led to seemingly irresolvable confusion in using Formal Logic in reasoning about Movement.

While Hegel made a significant contribution to this area, he was still an *Idealist* Philosopher, and therefore really only concerned with Human Thought. The "world-in-question" was entirely contained within man-devised conceptions alone! There was no other world independent of that, which could validate those elements.

So, though Hegel quite correctly criticised the pluralist nature of all these conceptions, and torpedoed a Formal Logic that only dealt in *fixed* qualities and totally excluded all Qualitative Change, his own basis still located the problem entirely within that same initial and crucial limitation.

In his Dialectics he removed one debilitating restriction, first by replacing Plurality by Holism, but thereafter also by acknowledging the "legitimate" transformation of such concepts into their opposites "within certain transforming conditions".

But, as an idealist, he could provide NO concrete grounds for these transformations: it became a balancing of multiple secondary and constantly varying sub-concepts, which by varying the "amounts" of their contributions, could "flip" the conceptual balance to the opposite resultant overall concept.

It was still all in the head!

Now, Schofield puts down Bohm's attempt to find a resolution between these two seemingly opposing stances of Relativity and Quantum Mechanics to:-

"undivided wholeness"

But, it was, of course, the actual presence of a real concrete World, to which Bohm actually ascribed his confidence in a resolution being available.

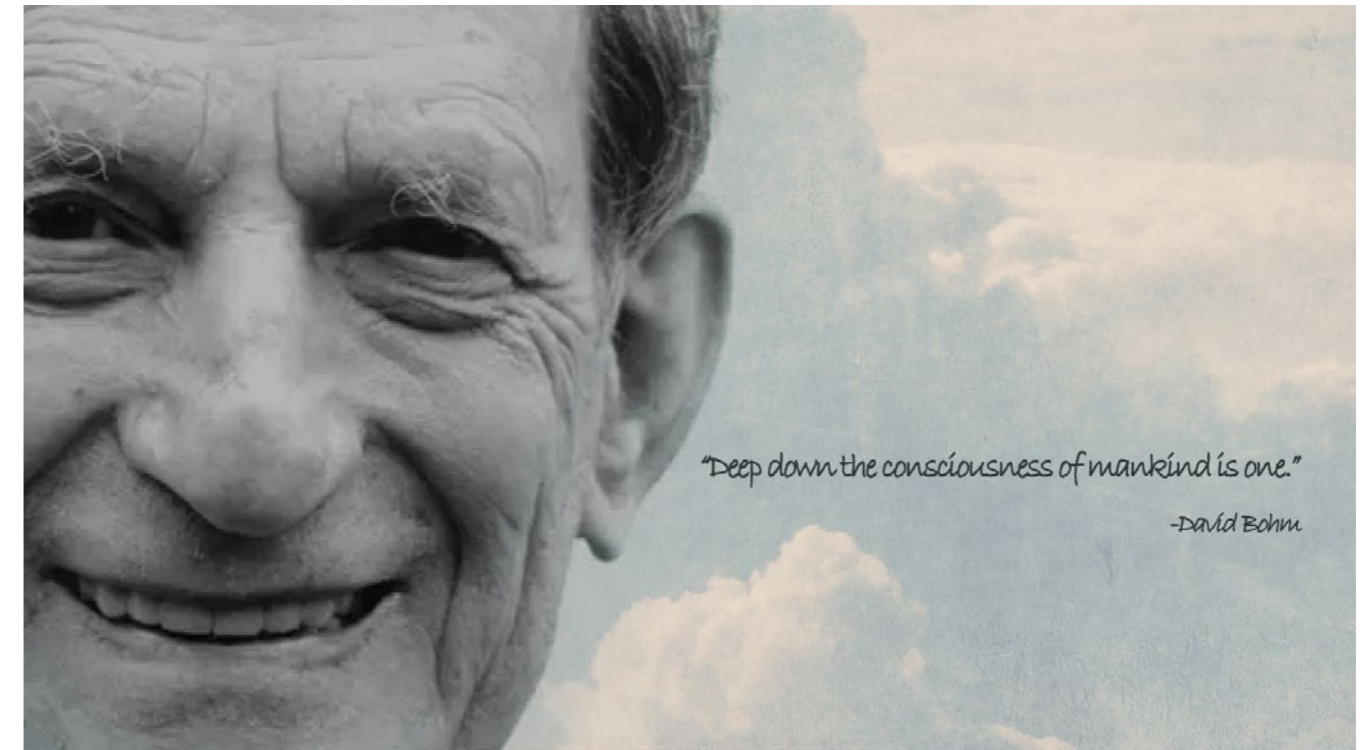
But, Schofield also says that:-

*"To obtain such a holistic theory of nature, Bohm set a course balanced between Einstein and Bohr"*

But both Einstein and Bohr, as with all scientists at the time, were pluralists (that was, in fact, their common problem), so how could plotting a path between these two be supposed to lead to a holist stance?

And, in addition:-

*"implicate order was intended to share Einstein's conviction that an objective reality exists independently of us, but also retain sympathies for Bohr, who maintained that the meaning of an experimental result and the form of experimental conditions are an inseparable whole that requires our participation."*



## David Bohm's Implicate Order

- David Bohm introduced a new concept, the implicate order, a process of enfoldment in a multi-dimensional space. It implies an organic vision of the universe unlike the classical emphasis on fragmentation.
- Bohm maintains that information of entire universe is contained in each of its parts, as in a hologram.
- For Bohm, order and unity are spread throughout the universe in a way which escapes our senses.
- Implications of holographic universe have been realized by Stanford neurophysiologist, Karl Pribram, in brain surgery.

*From the cover of David Bohm's "Wholeness and the Implicate Order"*

*The original image is from "Pas de deux", a 1968 short dance film by Norman McLaren produced by the National Film Board of Canada.*





But, it certainly doesn't help when those involved have literally no real idea of the true stance of either themselves or of their opponents!

The major effect of an unacknowledged belief in Plurality by scientists, was that as all sought-for Laws of Nature were deemed to be both eternal and independent of both one another and of their contexts, so it was possible for scientists to radically alter, by both omissions and rigid controls, an investigated location, to such an extent that a single-particular-"Law" could be both clearly displayed and extractable, totally unimpaired.

No it can't! And, ignorance of this fact, caused Bohr to misinterpret the real problem situated in the universally accepted way that scientists always do experiments.

What they find, is never a general truth, but one restricted solely to the conditions in which it was extracted.

And while those conditions may be extensive and persist, they are never universal or eternal.

AND crucially, they always go much further, to Mathematics, to find a relation similar to their obtained results, and use those same results to tailor the Formal Equation to fit them. So, thereafter, instead of the physical causes being what delivers that "Law", it becomes a wholly pluralist formal relation, from Mathematics, as the then referred-to and used Law. Not only is Reality itself always simplified to enable the extraction, BUT, then, the data is always idealised into "being the result of" a purely formal relation.

And, if you still disagree. I will fire a final parting salvo!

Since, the Greek Intellectual Revolution, circa 500 B.C., the Philosophy of Science has always been a contradictory Amalgam of Materialism and Idealism, also juggling both Holism in Explanation and Plurality in everything else. And all of which are both underpinned and "considered to be validated" by the most ancient stance of all, namely Pragmatism - exemplified by the tenet "If it works, it is right!"

Schofield goes on to quote Stapp's advice to scientists that:-

*"they resist the temptation to try to understand the reality responsible for the correlations between our experiences that the theory correctly describes"*

Which in the light of what I have said above is nonsense, and discounts almost the whole History of Science when so little was actually understood. If you applied that advice to those Historical Experiences, it would amount to "Give up now, you'll never do it!"

The inadequacies due to a scientific incompetence in our Philosophers, so evident in that quote, also reveals an idealistic concept of Truth! The History a Science has revealed that absolutely NONE of our achieved Explanatory Theory represent Absolute Truth: Yes, Absolutely None!

They, at best, reflect aspects or parts of that Truth, which we may call Objective Content. So, we don't constantly overturn a series of untruths with each supposed new real truth, EVER! We actually replace old Objective Content with ideas that clearly contain *more* Objective Content, and which in turn will themselves be so replaced at some point in the future.

But, they are certainly NOT Pure Invention! They have to deliver more, and progress ever more closely to the Truth - to the material Reality we call the World.

Schofield also ascribes an agreement between Bohm and Bohr via the following:-

*"our understanding of the world is confounded by how we look at it. More precisely, "our scientific instruments can affect our assumptions about perceivability; and these in turn can affect our assumptions about what is conceivable"*

In a word, NO! They can, of course, do that, but they certainly do not always do so!

As a philosopher myself, as well as a physicist, I know that the above only pertains in "head-down thinking" constrained within a tightly-limited structure of Objective Content. For, in "head-up thinking", open to resources across many specialisms, and even an extended range of diverse disciplines, Human Thinking can transcend their evident local restrictions and really access more Objective Content than could ever be available from a vast number of formal equations, or even the data they represent.

How about Darwin and Wallace?

Returning to Schofield's account (with a tidy dose of Pylkanen too), we are told:-

"The 'quantum' context thus calls for a new kind of description that does not imply the Separability of the 'observed object' and 'observing instrument'"

But, here the "quantum tail" is being allowed to wag the philosophical dog, for the real historical reasons for the many revealed impasses go totally unrecognised - they are often directly due to Plurality - with its insistence upon "universal Separability", along with an old version of Holism, leaving out the full import of the contributions of both Hegel, Marx, and later contributors to Holism. Indeed, the closing quote of the whole paragraph says it all:-

*"analysis into autonomously existent elements is not relevant"*

This line of reasoning proves my point about the inadequacy of the "Holism" assumed here - for it leaves out, entirely, the importance of Dominance and Stabilities in the actual trajectory of real-world development, and even in conceptual developments too.

For *Development* is neither smoothly incremental, nor a mere complication of eternal factors. It *is* dialectical, in its oscillation between long-periods of self-sustaining Stability. and short, creative, revolutionary Interludes of Transforming Changes, as described in *The Theory of Emergences* (2010) by this writer. This evident pattern in Reality, explains the initial settling for one or the other of these two mistaken stances, each of which is wrongly-taken to be the "whole general Truth"!

But, yet another earlier position by Bohm, as evidenced by the following quote, is also mistakenly interpreted by them both:-

*"in thermodynamics we measure the pressure, temperature, and volume of a given system. In very small regions of space, especially near the critical point, we find that these quantities no longer obey an equation of state exactly, but instead exhibit large random fluctuations about a mean value that is predicted by the equation of state. Hence, the deterministic laws of thermodynamics break down and are replaced by laws of probability. This is because the thermodynamic variables are no longer appropriate for the problem and must be replaced by the position and velocity of each molecule, which are, from the viewpoint of thermodynamics, hidden variables"*

Now, this is important, being not only sound for Thermodynamics, but also providing a model for other quite different areas too. For, the references to Locality deflect us from the *concrete* reasons for such a term to be used.

For example, when talking about a Particle, "locality" may be excusable, but when dealing with a Substrate or Medium, it would be very misleading to do so. The reactions of a substrate to any enclosed events, are absolutely never local. Things will be happening, over a decidedly non-local range of areas, and particularly, when reciprocities and even recursion are involved, the effects overall could indeed be modelled using probabilities.

In the *Theory of the Double Slit Experiments* (2010), this theorist removed every single anomaly, in all of those experiments, merely by assuming the presence of a currently undetectable Substrate. And, subsequently, the whole of the Copenhagen Interpretation, including Quantized Orbits and so-called Quantum Entanglement have all been disposed of, in the same dialectical way.

Now, without recognising the role of such a Substrate, both as a recipient of disturbances, and as providing a subsequent modifying effect upon the supposed cause, it is clear that Wave Equation determined probabilities could well be effective as a model! Now, clearly, an alternative way of interpreting Bohm's Implicit Order is as his "hidden variable" being involved in a physically existing, but currently undetectable, Universal Substrate occurring "beneath" the phenomena observed. But as the concept is of a Universe-wide Substrate, it could also do the same job for removing the speculative theories at the Cosmic Level too. Current researches are concerned with the Cosmic Red Shift and an alternative explanation delivered by that very same hypothetical Substrate.

## What is Bohm's Implicate Order? II

Schofield then goes onto:-

The de Broglie-Bohm theory

*"A causal, or hidden variables interpretation of quantum mechanics was first proposed by de Broglie (1927) and later adopted by Bohm (1952). In this theory particles are described as evolving according to the Schrödinger's wave-function, but unlike the orthodox view, (the always-present) particles are also physically guided by this wave. Accordingly, the wave function evolves according to the Schrödinger equation and never collapses; it does not represent the states of systems, but the state of a quantum field (on a higher-dimensional configuration space) that influences the physical system. Contrary to Copenhagen QM, this renders the randomness of quantum phenomena a result of our ignorance, whereas reality is considered determinate in virtue of hidden variables of this pilot wave."*

Now, thus far, it has become necessary, just as Schofield had to do in his revealing Bohm's position with respect to Harris's, for me to also contrast Bohm's position with respect to my own, as well as to Harris's - so here I must at least outline that third alternative.

The key difference, to both of the above defined alternatives, is the presence of an actually-existing, though currently-undetectable Universal Substrate, which replaces both the Copenhagen and Bohmian means of delivering all the known Quantum phenomena, the Double Slit Experiments, then later of everything else that those other Theories purport to explain.

In essence, all the phenomena involve interactions of Particles both inflicted-upon or received-from, the Universal Substrate: the various odd phenomena, in the DS Experiment, initially being due to on-going

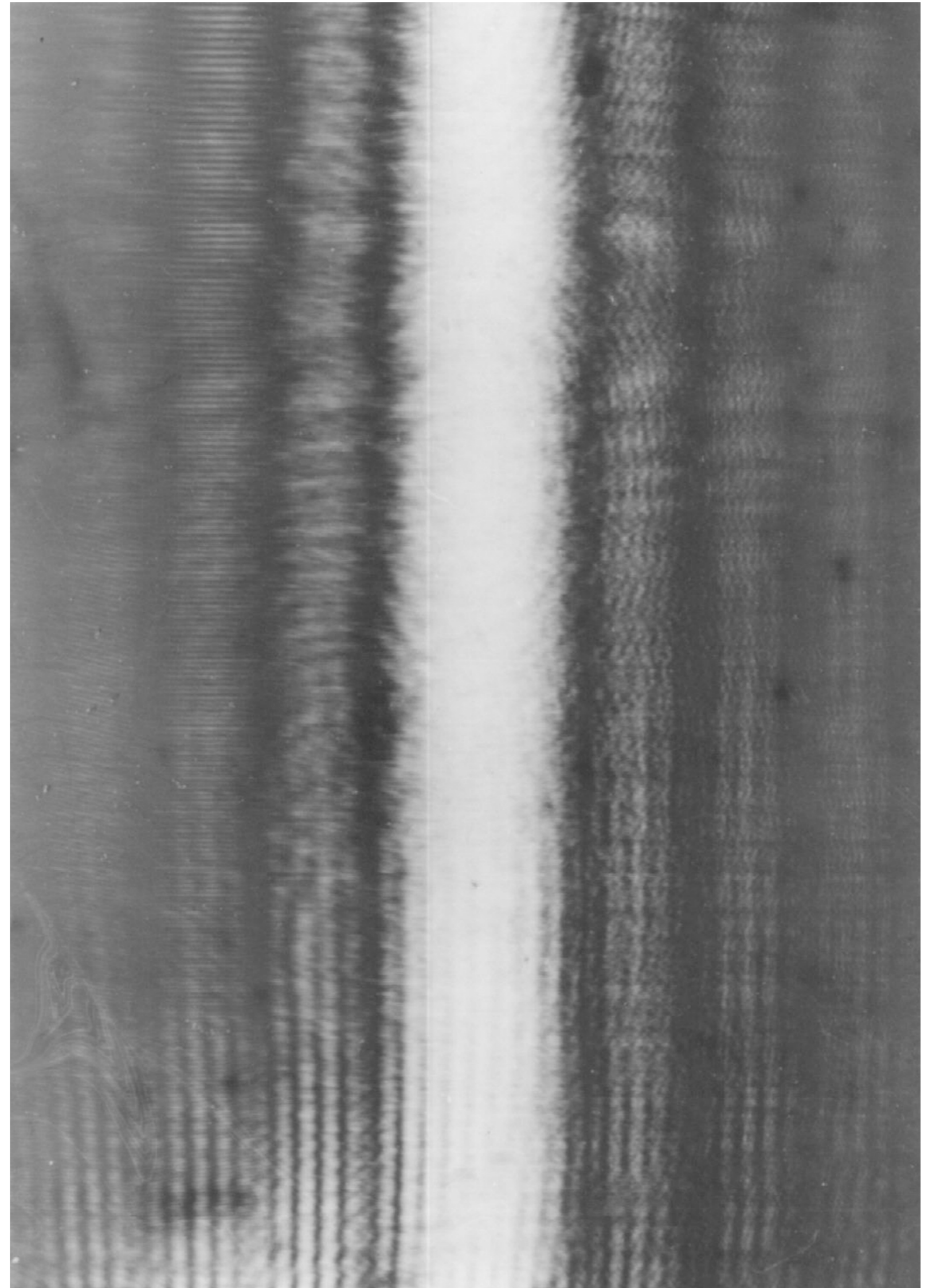
disturbances, caused by the moving Particle, within the invisible Substrate, which are then affected by both Slits such that it, later in turn, can affect back onto the very thing that caused the initial disturbance, when it finally enters that dramatically distorted area of Substrate, beyond the Slits. This is explained via a recursive relationship between the particle fired and medium between the slits and the detection screen.

This recursion is the crucial Factor in those experiments. For, the "elsewhere-caused-disturbances" when passing through the Slits, produce the split waves which interact to cause a sustained interference, so delivering the final results - indeed the produced Actual Physical Waves affecting the consequent passage of the originally causing Particle.

In yet other cases, it can be the temporary dissociation of the Substrate into driven Streams and Vortices of its own once-component particles, which deliver otherwise physically-inexplicable results - the collapse of the Wave Function, for example.

Absolutely ALL of the problematic behaviours, that prompted Copenhagen, are *physically* explained in a holistic and dialectical way, and this therefore, on principle, necessarily dispenses with all the usual Formal Equations, as being both simplified and idealistic distortions of what actually happens in Reality-as-is, though they can, and indeed do, mirror what happens in those tailored-and-controlled situations.

The crucial gain is in Explanatory Theory: for what is said to happen, does indeed do so, and hence Real Physical Theory, currently dead-and-buried, under what is termed "The Math", is once again revealed to aid in Understanding, not only within the area in question, but





in all Physical Developments from it too! The Dead End of Copenhagen, just like the Dead Ends of contradictory Dichotomous Pairs of concepts, is similarly dumped, along with Plurality, Idealism and the Amalgam with Materialism, made possible by the still ubiquitous Pragmatism!

Of course, technologists and manufacturers will continue to use the old methods, but Physics itself will return to its real and vital task of struggling to understand the World, and by such means transforming Everything. But not just yet! We still have to create the necessary Holist Experimental Methods, essential to facilitate Understanding rather than merely enabling Technology.

Now, quite apart from his ideas upon Quantum Theory, Bohm also tackles other questions, usually totally ignored by most scientists, whether Classical or Copenhagen. He even has a concept of Emergence, as in:-

*Bohm thus depicts a theory of emergence via phase transition*

But, of course it is merely that evident in Phase Transitions and not in the creative, transformative interludes of a Revolutionary Emergence. Nevertheless, he clearly tackles the important questions unavoidably generated by a holist stance, as revealed in the following:-

*“(How) explicate form enfolds the whole is considered essential to it and to how it behaves: “So the whole is, in a deep sense, internally related to the parts. And, since the whole enfolds all the parts, these latter are also internally related, though in a weaker way than they are related to the whole”*

For, this approaches the “Truly Natural Selection” ideas of this writer, in his investigation of pre-life competition and co-operation between simultaneously-present, chemical processes, leading directly to dominances and even long-lasting Stabilities, and which would, at a later stage, play a role in producing Life.

And as Pylkkanen attempts to explain Bohm’s position:-

*“So the incident of an electron represents the explicate, while the form of an electromagnetic field is that of implicate order.”*

Thus, all those phenomena currently unexplained by either the Classical or the Copenhagen stances, such as

Fields; are endowed to the implicate order, but in the New Stance by this author is delivered by an actually physically existing, though currently undetectable Universal Substrate.

Science always attempts to extend Understanding by tackling what is evidently investigate-able - what can be observed “in transit” (so to speak). For, if it could not be followed-in-detail as it changed, it could not reveal its intrinsic patterns, and hence could not be predictable in its future performances.

But, such knowledge does not, of itself, explain why things behave as they do, but only provide a description of how, so a further demand was unavoidable, namely, “Why does it behave in that way: what are its *causes?*”

The patterns were useful, for with a certain measure of control and knowledge of such “explicate order”, situations could be directed to some desired end. But, how much more would be possible, if we also understood *why* - if we could also expose Bohm’s “implicate order” too!

Now, historically, some such Explanations were possible - and a descent into underlying levels was begun - the Reductionist path seemed to ultimately promise complete explanations. But, exactly as had occurred in Formal Logic (with Dichotomous Pairs of contradictory concepts), where there were always terminal impasses in the reasoning, so too did something similar happen in Science, when the underling level seemed wholly inaccessible!

Bohm decides that such is there physically, but residing in some inaccessible dimension! While the Copenhagenists make it forever and necessarily out of reach due to the unavoidable effects of our distorting interventions. Yet, this investigator has removed literally all the founding anomalies of that stance merely by assuming a Universal, if currently undetectable, Substrate!

Sadly, according to the thesis by my namesake, Bohm extends his theories to cover the Mind as well as Nature, and embarks upon a final path which does nothing to further the defeat of Copenhagen, and even incurs rapprochement with the subject of Schofield’s Thesis - the Subjective Idealist Errol Harris.

## Conclusion

For a time, in my youth, I believed that Bohm might have the answers to Copenhagen, and I read his book *Causality and Chance in Modern Physics*, but at that time, in the early 1960s I was too ill-equipped in Dialectical Materialism to make any real headway with his ideas.

Indeed, it took another 40 years and major diversions into other fields of research, along with a consequent essential return to studying Philosophy, from Hegel to Marx, and beyond, before the wherewithal to make a significant contribution myself gradually hove into view! It came via Hegel's treatment of Impasses caused by Dichotomous Pairs of contradictory concepts, by using a careful re-examination of the premises involved.

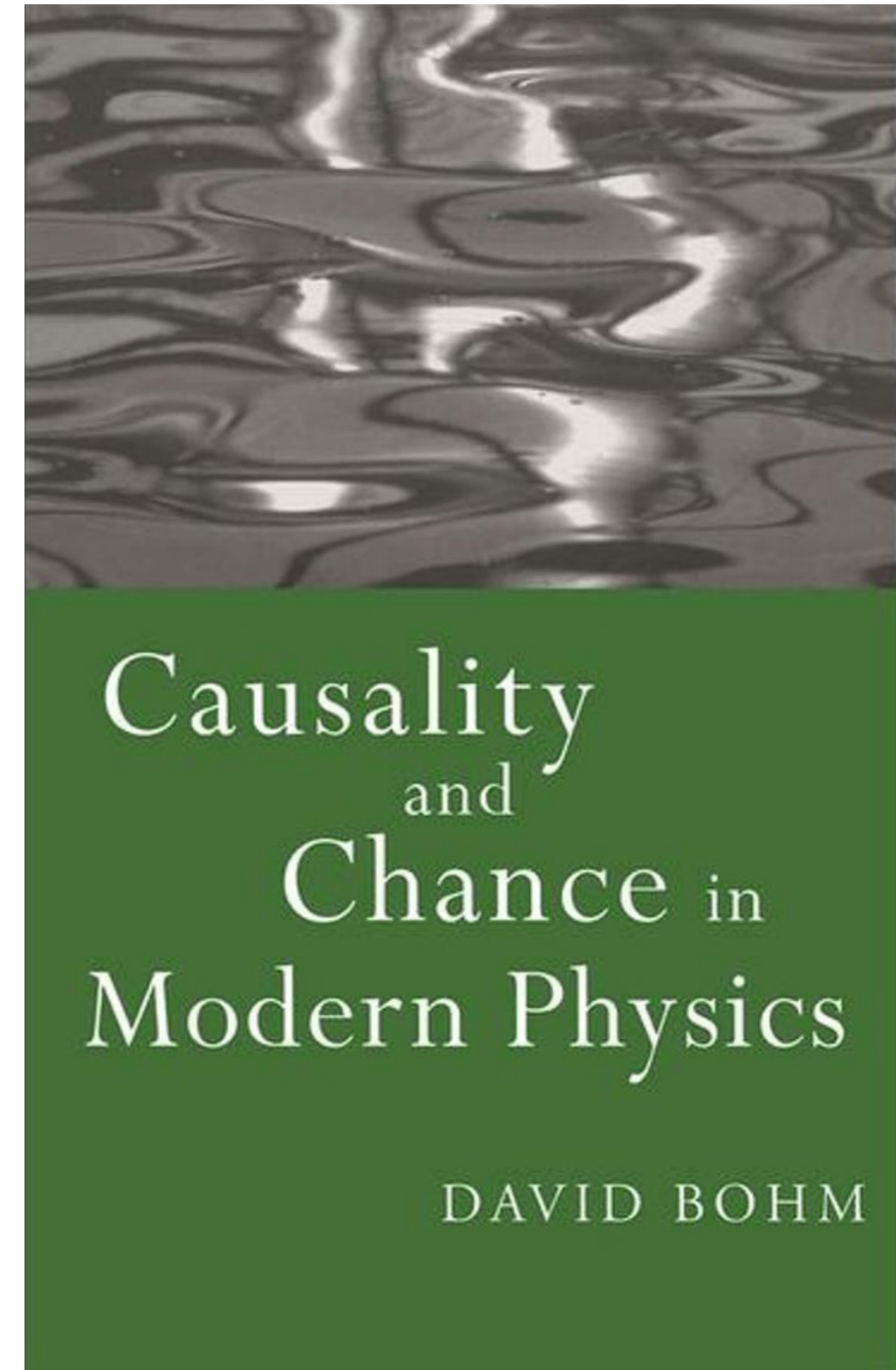
For it, initially, also enabled me to focus my criticisms of the interpretation of the Double Slit Experiments upon its premises, and the realisation that the reinstatement of a Universal Substrate actually removed ALL the anomalies thrown up in those experiments. The incorrect assumption by physicists was that there was nothing there - the assumption of Empty Space.

And, this, in turn, precipitated a through-going critique of the Development of Philosophy by Mankind, from the Pragmatism of their Hunter/Gatherer Phase, through the Neolithic Revolution, and into the rise of intellectualism under the Ancient Greeks, before finally resulting, via Science, into a "Positivist Amalgam" of several contradictory stances, justified, on the one hand, by Pragmatism - "If it works, it is right!", and, on the other, by a general acceptance of Plurality - establishing the "permanent independence of Natural Laws", and the consequent justification of employing Mathematics as an undisputed and indispensable Truth of Reality.

Just, as Hegel had shown that Mankind, in spite of the revelations of Zeno of Elea, flipped between contradictory stances for a further 2,300 years, before he began to address the consequences in Formal Logic, the scientists had done the very same within their disciplines. Not only had their premises to be critically addressed, à la Hegel, but, in addition, the pluralist Amalgam of contradictory stances in Science had to be dismantled: and that would be no easy matter - for it required the abandonment of Stabilities as delivering the Essences of Reality, and a wholesale switch to a Holist Approach to Science, and the demise of whole, extensive tracts of assumptions, beliefs and methodologies, including the lauded Scientific Experimental Method, AND an end to the mathematical tail wagging the physical dog!

It requires an Intellectual Revolution.

Clearly, such an undertaking cannot be inserted here, but the current achievements have been being both addressed and published over the last decade, principally in the Marxist SHAPE Journal which this month (August 2018) reached its 120th Issue!





## Implicit Order within Reality

### Where do the answers reside?

#### Origins?

When scientists finally began to realise that Reality was not in a fixed-forever-state, but a constantly developing situation, they considered that a vital part of their remit had to be the revealing of that process, right back to some original, much simpler state.

So, it was a reasonably long-standing objective to find the original components or “Elementary Particles” from which everything had been constructed.

But, of course, there just had to be “Something Else”, which drove such inert fragments of Matter to begin to come together to form ever more complicated outcomes.

So, taking the currently-everywhere evident complication, as an indicator of various building processes taking place, they allocated properties to their Basic Units, and Energy (to effect such Change, as universally available too), and eternal Natural Laws governing what sort of processes of construction could, and indeed, would, be involved.

Yet, right away, there was a problem!

First, most things seemed to persist just-as-they-were, most of the time: and when something did happen, it tended to be almost always as processes of dissolution rather than construction.

Indeed, so widespread was this general decomposition that Mankind settled upon the Second Law of Thermodynamics - as inevitable, delivering ultimate decay, and leading, in the end, to a totally dissociated World!

Clearly, there was still a Big Problem with this version. For often, two directly opposite general processes seemed unavoidable: how could both be true?

Of course, a Man could build a house, which, if not regularly maintained, would definitely deteriorate, until it finally fell to pieces. So, a similar history was assumed for our World - it had been built, but now it was deteriorating towards that ignominious and inevitable End.

Yet, new Plants appeared every Spring, and families of all living creatures had babies, which grew into adults, and survived for considerable periods before they too perished! How is this thermodynamic? Clearly BOTH processes continued, but the constructive must have always originally dominated, until it ran out of energy, and inevitable dissolution then stepped in.

The oscillation was covered, but as the certain process was Dissolution, there must have been an original Creation to set up an adequately developed starting point.

The obvious solution had to be an omnipotent and eternal God! Reality must be God’s work, and the Laws were the *Word* of God: that solved the problem!

But, ultimately, Human beings studied their world and found indisputable evidence for the regular appearance of the wholly New - *out of* the Old!

The contents of the Living World, at least, seemed to evolve over time.

And, further investigations proved that such Changes also occurred long before there was any Life upon this planet. So, Reality itself seems to have evolved too, long before there was any life at all. And, in addition, it was also clear that Dissolution was also present, and still acting now, elsewhere, in undoubtedly non-living Worlds and even Stars!

What had become Science was not only delving deeply into the interstices of Matter, but also ranging far into the Cosmos too, to try to understand Reality.

#### Analysis?

But, problems occurred at both ends of these investigations: and it was clearly due to those who were conducting the investigations - Human Beings! For, we are but a species of Great Ape, which evolved initially in Africa, spreading across the world, arriving in Europe 40,000 years ago. Western Philosophy took a further 37,500 years: so, their intellectual abilities would most certainly have been socially-acquired, rather than endowed congenitally, and the even-now-continuing predominance of Pragmatism - "If it works, it is right!", also makes it clear that the trajectory of their theorising about Reality has always been, and still is, far short of approaching any Absolute Truths. So, as you will have guessed, even their current stances still leave a great deal yet to be achieved.

Indeed, though what has been achieved has been remarkable, its gains are, at best, the achieving of greater Objective Content in our knowledge and ideas - Absolute Truth being an Idealist myth. So the intellectual gains upon both the deepest reaches of Matter, and of their understanding of the Universe, have been in permanent crisis for over a hundred years.

Indeed, even though the gains already made constitute a remarkable achievement, they do so in spite of the also evident and widespread weaknesses still unaddressed.

For, most of Mankind's time upon earth, their single primary tenet was Pragmatism, which involved absolutely zero understanding of *Why* things behaved as they did,

only *How* they behaved and could be used. So, clearly, like other animals, the world was accepted "as is", and only gradually and incidentally, did they guess at reasons for things, just as they, as humans, had reasons for doing what they did to survive, and, just maybe, actually prosper.

So, any incremental steps-ever-upwards, in understanding, simply could not, and would not, merely accrue. Most of the guesses initially were that some God, in the image of Man, but all powerful and with a comprehensive understanding of the World, actually determined what happened, so, the real developments only occurred once Human beings lived together in considerable numbers, so that any fruitful ideas spread easily among the interacting populations. So, that within a few thousand years after the Neolithic Revolution, around 500 BC the Greeks delivered another revolution, this time about Thinking and Reasoning.

But, as with all such developments, they were only partially true, and sometimes totally wrong. The oldest principle of all allowed a contradictory mix of opposing stances to all be available "when they worked". And, in addition, a banker principle from the new invention of Mathematics, namely, Plurality, suitably simplified Reality to conform to Eternal Natural Laws, extracted from appropriately filtered-and-controlled situations, which because of this principle were considered to be universally true.

But, they weren't!

The "experts" had to switch constantly from one "rule" to another, entirely-unrelated one, or even to a magic chant or prayer, and/or the sprinkling of some magically treated condiment to, at least sometimes, succeed.



## Below Elementary Particles

There are features of Reality, which inevitably direct us to investigate a Sub Elementary Particle level. For example, there are many unanswered questions which arise such as:- What is Energy? Can it exist independently of Matter? Is Radiation just Pure Energy? What is Charge? Where does it come from? Why aren't opposite Charges seen as asymmetric fragments of neutral wholes? How does Charge relate to Force? Why are there both Matter and Antimatter? Do they really mutually annihilate one another, or merely become an undetectable joint-entity, capable of carrying energy internally? What is a Photon? Why do obvious pairs of opposite matter-type also have opposite charges? What is really physically happening in what we call Quantum Entanglement? Why is neutrality never considered as primary? As the Electron is so important, and has inexplicable properties, what makes it so? What actually is Spin? Is Physical Spin the only way a single 1D direction and a 2D plane can be defined? How does this relate to the forms of Moon Systems, Solar-type Systems and Galaxies? What-are and why-do Dipole Moments occur? Can Gravity link mutually orbiting extremely tiny particles? Can Magnetons, as mutually orbiting pairs, deliver both electrical and magnetic fields? Would a Universal Substrate, or even a hierarchy of them provide answers?

And, this list of questions can certainly be much further extended!

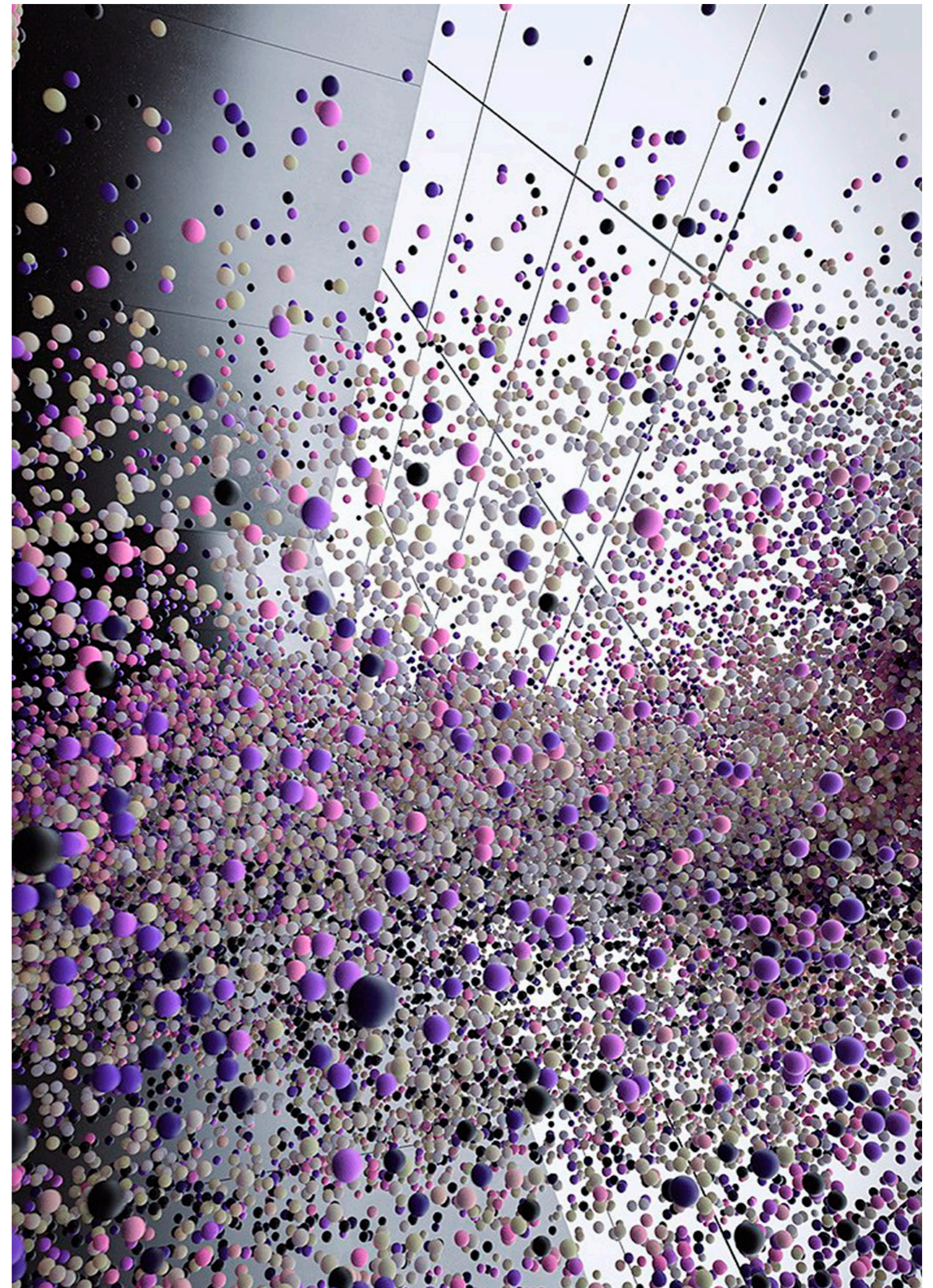
Clearly, whatever we have achieved with our Science, the results have posed as many questions as answers, when we attempt to get beyond answering "How?" to tackle the much more important "Why?" And, the universal acceptance of the Principle of Plurality, with its freezing of entities and their inter-relations, certainly both simplifies and idealises what we both extract and use from Reality-as-is, unavoidably walling us off from all real holistic factors, and, therefore, funnelling our consequent conceptual world into forms which will undoubtedly lead us into unavoidable impasses, and which could only be transcended, by a very different

holist approach, drawing us away from Fixed Laws and Stabilities and into the Real Changing and Developing World.

But, such a revolution is not only very unlikely at this stage, due to universally-held premises and methods, but will also be sorely-hindered by the almost total absence of effective holist methods available to us, and which even when they do get defined, would, because of the necessary variability of everything involved, never be as simple as are delivered by the current pluralist methods applied in rigidly controlled situations as they are most certainly currently. And, it seems likely that any new approach will certainly be one of also addressing much smaller entities than are involved in current methods, which are also likely to be concerned with very small, or currently undetectable entities, as well as using very different means (many of which are still awaiting invention or discovery).

Look again at that initial list of as yet unanswered questions! Where do you reckon the answers will be found? In addressing the possibility of a currently undetectable Universal Substrate, composed entirely of mutually-orbiting pairs of currently known Leptons, every single anomaly of the famed Double Slit Experiments (which were the basis for the Copenhagen Interpretation) were quite easily disposed of, and further developments in that same area are increasingly replacing the "formal-truths" of Copenhagen, with physical-truths based upon such a Substrate.

Indeed, the Copenhagen Stance has long ago abandoned Materialism for the Idealism of Mathematics, and its pluralist basis. So instead of seeking Nirvana solely within formal relations, we must refocus upon observable Physical Reality and its as yet unknown aspects, both in neutral combinations as with the Universal Substrate, and in the kinds of matter existing below our current "bottom line" - The Elementary Particles!





## Phase and Locality

### How Context-Form can Change Outcomes

In entirely theoretical researches into the Neutrion (a stable version of the Positronium, a mutually-orbiting Electron and Positron), a series of possible alternative Phases, or organisations of this particle, emerged as possible under particular conditions, and these allowed various different behaviours to also be possible, thereby explaining various phenomena, which, prior to these investigations, were completely unconsidered as being possible.

Now, of course, different Phases of matter-in-general are well known, and very well researched, for many common substances upon Planet Earth - the most obvious being Water (H<sub>2</sub>O), which occurs regularly as a Liquid (Water), but also as a Solid (Ice) and as a Gas (Water Vapour) and even as Clouds (suspended tiny droplets in Air), and finally as a kind of “terminating Skin” surrounding a volume of liquid (as in a Droplet), but also covering vast areas of liquid Water in Lakes, Seas, Oceans, and even moving Streams and Rivers.

In addition, the effect of solid objects moving through Liquids can produce active Streams, within the body of the Liquid, and even localised spinning Vortices. And, versions of these latter effects can be associated with Liquid surfaces too, though obviously modified by the two-dimensional boundary of the Liquid, and involving Surface Tension Effects too.

Now, these Standard Phases are usually associated with general temperatures, but what appeared in the researches mentioned above was that they could also be brought about by other kinds of energetic disturbances too, as well as by certain initiating presences and their effects.

The point of mentioning all these well-known effects is that some similar things appear to also occur with Neutrions. And Neutrions are also being considered as units of a currently undetectable Universal Substrate, which, if true, would affect literally ALL phenomena!

Now, Neutrions are totally invisible, being composed of a mutually orbiting pair of one Electron and one Positron, so that the opposing properties of these components, cancel each other out. Yet, surprisingly, these same entities still form different Phases, with different overall properties.

In minimally disturbed situations, these Neutrions could form a loosely-linked “solid-like” structure termed a Paving. While the energetic passage of any moving particle, through such a structure, could very easily dissociate it back into individual Neutrions, and then, either drive them into Streams, or into something like an energetic “Random Gas”.

For, another theoretically-investigated joint particle, (again a possible Unit of a Universal Substrate) there is the Magneton, which was composed of a mutually orbiting pair of a Tau and a Muon, which also became endowed, because of their asymmetry of size, with a Magnetic Dipole Moment, allowing two very different physical Phases to self-assemble in different circumstances.

One was a relatively dense, close-packed, 3D form, somewhat like a “solid”, and effectively delivering an Electric Field, while the other formed 1D “strings”, in closed loops producing Magnetic Lines of Force.



And, in Yves Couder's Bohmian "Walker" Experiments, the same sort of Phases, which appear to be caused Streams and Vortices, upon the substrate surface, which produce the observed Quantised Walker orbits. And also, within the body of the Substrate, are different Streams, caused by the absorption of energy from the Substrate to power one Walker's movement, and produce under-the-surface flows, which cause the in-line, following by other Walkers.

It was Couder's discoveries, which allowed this theorist to explain Quantised orbits of Electrons in Atoms, by exactly the same model, but there taking place in a Neutritron Substrate, and caused via its internal Streams and Vortices created by the orbiting Electron.

Clearly, to begin to design a Holistic Experimental Method, these experiments, and the consequent theories developed from them, should deliver an excellent starting point! Indeed, Couder's method of removing everything from his experiments except the Substrate was an excellent starting point, because as soon as other entities are multiply- involved, they would affect each other, and everything else, to deliver a then unanalyse-able complex of processes.

So, Holist Experiments should always, as Couder did, only meagrely bring in new elements, one at a time! I call this the Holist-Constructivist Experimental Method!

NOTE: Such an alternative approach must be seen as a means of correcting the problems caused by the now universally accepted Pluralist Experimental Method, which, because of the Principle of Plurality, infers that absolutely no changes are imposed upon the targeted Law, by the major filtering and tailoring controls imposed upon the Experimental Situation, to both clearly display it, and allow its extraction - for those assumptions are clearly erroneous.

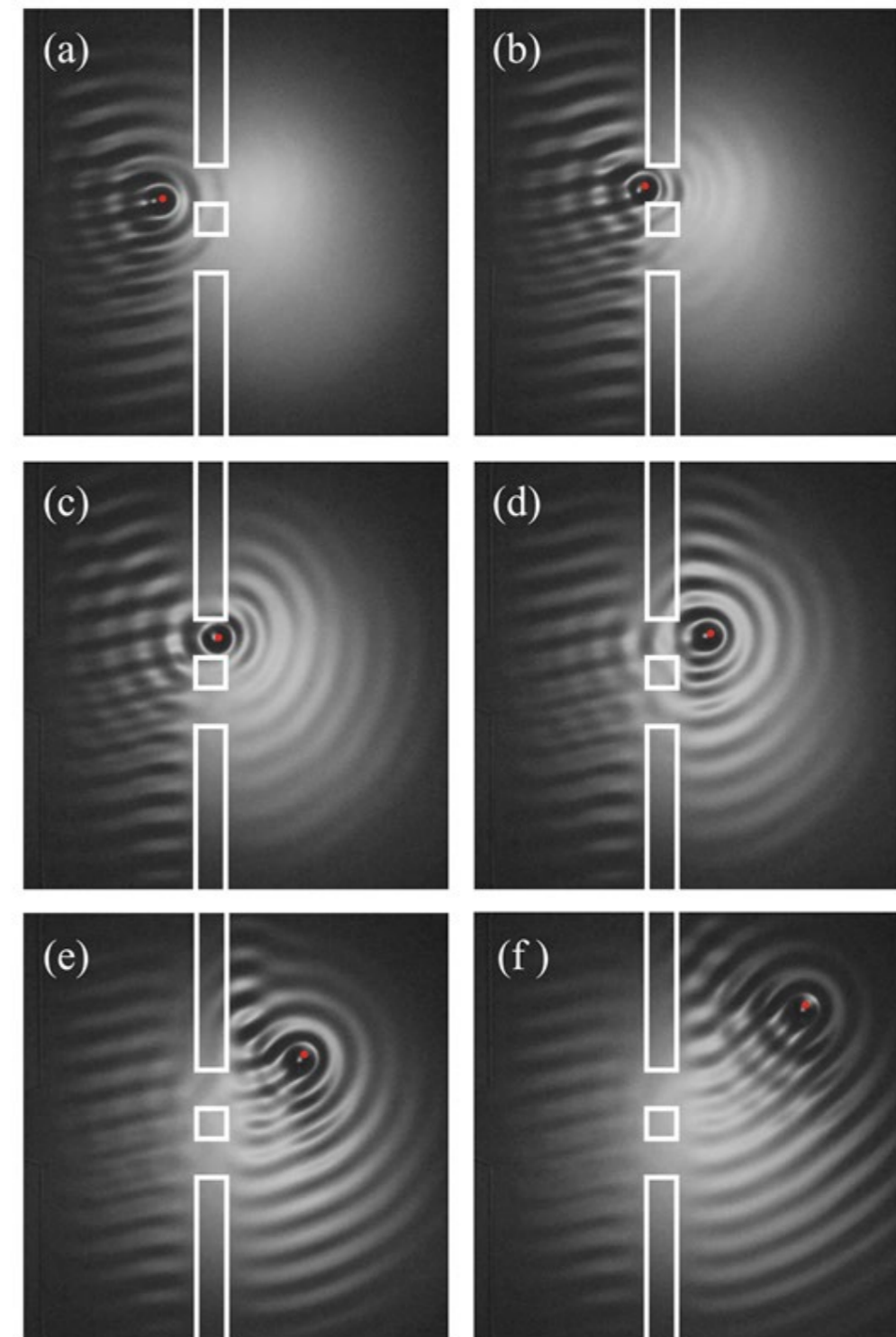
The new Constructivist Method, as initiated by Couder, and developed theoretically by this writer, attempts to deliver a route by means of which, from the simplest possible start, the mutual effects of individual extra factors, both upon the receiving situation, AND also by that situation upon the new factor, may be revealed! And, crucially the understanding so achieved on a given added factor, could inform the analysis of the next stage, when another factor is included.

For, the two methods start from opposite premises:- 1. The Standard Method is from Plurality, where eternal Natural Laws are totally unaffected by Context, and 2. The Constructivist Method from Holism, where everything affects everything else. Clearly, the former of these two was adopted both because it is easier to manage, and because the Laws obtained could be predictably useable by ensuring the exact same context for use as was delivered for extraction.

But, it had major flaws theoretically, for all Laws were assumed to be eternal and unaffected by context, so absolutely none of the actual changes caused by differing contexts were ever even considered, never mind understood. A Parallel World with certain similarities to Reality, but lacking not only the full, real wealth of actual relations, but also, and crucially, NO explanations of why-and-when all such relations eventually FAIL!

Pragmatically, prior experience of real world situations had enabled such failures to be got around, and what replaced them, to be indicated by certain variables passing recorded thresholds. but absolutely no reasons were delivered by such pragmatic means.

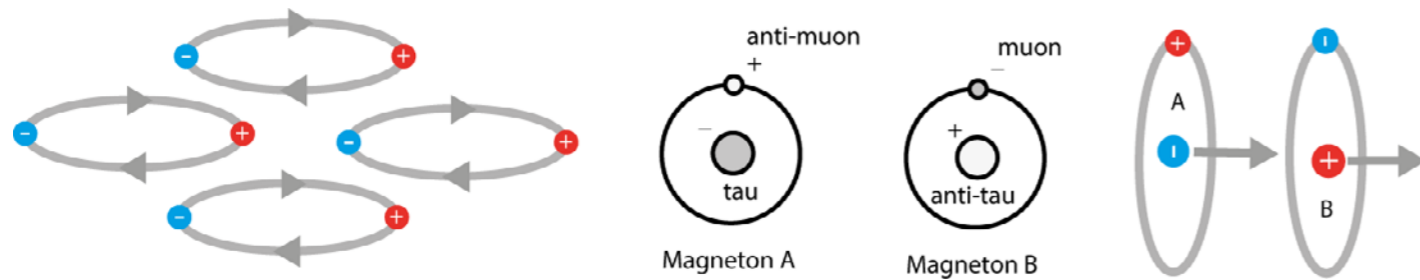
NOTE: Though only briefly touched upon in this paper, there is now an extended body of work upon the Universal Substrate, including its various undetectable components, published here in SHAPE Journal.



*Couder's "Walker" experiments provide supporting experimental evidence that the presence of a Substrate (in this case Silicone Oil) can re-produce all Quantum anomalies.*

## Streams, Vortices and Electromagnetism

Physics rather than Mathematics  
Reality rather than Ideality



This discussion has turned out to be about how orbits or equivalent local circular movements can Absorb, Store and Release Energy. For this area turns out to be very extensive, because the same involved processes are applicable to such a wide range of structures - with a Vortex at one end of the diversity, and an orbiting electron at the other.

We know that orbiting electrons within atoms can indeed do this, while vortices created within a substrate-flow can do so too, but the causing energies, so captured, are very different - in the atom the source being the translational energy of the electron w.r.t. the capturing proton, to actually originally form the resultant Hydrogen atom: while a vortex gets its energy from a traversing particle, transferred initially to the substrate as an energetic Stream of dissociated substrate units, and with a preponderance of energy inflow to thereafter form associated individual rotating vortices.

In contrast, a Magneton, as one of its components, can also play various roles within a Universal Substrate, as active constituents of both an Electrical Field or even Magnetic Lines of Force.

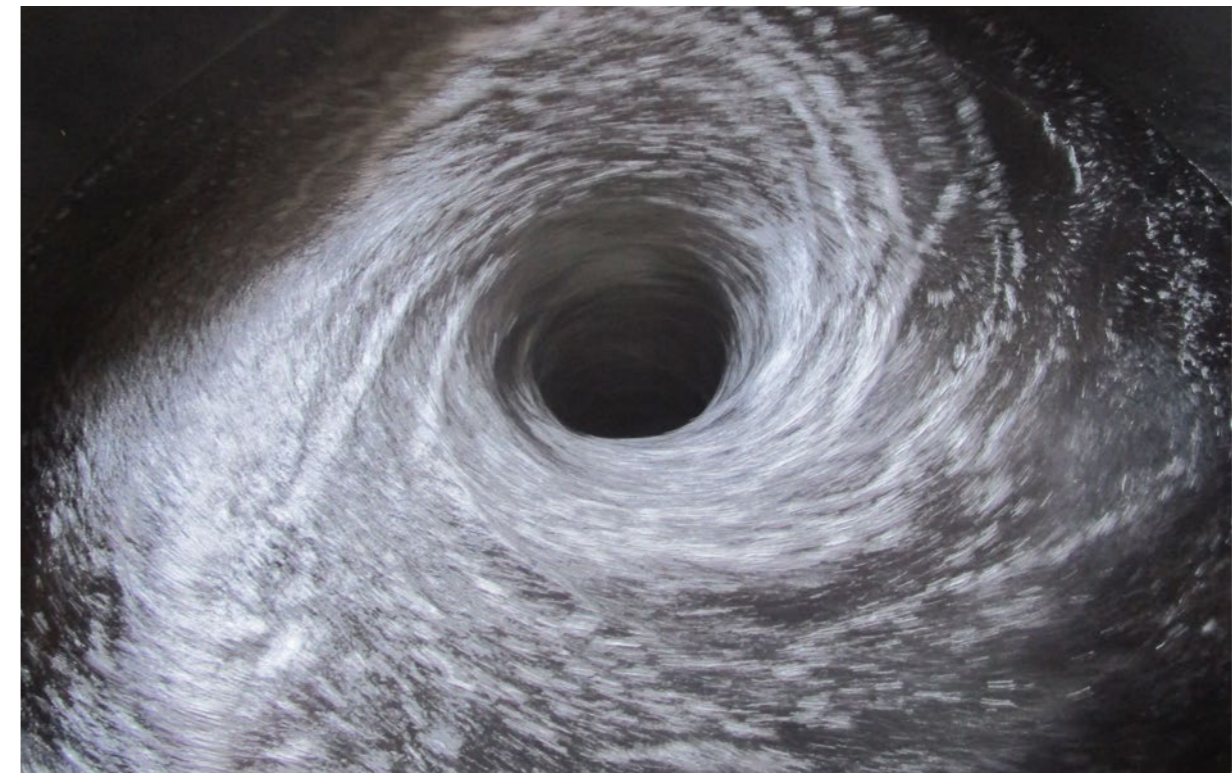
Things can also get more complex with an established electron orbit, as transfers to-and-from vortices in the Substrate, from-and-to the electron orbit, which settles unavoidably into one or another of the so-called Quantized orbits, due entirely to persisting stabilised balances between such energy flows.

But, if the electron "orbit" is in a loop of wire the orbital radius cannot change, and its energy will have come from an electrical Potential Difference generated elsewhere.

But, if the movement involved is that within a Vortex, it is clearly part of the substrate-itself, which had been driven into a set of interlinked-nested-circles - how on earth does that work?

Is it like a whirlpool or waterspout, and if there is such an outflow, is it at the centre and perpendicular to the plane of the rotation, as the inflow into the vortex is always at its periphery?

NOTE: In 3D (rather than the usual 2D in surfaces) the vortex can be in the same form as a Smoke Ring, or like an inverted Toroidal Scroll, so any outflow will be at the periphery, and backwards.



The general problem gets ever bigger, when resonances are transferred across substrates and natural in-built resonant frequencies get their energy from elsewhere, yet can destroy what they ultimately affect.

Clearly, this is an important area and worthy of further study.

Often, the question of the involvement, or not, of any intervening Substrate, greatly changes our explanations of what is actually happening, and the assumption of "no substrate present" as we currently assume for Cosmic Space, just shelves adequate explanations completely, and makes even more likely the replacement of physical explanations generally by purely formal descriptions alone!

And thus, Physics heads off into idealist speculations, justified only by there being "formal descriptions available", whether the "phenomena" actually exist physically or not!

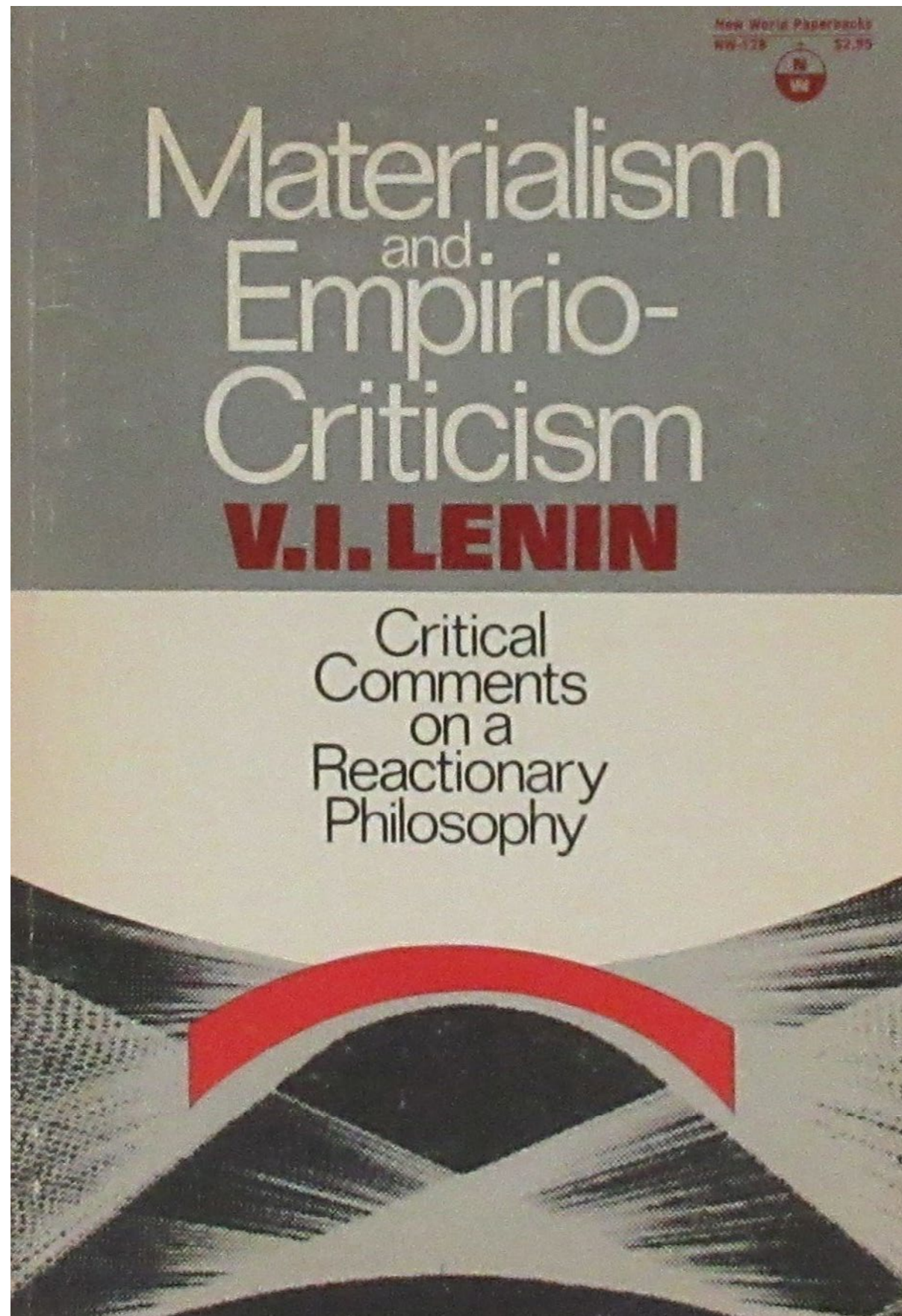
This exposes the ultimate danger of such a development: for Mathematics is not the same as Reality!

It is both pluralist, which Reality is not, and idealist, dealing exclusively only in Perfect Forms, so it is both LESS than Reality, by excluding all of its real messiness, while also considerably MORE than Reality, by including vast amounts that do not exist, solely on account of them conforming to the formal definitions of Mathematics.

Indeed, as a competent mathematician myself, I both know its limitations, and have too been seduced by its beauty and grandeur!

I switched from descriptive of the perfect, the elegant, to explanatory of the real, in all its messy forms: I swapped Ideality for Reality.

And, hence I require explanations FIRST!



## Non-Marxist Dialectical Science?

How the vacuum left by Marxists in not addressing Science has led to other inadequate approaches

The major task for Marx was always, in his own estimation, the application of his Dialectical *Materialist* philosophical stance to Science. But, he personally never managed to get to that point, as his initial paramount task - the criticism of Capitalist Economics (in his four-volume work *Das Kapital*) took him the rest of his life to complete.

But, in addition, he was also unable to comprehensively describe the new stance and methodology in order to aid those who followed him, to effectively apply his discoveries and approach to all the other intellectual disciplines - not only because they were all significantly hamstrung by the old methods, but also because "Marxism" itself could only develop itself sufficiently to become a general Dialectical Materialist approach, when necessarily enriched by such essential wide-ranging developments.

As History has proved, since Marx's death, what was disseminated worldwide by followers of Marx was not up to the many problems that had to be addressed, and that includes the political ones, which were their major areas of application.

Lenin knew of the Science problem too, but in spite of his book *Materialism and Empirio Criticism*, against the leading Positivist physicists of his time, namely Henri Poincaré and Ernst Mach, though it was correct philosophically, it didn't recruit physicists to the Marxist standpoint: it also proved that the conquest of the Sciences would require scientists and current "Marxists" to together complete Marx's intentions to the essential benefit of both.

Now, this task is finally underway, primarily due to this theoretician, who aspired to being a Marxist from his youth, and whose profession is as a fully qualified physicist. But, the wait since Marx's death has been far too long, and the effect upon "Marxism" so debilitating, that this committed comrade found absolutely NO others to co-operate upon this major undertaking, as well as too many charlatans professing to be addressing these questions, but doing nothing of the kind.

I well remember an able mathematician, who was in the same professedly "Marxist" organisation as myself, approaching the famous scientist David Bohm, who also had left-sympathies, about such a collaboration, but it came to nothing.

And, without a real Marxist effort, others professing a Dialectical Holist stance also entered the field - such as the Idealist Philosopher Errol Harris.

So, this short series of papers has been deemed necessary to criticise these alternative approaches, as not at all genuine, and certainly worthy of exposure, as part of the overall task of doing what is required myself.

The demolition of the Copenhagen Interpretation of Quantum Theory has been the first main step, and all papers on this are available for free in this very publication. We must return Physics and Philosophy to Materialism, and stop living in an Idealist dreamworld.

## Qualitative Aggregate Properties I

### Dealing with Emergent Transitions in The Sciences

#### Preface:

This is a unique effort at a Holist Physical Explanation. It will not seem very different, initially, because, without being aware of it, all the historical methods of explaining things, were initially, even within Classical Physics, always holistic! But, they existed alongside a formal description of the same phenomenon, which was definitely and unavoidably pluralistic - as were its resultant Equations. And, the inevitable dichotomies between the two were always overcome by the continuing-and-dominating presence of Pragmatism...

So, see it through! It is an important attempt!

When we consider a Gas, a Liquid or a Solid, composed of the atoms of a single substance, we cannot merely sum multiples of the properties of the individual atoms to give the properties of a resultant aggregate, for these cannot be directly predicted entirely from the individual properties from the lower level.

The properties must take into account the clearly combined-structures, which are only possible in aggregate, and which occur under various different conditions. After all, the aggregate could be a Gas, a Liquid or a Solid - each of which present very different aggregated-properties indeed.

Now, using our usual pragmatic excuse of "If it works, it is right!", we simply vaguely and backwardly-from-the-higher-level "see" a connection, but never bridge that transformation theoretically, and in detail: we simply take-it-as-read and begin to gather relations at the new level, and leave the transition for later.

Now, these are not trivial omissions!

Historically we had no other choice.

For, our "then-progressive" insistence upon a valued subscription to the Principle of Plurality, allowed us to do no other - for it made all Laws eternal, and hence totally independent of their varying Contexts. So, our individual component Laws could not then, and never will now and in the future, ever deliver our aggregate-laws for they DO indeed change in their new Contexts.

Let us pursue this in another way!

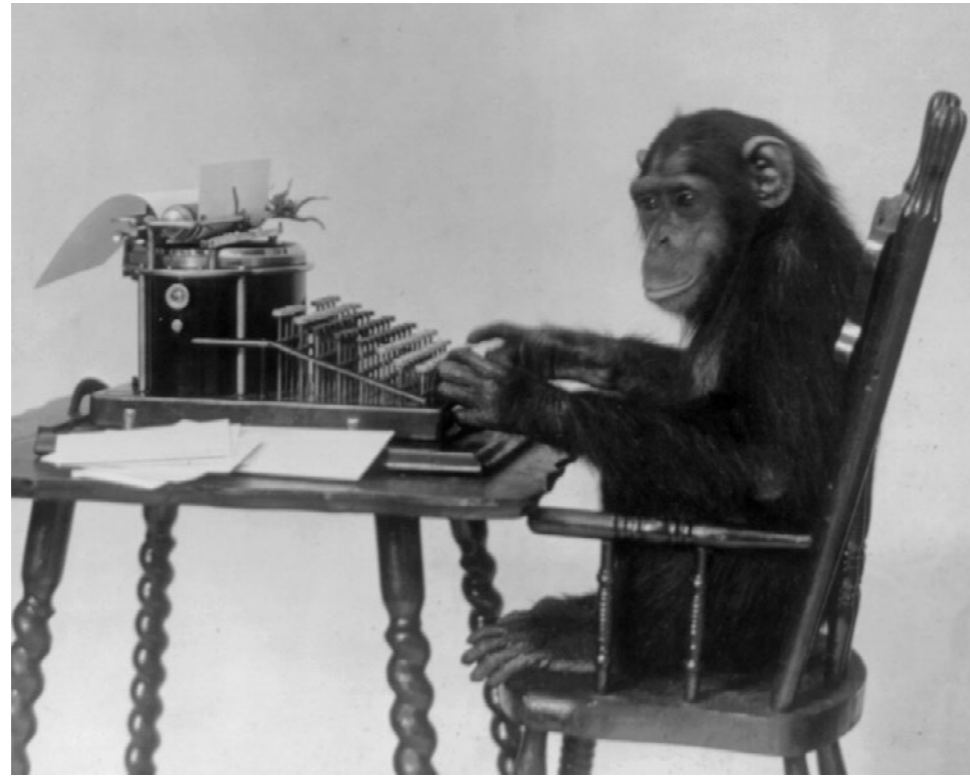
When presented with the miracles of Evolution, it is usually initially explained by Random Chance.

Instead of any sort of understanding of Qualitative Changes, the remarkable achievements are solely put down to merely incremental Quantitative Changes (governed by fixed Laws) - BUT with the added ingredient of total Random Chance - allowing all possibilities to occur, sometime: so billions of things occur, without any development, until a particular one happens, which produces something new, that also persists.

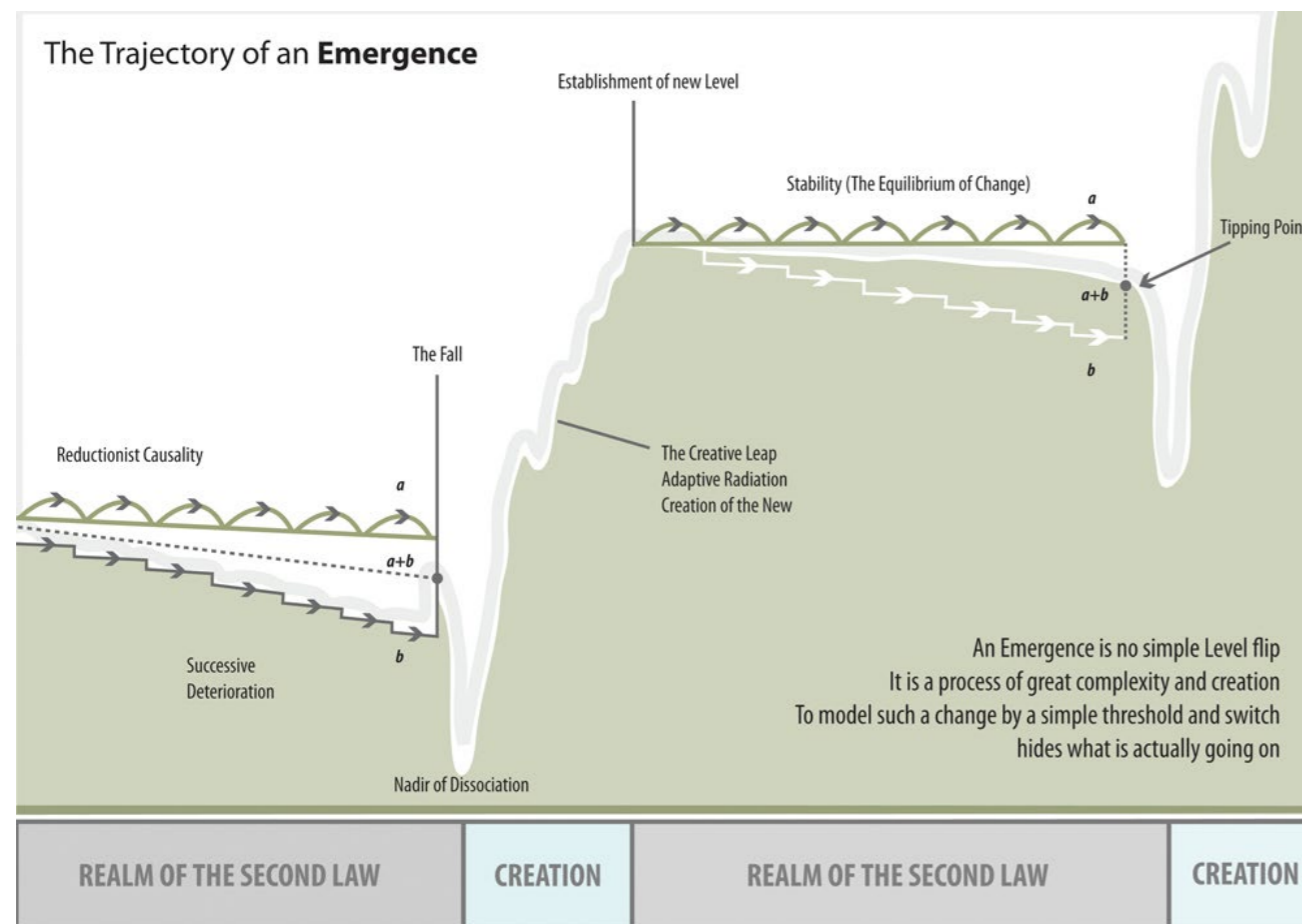
No intent, purpose or directional cause is involved; it *could* happen, so given Random Chance, it inevitably would, at some point! The new component cannot do anything significant, as yet, but it has changed-the-mix though, so far, only very marginally indeed.

Thereafter, billions of things occur again, over vast periods of time, but this time our new component varies the outcomes, and while most of them mean absolutely nothing, some may occur, which deliver something once





OR



again which can be both new and persisting. You can imagine how the argument goes!

If over billions of years an infinite number of monkeys are hammering away at an infinite number of typewriters, they will in the end produce the Complete Works of Shakespeare, entirely-by-chance then.....

.....ultimately our Random Chance mechanism above must in the end have generated Evolution - wholly by chance.

But, why do they come up with such nonsense?

Again, it is because of Plurality - "Natural Laws are FIXED - independent of Context, so only a mechanism which produces every single possibility, BY CHANCE can be the only way that Evolution could ever occur!"

The opposite to Plurality, is the Principle of Holism, which states that "Everything affects everything else", so all is in constant change: in other words, Laws are not fixed, they are affected by their Contexts, so, in differing Contexts they all produce somewhat different outcomes; and with many simultaneously present in local contexts, they will produce many different things at the same time, and, with some MIXING of different localities, the variety will go through the roof.

NOTE: This is usually rejected because "it just does everything quicker!" But, also involved in these changes, there occur sub-systems of conducive or even balancing processes that also persist: we call such occurrences Stable Interludes, and around these hierarchies can begin to grow, and even recursively change their causing contexts.

And, in addition, the new products will, themselves, be subject to wholly new Laws, which will also be changed within differing Contexts, so that what would take FOREVER in a Pluralist World, gets down to reasonable, if still considerable, proportions in a Holist World.

Now, this is of course, an over-simplification, but it does get to the nature of Reality correctly, with regard to the most important factors in developmental change.

But, the far more important trajectory of such Qualitative Changes, are when they occur within truly major avalanches-of-change - that is in Emergent Interludes, or Emergences (Revolutions), for these are still totally

absent in the Sciences, but are episodically inevitable in a World of constant changes!

Marx ensured that, within History in general (with the occurrences of Social Revolutions), and in certain disciplines too (such as Economics), when dramatically transforming changes delivered a situation into a wholly unpredictable new state. Yet though these certainly happen in the Sciences too, they have never been given the comprehensive treatment that Marx dedicated to his critique of Capitalist Economics.

These were revealed, in general, in this author's *Theory of Emergences* (2010), as shown in the diagram (opposite) entitled *The Trajectory of an Emergence!*

This is, of course, a very general trajectory, and will only come alive to scientists when applied holistically and dialectically to transformations achieved within a Science like Sub Atomic Physics.

Watch this Space!

Now, the smallest of the transitions referred to above, occur all over the place, and all the time, so, let us, as an example, consider the joining of two neutral Hydrogen atoms into a Hydrogen Molecule, which occurs literally everywhere. The structure of the atom is one Proton of positive charge, orbited by a much-smaller single Electron of negative charge.

They seem to cancel-out each other's properties completely, so what is it that enables two of these atoms to immediately link together as a molecule? There must be something else involved, not discernable when considering only a single Hydrogen atom, and which only appears in aggregate-able conditions.

Could it be the Magnetic Dipole Moment produced by the orbiting Electron and delivering both "North" and "South" poles on either side of that orbit?

And, in metals like Iron (Fe), which also has a single Electron in its outermost orbit, it too has the same sort of Magnetic Dipole Moment, in each atom, but also has all atoms are usually linked into an overall solid structure, they are usually totally without any overall magnetic effects! But, external stroking by a "Permanent Magnet" will align a significant number of its component atoms' Magnetic Dipole Moments, and effectively turn it into

a Permanent Magnet itself! Indeed, if the Iron is turned into a Wire, and an electric potential difference is applied across its ends, a current-of-electrons will flow, with those outermost Electrons jumping from atom-to-atom, thus attempting to cancel that potential difference.

Now, all of this counts as Physics: but if atoms of the metal Sodium (Na) and the green, poisonous gas Chlorine (Cl) come into contact, they link via that outermost Electron of the Sodium atom to produce Common Salt (NaCl), with none of the properties of its component atoms!

This has crossed the line! It cannot be dealt with within the usual methods of Physics: it opens up a truly enormous World of wholly new possibilities, so it initiates the new realm of Chemistry!

Now, I am well aware that the above is wholly inadequate, in establishing what conclusions it draws, but much fuller accounts have been achieved elsewhere, whereas this only really establishes the initial ground for the wholly new discoveries to be elaborated below.

For, the very same reasoning is now to be applied to Magnetons - a mutually-orbiting pair consisting of a larger Tau and a smaller Muon of appropriately opposite properties to deliver a charge neutral Joint particle with a Magnetic Dipole Moment (similar to the Hydrogen atom), but here existing along with its mirror image opposite, as parts of a Universal Substrate, and capable of self-erecting these units into TWO very different aggregates - namely, as an Electric Field or as Magnetic Lines of Force, in differing initiating circumstances, though being causally entirely-self-constructions of the Universal Substrate itself, in response to only the presence of those initiators within it.

Indeed, the very same Magnetons can produce BOTH of these aggregations. But here's the rub!

Though two different aggregate structures can be conceived of in terms of the Magnetic Dipole Moments of the individual Magnetons, the aggregated-properties cannot (as we have seen above) be reduced directly to those properties as previously defined at the prior individual particle level. For they also act along with properties of the aggregate structure too.

For example, when reacting to the presence of a Charged Particle, the magnetons, which were previously randomly moving with totally un-orientated Dipole Moments, when encountering the Charged Particle, then situate themselves around it with one of the Poles of the Dipole pointing directly at the particle, until they form a complete spherical shell.

At which point, energy moves in from elsewhere in the Substrate to promote the Magnetons orbits to a common higher level, so that, overall, the Particle's charge has been totally "capped" - the amount of energy in the whole shell exactly cancels the effect of the enclosed Charge.

But, all the outwards-pointing Poles of that shell, will elicit another shell to cover it, and successive shells will similarly gather in sufficient energy as before, but this time their contributions will be to "cap" those of the next-shell-in, thus producing an Inverse Square Law in accordance with the relative surface areas of the succeeding spheres.

But, there will be differing numbers of Magnetons per shell so individual-linking-forces from each-inner-magneton-to-each-outer-magneton wont always be possible.

Indeed, the fact that it isn't actually possible. is proved by the contents being determined by their containing shells, rather than by the dipoles of individual Magnetons.

Once again, the relations in aggregate turn out to be different to relations that are merely Magneton-to-Magneton!

But, what about when they form Magnetic Lines of Force?

Again, the transformation requires an initiator.

For simplicity, at this stage, we will assume that the initiator is a Permanent Magnet, in which the Iron atoms with their Magnetic Dipole Moments will have been significantly aligned in a single direction, so the whole piece of Iron acts as a giant Magnetic Dipole. For then, whenever a free moving Magneton, in the Universal Substrate encounters such an entity, it will attach itself with its own Dipole Moment aligned in the same way, but this time, with North Pole-to-South Pole in separate single chains. AND these will build up from both ends of the initiating magnet, to ultimately link up, forming a system of such continuous loops!

But, such a form of linkage will produce separate Magnetic Lines of Force of different lengths, and at different distances from the initiator - so then, they too will elicit the gathering of energy from elsewhere in the Substrate - but here all the units of a single Line of Force will carry the same energy content. This is very different to the energy distribution in the units of the Electric Fields.

So, with different initiating circumstances, we get very different Aggregate Structures within the Substrate.

And, crucially, with a charged Particle moving-through the Universal Substrate, we will get both kinds of field - initially an Electric Field, moving along with the Particle, but, on encountering "static Universal Substrate", the leading edge of the Electric Field will be dissociated sideways into individual Magnetons, where they will link as a whole array of Magnetic Lines of Force.

NOTE: I make no apologies for the above "speculations": and for very good reasons! I am attempting something very different from the usual reductionist-reasoning. For, I am attempting another alternative approach to the universally-applied pluralist reasoning, because what matters crucially are the differing Contexts involved, and, with this holistic reasoning, Laws are not eternal: they depend upon Context! So, here there is a constant awareness of Context, and how it can change-qualitatively what can ensue.

## Qualitative Aggregate Properties II

### Dealing with Connectivities in Electromagnetic Fields



4/30

*[Handwritten signature]*

In the previous paper in this series, I began to initially address the connectivity of aggregated-structures at the lower-sizes-end of the relatively wide spectrum of possible cases. But, though I began to investigate certain relevant aspects concerned with the subtending of both kinds of Electromagnetic Fields within a Universal Substrate, I did not investigate fully the required connective-relations-in-detail between the straightforward associations of individual particles with one another, and how those relations changed when an aggregated Structure, such as an Electromagnetic Field, was involved.

But, this turns out to be the very first and essential step in development from the usually-adhered-to, strictly pluralist-and-reductionist concept of Reality (generally adhered-to in Science), to a much sounder holist-and-dialectical alternative.

The problem is that the particle-to-particle connectivity, as such, can never be just quantitatively-summed, to thereby deliver the connectivity into an already, extensive Field!

The prime example involves the Substrate Units termed Magnetons, in both their integration, on the one hand, into an Electric Field, and, on the other, into a field of Magnetic Lines of Force. The sort of relations used in simple associations, just cannot fully explain either of these alternative Fields.

Now, it must be said that formal-descriptions and their consequent formal-equations, of such aggregations are, indeed, available, BUT, from them, as always, the also required causal-explanations just cannot be delivered, as they are always and unavoidably simplified-and-idealised approximations, rather than real, accurate descriptions.

It is currently impossible to use those prior-and-effective one-to-one explanations, applied both consistently-and-comprehensively, to explain the links and properties of both a pre-existing Field, and of its extension, via the addition of another (from outside) of the very sane units that presently comprise it.

Both Electric Fields and Magnetic Lines of Force are composed entirely of Magnetons, but nevertheless, the two Fields connect-internally in very different ways, while delivering entirely different field effects too.

And, even the energetic relationships in the two kinds of Field, though both being composed only of Magnetons, nevertheless obey different rules. For all of those, within a particular spherical shell of an Electric Field, carry the same amounts of energy, while all of those in a single Magnetic Line of Force, also carry different but also consistently the same amounts of energy - and that is not easily explained!

Indeed, to even begin to address these facts, requires both a clear understanding of the connections involved, and, crucially, also the transports-f-energy-involved, as both inflows and consequent internal-flows, of energy, must be understood causally too.

Perhaps the Magnetic Line of Force seems to suggest that delivering energy via Magnetons connected via their Dipoles is straight forward, as equalisation throughout a completed Line undoubtedly occurs [And a similar direction occurs within the Earth's Magnetic Lines of Forces acting as a conduit from electron flows].

But, such a means cannot be used to explain the common energy content of a complete shell in an Electric Field,

for those Dipole connections DO NOT ever Exist within such a shell. Clearly, there is another influence at work, which though it cannot cause the inflows of energy from without, can and does limit overall totals of energy, within a shell, due, in the shell, to the initiating Charge, and in a Line too, due to the initiating Magnet.

Now, attempting to explain these things, entirely in terms of the lower-level, one-to-one cases - the pluralistic way - is impossible, for, once a field is constructed (even partially), it is no longer simply a summation of its components and their properties, but a new and different entity acting as a whole!

Plurality and Reductionism are wrong in such cases. And, our two possible Fields, made from the same Magneton units, but with different initiators, will also behave quite differently too.

To build a Field of Magnetic Lines of Force, requires an initiator with two magnetic poles of its own (maybe due to a single line of Iron atoms, each orientated with their Magnetic Dipole Moments in the same direction and linked directly by their opposite poles, both ends terminating at the physical edge of the magnet, in the opposite ends of the line of Iron atoms.

NOTE: This is NOT a Line of Force though its structure elicits such outside the Magnet. And, it would be at both ends of the initiator, which Magnetons would encounter and attach-to, one at a time, via the same opposite-pole-linkage, but it would not be until the two halves actually joined, that the shared energy-per-link (all the same remember) would be evident, and the sharing out along the line organised.

Clearly, both kinds of Magneton (remember there are two mirror image forms), could be involved, because the

opposite kind would only have to turn around to present the appropriate Pole and link up. But the two types both occur in equal numbers, so opposite effects, due to the opposite charges of the orbiting members of the individual pairs, would effectively have an overall zero lateral-effect, so relative close Lines of Force will remain separate.

But, with the Electric Field, surrounding a Charged Particle, in a spherical shell, there would be NO dipole links within a shell: they would all be back to the charged particle itself, and the gathered in energy, from elsewhere in the Substrate, would have to be sufficient to "balance" that charge - that is cancel it, and replace it totally by the outwards pointing poles of the involved Magnetons.

BUT, and this is important, there could not be one-to-one linkages to the next shell as it would necessarily contain more magnetons than its immediately-inner-shell. The pluralist assumption breaks down!

The inner shell must act as a whole, and along with its unavoidable geometric requirements attract another full-shell, both capable of capping the inner shell, but replicating its overall effect in the new shell, though shared between a larger number of units.

Now, in case this isn't understood for what it actually shows, may I bring in the example of any solid, which interacts with other things NOT as a summation of its constituent units, but as a single integrated entity - doing many things which cannot even be explained by being mechanistically reduced to the effects of its individual units.

This is Holism as I understand it.





