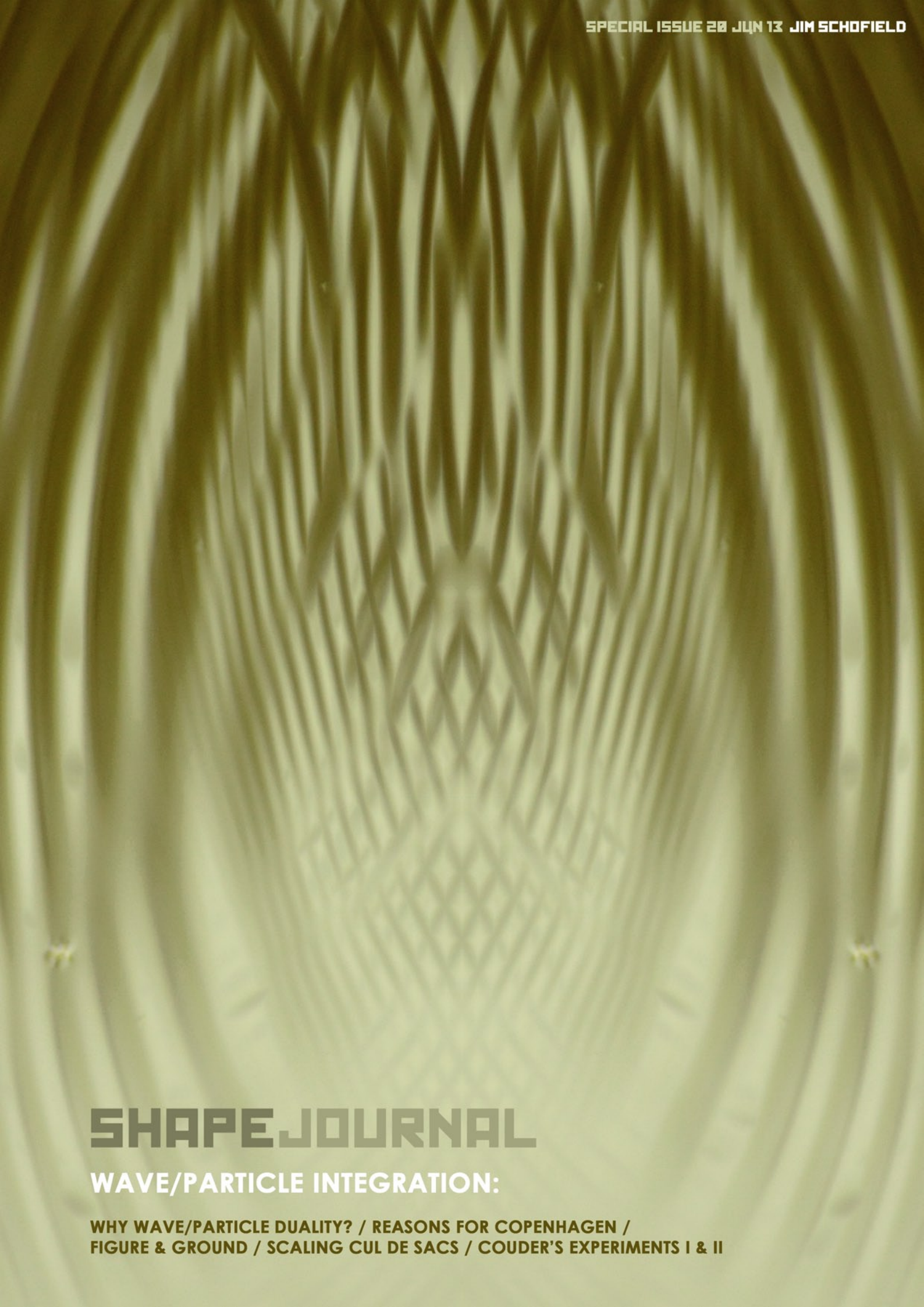
SPECIAL ISSUE 20 JUN 13 JIM SCHOFIELD



SHAPEJOURNAL

WAVE/PARTICLE INTEGRATION:

WHY WAVE/PARTICLE DUALITY? / REASONS FOR COPENHAGEN /
FIGURE & GROUND / SCALING CUL DE SACS / COUDER'S EXPERIMENTS I & II

Shape Journal
Special Issue 20

Wave/Particle Integration

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Why is there Wave/Particle Duality?

The idea of Wave/Particle Duality is much more complex than the nature of an electron or of a photon, for in its very conception it localises phenomena that are not actually local.

We are always happier with individual entities, carrying with them their unique load of properties, and interacting with one another, due to both these properties and to "prescribed" Laws of Nature.

Any holistic mish-mash of an alternative, with things being changed, or even determined, by their vast range of possible contexts and contributions, confuses us, and is widely condemned as unsolvable obscurantism.

So, in spite of evidence to the contrary, we stick-like-glue to our naming, defining and studying of particular entities, and their properties and relations.

Indeed, our greatest, while at the same time our most debilitating, method has been to purposely limit the context of a phenomenon so tightly as to easily display just one very simple relation, which we then immediately assume is a Basic Natural Law, and so, via quantitative measurements, we manage to extract this Law, and by matching and fitting it to one of many already known general forms – the meat-and-drink of mathematicians, and therefore available in abundance from these purely formal investigators, we end up with our beloved Natural Laws.

Finally, and significantly, we assume that these Laws are always separable from both each other and from their contexts – that is they are totally unchanged, as laws, by whatever context they occur within. And hence all the apparent diversity that we observe is, in fact, put down merely to complication – the simultaneous activity of various mixes of such Laws.

This is the primary Principle of Plurality, and is certainly the most important assumption in what we believe that we see, and indeed then impose upon, Reality.

And, of course, these assumptions were not countered when we came to use them, for we soon learned to replicate the contexts in which we had been able to extract them, in order also to effectively use them.

So, armed with a well-established and eminently useable methodology, we approached the mysteries of the Sub Atomic Realm, fully expecting that our approach would, once again, triumph and deliver more Natural Laws acting upon unchanging entities, to add to our growing store.

But, getting this close to Reality also puts our investigations beyond our usual and achievable control. The usual "farming" of Domains in this particular area of Physics turned out to be impossible. Indeed, the same entities sometimes acted as particles (itself a man-devised simplification), while at other times seemed to diffuse into waves (yet another such simplification).

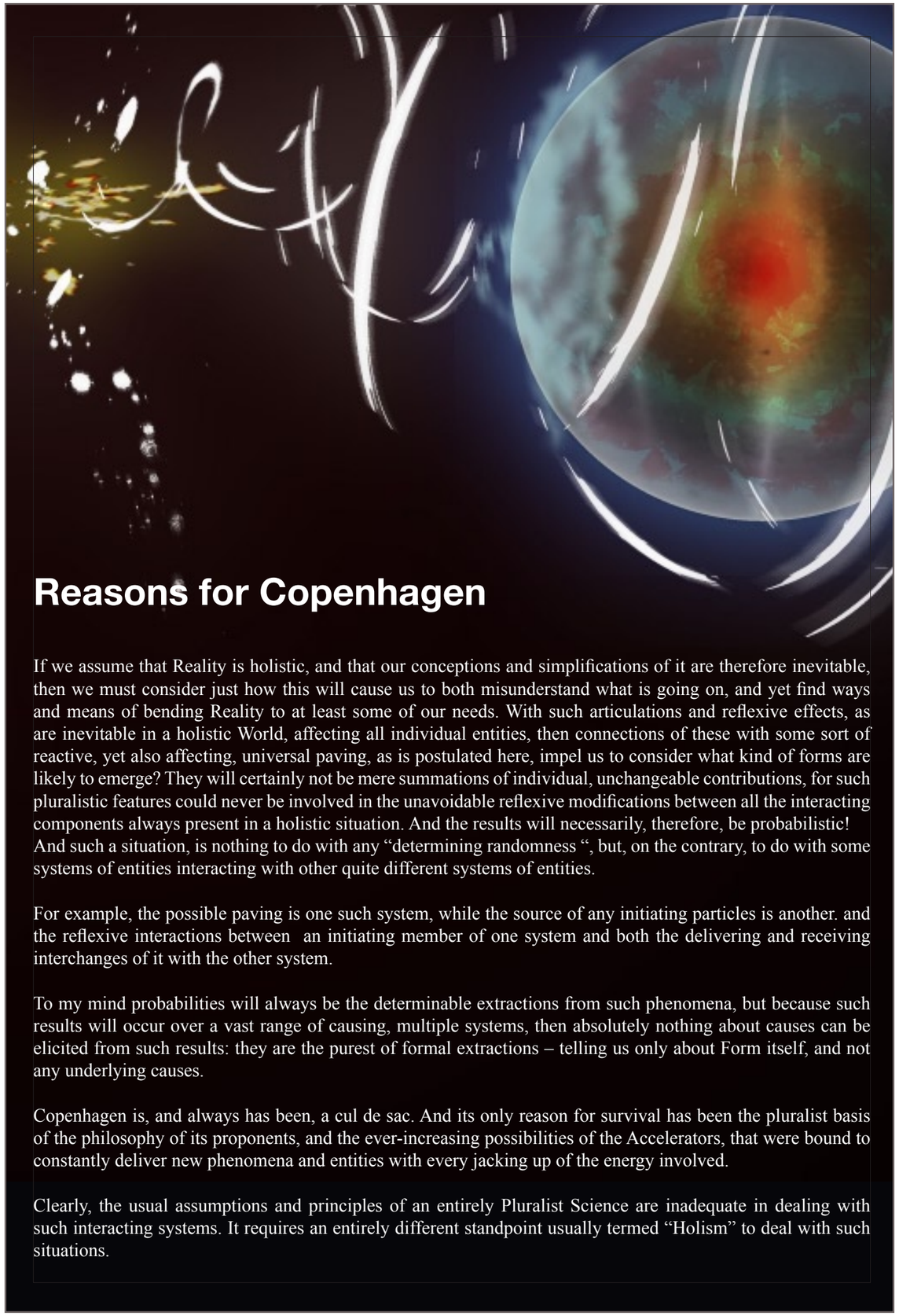
Now, this was rapidly becoming serious!
The discovery and establishment of the quantum had initiated an absolute avalanche of difficulties, and now such pairs of "incompatible" alternatives began to appear almost everywhere in this new realm.

After centuries building up an effective approach, and productive experimental methods, which could be used with confidence, Science was now being presented with a seemingly non-conforming area of Reality.
What could they possibly do?

Well, the mathematicians, of course, "already knew"!
When presented with things that defied Analysis, it could often be formalised by addressing whole populations or collections – "Study the forest rather than the individual trees". Statistics and Probabilities were the best approach! And, needless-to-say, the mathematicians were able to re-interpret derivable formulae NOT to deliver the particular, but instead the overall – the generality! All possible points could be delivered as probabilities.

So, was born the Copenhagen Interpretation of Quantum Theory that explained absolutely nothing, but, via probabilities, could predict with accuracy.

Though the "old-fashioned" physicists could continue to worry over the Wave/Particle Duality, the "modern, philosophical" physicists (usually mathematicians) embraced a purely idealist standpoint, and condemned all explanations as mere self-kid!



Reasons for Copenhagen

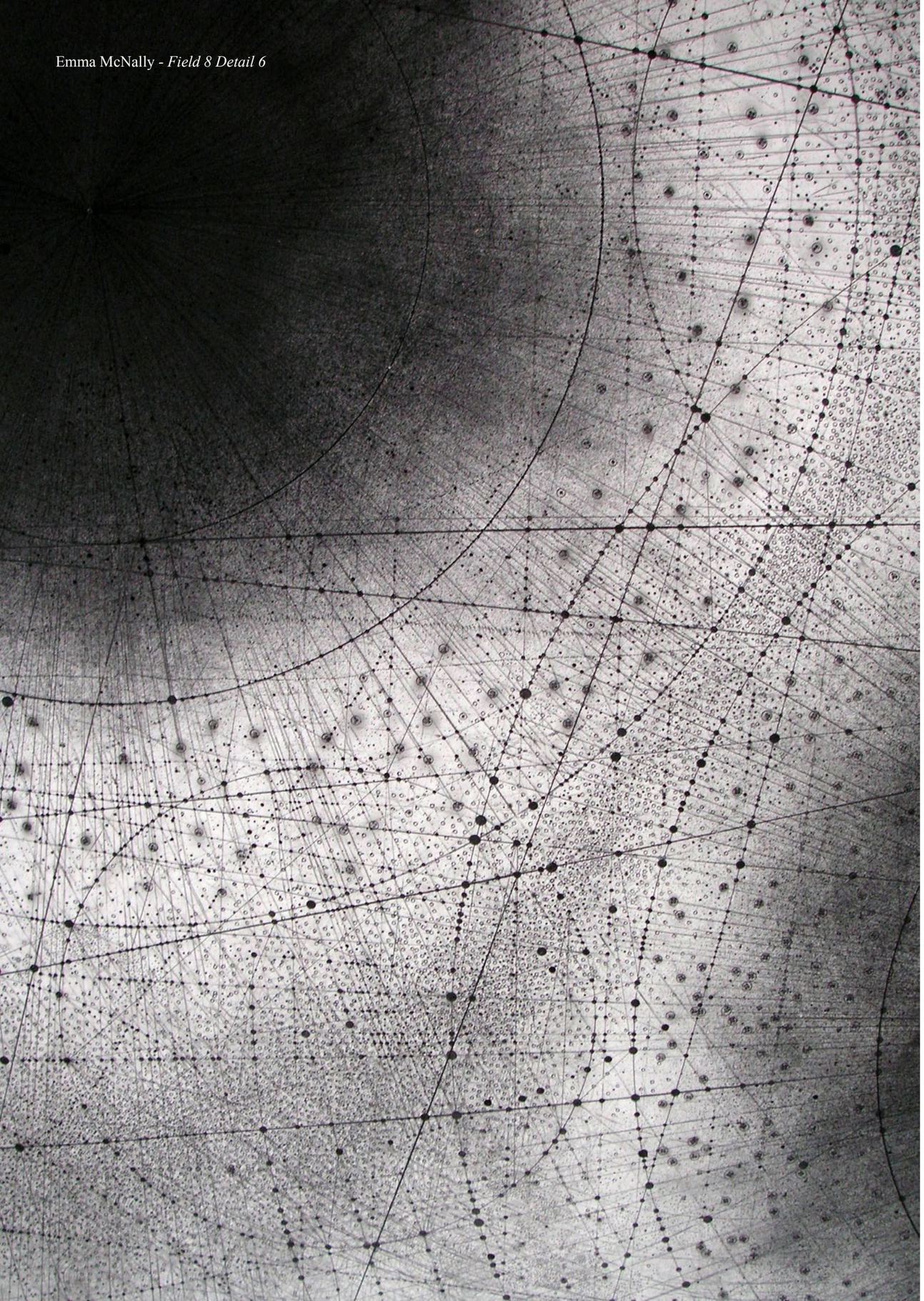
If we assume that Reality is holistic, and that our conceptions and simplifications of it are therefore inevitable, then we must consider just how this will cause us to both misunderstand what is going on, and yet find ways and means of bending Reality to at least some of our needs. With such articulations and reflexive effects, as are inevitable in a holistic World, affecting all individual entities, then connections of these with some sort of reactive, yet also affecting, universal paving, as is postulated here, impel us to consider what kind of forms are likely to emerge? They will certainly not be mere summations of individual, unchangeable contributions, for such pluralistic features could never be involved in the unavoidable reflexive modifications between all the interacting components always present in a holistic situation. And the results will necessarily, therefore, be probabilistic!
And such a situation, is nothing to do with any "determining randomness ", but, on the contrary, to do with some systems of entities interacting with other quite different systems of entities.

For example, the possible paving is one such system, while the source of any initiating particles is another. and the reflexive interactions between an initiating member of one system and both the delivering and receiving interchanges of it with the other system.

To my mind probabilities will always be the determinable extractions from such phenomena, but because such results will occur over a vast range of causing, multiple systems, then absolutely nothing about causes can be elicited from such results: they are the purest of formal extractions – telling us only about Form itself, and not any underlying causes.

Copenhagen is, and always has been, a cul de sac. And its only reason for survival has been the pluralist basis of the philosophy of its proponents, and the ever-increasing possibilities of the Accelerators, that were bound to constantly deliver new phenomena and entities with every jacking up of the energy involved.

Clearly, the usual assumptions and principles of an entirely Pluralist Science are inadequate in dealing with such interacting systems. It requires an entirely different standpoint usually termed "Holism" to deal with such situations.



Emma McNally - *Field 8 Detail 6*

This seeming diversion was absolutely essential, because they had found an area of Reality which most certainly could not be pluralised in the usual way. Analysis (like dissection) merely "killed-the-cat" and just couldn't explain it at all!

It was a purely holistic area, where rather than the Laws determining the context and behaviours (Idealism), it was the Context and Content that determined the Laws and behaviours (Materialism)

Now, the whole Domain-defining and maintaining method could not work for there were crucial determinators that were as yet unknown, playing a significant role. Attempting to endow an individual entity with both particulate and wave-like characteristics, which replaced one another at the drop of a hat, just would simply never do as a scientific explanation.

So, scientific explanation was dumped.

And instead, only the probabilistic formulae ruled supreme (plus some handy "rules of thumb" as to which one to pick in a given situation).

Two crucial things prevented any possible solution via the usual methods. First and foremost, the Principle of Plurality did not hold: it was an unavoidably holistic area. And second, there were determinators Not-yet-known, which clearly were part of a holistic solution. Without both a change in method, and the necessary revelation of as yet unknown contributions, this area of Science was brought to a dead halt!

Now, there is something here that prevents even the most trained scientists from approaching a solution. The allocation of both particulate and wave-like properties to a given entity was all they could think of. The phenomena were obviously predicated upon that entity, and still occurred in the most emptied environments that the scientists could deliver. Where else could these properties be affixed to except our given entity? There simply wasn't anything else available!

But, the question has to be asked once more, "Is so-called Empty Space *really* totally empty?" There are certainly many phenomena that have been observed, which seem to contradict that belief. But, as always, the failure to detect anything of substance seemed to terminate any such speculations.

But, what if Empty Space were not actually empty at all? What if it were filled with something that has wave-like properties? "Oh!", would be the immediate reply, "You mean ***The Ether***! That was long ago dumped as undetectable, and hence non-existent!"

But, that was before the advent of the Quantum, and the propagation of these descrete "packets" of energy through Empty Space.

How could that occur?

Could there be a Paving of the Universe composed of descrete units, rather than any liquid-like medium, the units of which had a net-zero matter content and also a net-zero charge content, but could carry individual quanta of electromagnetic energy?

And, believe it or not, such an entity does indeed exist. It is usually termed the **positronium**, and was observed many times in High Energy Accelerators.

Wave/Particle Integration

Re-establishing Materialism in Sub Atomic Physics

The unsolved problem of the propagation of electromagnetic energy, through totally Empty Space, is clearly the most important task in modern Physics. It has elicited many man-devised models in attempts to explain it, and though many have allowed real progress, none have solved the problem: they have all been pragmatic frigs! And, of course, all of these could only be predicated upon Mankind's current achievements and level of understanding, at each and every point in its history. How could it be otherwise?

Now, we can consider these constructs in two very different ways:-

First, as self-kid myths that fit, but don't explain, and Second, as effective and transforming miracles.
For both of these are true!

What can never be the case, however, is that they are the *Absolute Truth*. For that is impossible for any conceivable phenomenon!

Yet, the certainty that something important resides in our models could not be disregarded, for they did represent advances in our understanding. Then, with the advent of Science as a rigorous discipline, each and every model was not only put through the most rigorous intellectual and rational paces, but was also concretely tested in specially designed experiments – to prove or deny the validity of each and every hypothesis. Only the "best" were retained.

And to those who went further and required to categorise what had really been achieved, the idea of *Objective Content* came to express the partial and useable truths achieved.

So, it is from this philosophical standpoint that I intend to address this question. I do not, however, intend to deliver a full-blown academic account, with detailed historical references throughout, for I do have another objective, and this will determine what I deliver here! I want to establish a new theory (a model) that I am certain contains a great deal more Objective Content than its current, and dominant, rivals. But, as these rivals are, by now, well-entrenched, and the latest mathematical-philosophical position in Sub Atomic Physics has ruled the roost for almost a century, it will not be an easy task.

Yet, this consensus has remained in spite of its many difficulties, contradictions, false assumptions and unsound principles. You might well wonder why it survives, and the reasons for this are fascinating.

First, it is based totally on Form alone: it actually resides in that World of Pure Form inhabited by Mathematics, and named (by this author) as Ideality. It rests upon the "Absolute Truth" available in that perfect, purely formal world, and upon the essential design and control of specific Domains, constructed and maintained within areas of concrete Reality to provide, and indeed guarantee, that their perfect, abstract Laws actually deliver in the "real world" – the highly successful technological approach, based upon relations extracted from such manufactured Domains.

The consensus standpoint does not dispel Wave/Particle Duality, but actually embraces it mathematically and technologically, and rigorously limits experiments to areas, in which it is guaranteed to constantly un-earth new data, entities and even relationships. Its tools to deliver this are increasingly enormous – from giant American Accelerators to the colossal Large Hadron Collider in Europe+. It sustains itself on new data as the energy levels in its particle smashers are forever jacked up to colossal proportions. They currently claim to have produced the fabled "Higgs' Boson", which was supposed to have been involved in the very first Matter to be created in our Big Bang Universe from Pure Energy alone.

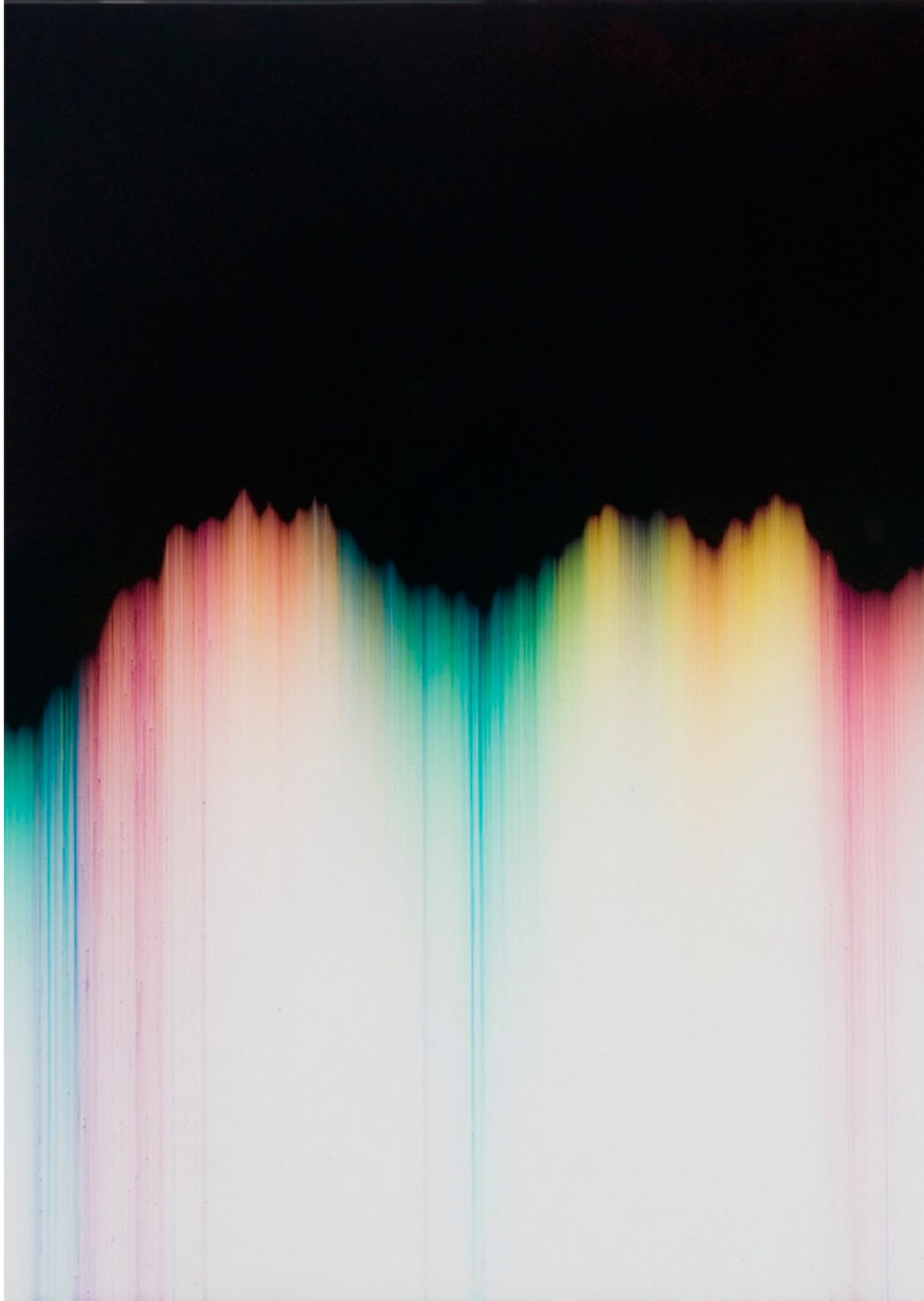
So, my target is to bury this major retreat by addressing the same contradictions from a very different standpoint indeed. NOT from Form alone, but from Cause and Content! That is from a materialist standpoint and not an idealist one!

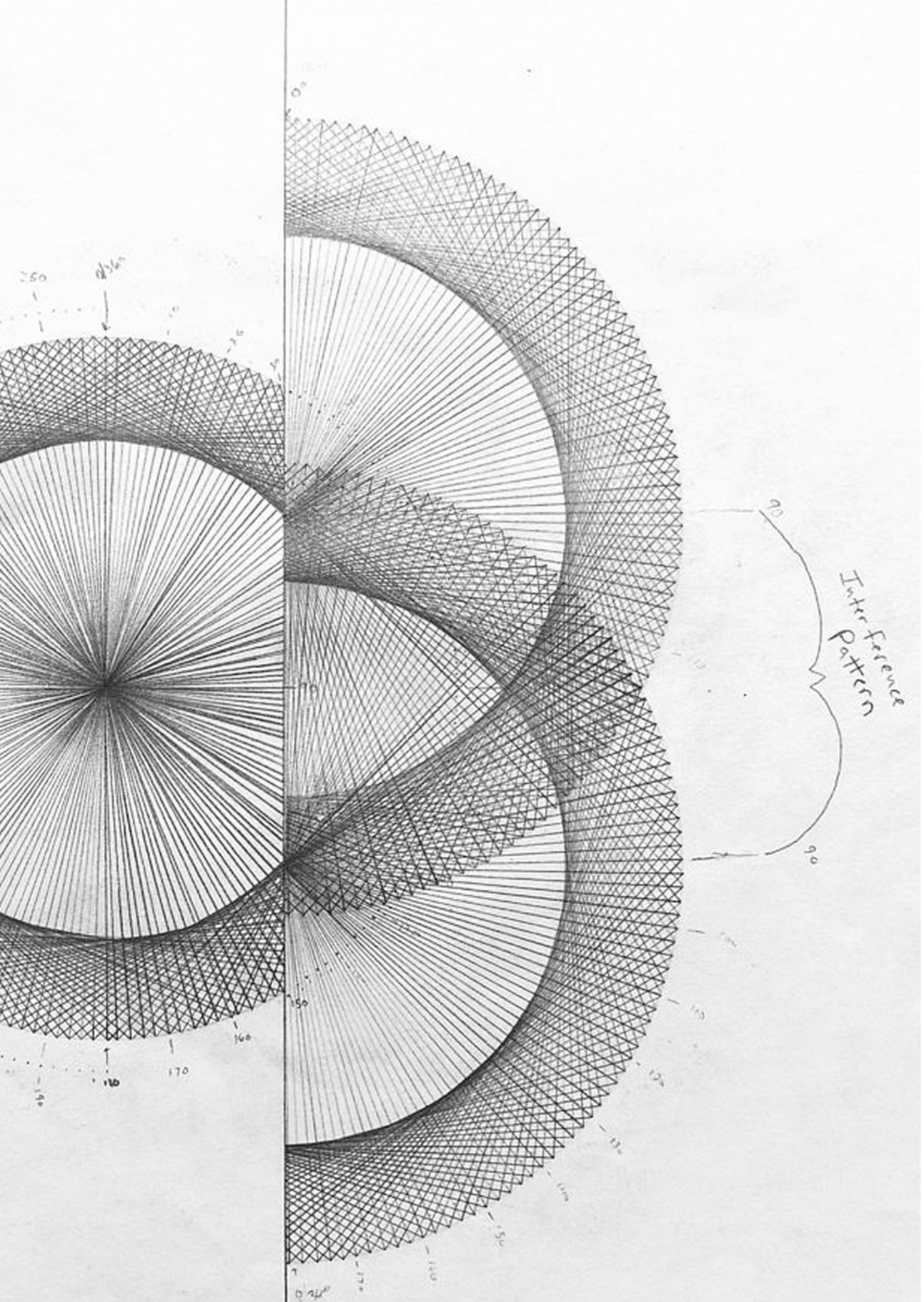
What really are the propagators of electromagnetic energy through Empty Space?

NOTE the difference from their objective, which is something like, "What formulae can we extract, that will enable us to predict with certainty and accuracy?" I think you will agree that such is a FORM-only approach!

So, starting from this alternative materialist approach, we must first address the two main historical contenders. Newton's corpuscles of Light could somehow be fired through Empty Space, but Huygens immediately countered this with the multitude of evidence for wave effects, which were impossible with Newton's particles, so that was vanquished (at least for a considerable period).

Light just had to deliver wave-like properties!





And, some time later, it was established irrefutably by James Clerk Maxwell that the "Forms" of electromagnetic radiation of all kinds was a wave-like oscillation of two vectors.

But, notice this brilliant piece of mathematics was again limited to Form: it didn't explain, it only (but rather beautifully) *described*!

Still, the primary question had not been answered –"What, in totally Empty Space was being affected in this way, and why?"

So, the still very numerous materialists wanted an answer to this question, and the only answer was the presence of an invisible, massless and elastic medium, which totally filled all of Empty Space, and acted as "the required medium": it was, of course, the infamous *Ether*! And though this model, in tandem with the equations of Maxwell, allowed a great deal to be predicted, and indeed used, with some sort of physical basis, the supposedly ubiquitous Ether could not be detected, so it was also dumped!

You can see where things were going!

"Why do we need these explanatory props?", insisted the pragmatic users of their reliable Forms. And they seemed more than happy with an oscillation of absolutely Nothing! It would be absolutely no problem for the formalists, of course, because Nothing could be conceived as equal amounts of exact opposites giving a zero result. Formally, Such a bit of Nothing itself could oscillate, given a bit of necessary energy.

But then, the roof fell in! Planck solved the cosmological Ultra Violet Catastrophe by assuming that this radiation came in descrete "particles" or "packages", which he termed Quanta. And later, Einstein solved the Photo Electric Effect with the very same assumption.

But what exactly was this Quantum?
Though possessing a gobbet of energy, no obvious receptacle was evident! It was termed a Photon and treated like a massless particle involved in many (formal) sub atomic interactions.

Yet the Quantum demolished many of the banker assumptions in Physics, and explanations now seemed impossible to achieve in a consistent way. For these gobbets sometimes acted like particles, while at others they acted like waves.

The two previously irreconcilable concepts now had to be retained, and used "when appropriate". Pragmatism took over, not only in concepts, but in relations too. Instead of direct predictions, as had been the norm heretofore, the various equations could only give probabilities for all possible positions in a given situation – these formulae worked, but any hope of a coherent, consistent and comprehensive material explanation was finally buried with the infamous Double Slit series of experiments.

For these seemed to confirm the Wave/Particle Duality as "natural", and the Copenhagen Interpretation of Quantum Theory became the consensus position in Sub Atomic Physics. For over 80 years, no one could breech this positivist edifice. Many were deeply unhappy with it, including David Bohm and the Nobel Laureate Laughlin, but an alternative was not found.

Then, in the mid Noughties this author (Jim Schofield) proposed a possible solution.

The impossibility of detecting any receptacles for E-M radiation was tackled by conceiving of a particle, which included equal amounts of both Matter and Anti Matter, and of positive and negative charges. For, if such could in fact exist, then it would indeed be undetectable!

But, could it also carry E-M energy within it as an individual quantum? It certainly could if the model delivered by the atom was employed to explain the internal structure of this new particle too.

Finally, and entirely theoretically, a new particle was proposed, consisting of one electron and one positron – mutually orbiting one another, in the very same way as with the atom. And these, as receptacles, could both "receive and hold", and also "give up" quanta of E-M energy, via the promotion and demotion of the contained orbits (again as with the atom).

I originally named the receptacles as Empty Photons, and re-named them as Photons, when they were each carrying a quantum of E-M energy.

But even this suggestion was not enough to explain the ubiquitous Double Slit contradictions!

Unless, they were not only free-moving transporters of these quanta, but mostly both stationary and temporary intermediaries. I suggested that these Empty Photons formed a "Paving" completely filling the Empty Space of our Universe. And, as soon as this was considered, the problems of the Double Slit Experiments were quite easily solved.

There would be interchanges of energy from an initiator, aimed at the Double Slits via disturbances in this universal paving, which would go through both Slits and "interfere" in the paving beyond. The original initiators would then pass through one or the other of the slits, encounter the interference pattern, and be deflected (or not) depending upon its particular path through the "interference" pattern. The pattern so caused on the detection screen would then be exactly that which was observed in such an experiment.

In addition, any disturbances in the paving caused by the introduction any detection devices, would indeed necessarily destroy the “interference” pattern, disable the phenomenon, and instead give the alternative “particle” pattern on the detection screen.

NOTE: Now, it should be mentioned here that this is an extremely curtailed account of what was finally put together in the full Theory of the Double Slit as published as a complete Special Issue of the SHAPE Journal on the Internet. Those interested in the fullest explanation should also consult that Journal, plus the Shape Journal Channel on YouTube, and even the following discussions as were posted upon the Shape Blog.

Now, all this could be, and was, ridiculed, yet the very proposed particle had, in fact, already been detected and described in an American Accelerator, and named as the Positronium! Yet, in spite of this evidence, the alternative theory was still dismissed, as these accelerator entities only lasted for a minute fraction of a second, before they dissociated into their component parts. “They are simply not stable enough for your theory!” was the conclusion. Except, that that these things had only happened in High Energy Accelerators, and even my theory would have then dissociating in such conditions, as the orbits would be promoted much too high and the components would break the bonds and be released. The really important question became, “What about if they occurred in Empty Space, almost totally devoid of free energy, would not these entities be very stable then?”

Of course, after a century of” progress”, the denizens of Sub Atomic Physics, were still not to be moved by the musings of some uneducated “dreamer” (not knowing that I have an Honours Degree in Physics). So, to win this one, a great deal more had to be done with this model. Many testable conclusions were necessary, and the most obvious area in which they might be placed was Empty Space itself – in other words in cosmological phenomena and experiments.

The very first task, however, would be to explain exactly how such a paving could deliver wave-like phenomena, and also allow multiple and distinctly different disturbances to “pass through” one another without mutually deterioration of the carried disturbances. How could both these be delivered by a paving of descrete and unconnected particles with contained quanta?

The first thing that has to be made clear is that the transfers between elements of such a paving, could only be via single quanta, and that each element could only be either empty, or carrying such a single quantum: no other possibilities could exist. So each filled entity could only interact with a single receiving Empty Photon. So the whole disturbance would be more like a shower of these quanta – all passing from Empty Photon to Empty Photon individually, and they would never occupy anything but a tiny proportion of available carriers.

Indeed, such a “beam” would undoubtedly effect such a small minority, that any other disturbance coming from a different direction, with quite different quanta could not interfere with any of the other stream’s transactions. It would instead find “free” Empty Photons for its transfers of quanta.

It would be like two crowds heading in different directions, and finding the necessary “spaces” to continue on their own separate ways, even though they might pass through one another in the very same area.

Likewise, addressing the other crucial problem, when a common source had had its disturbance divided and then re-combined, the identical nature of the quanta involved would cause adjacent particles with opposing, yet matching contents to deliver the same sort of “interference effects” upon intruders in localities composed of large numbers of receiving Empty Photons.

Now, apart from the physical questions, there is another side to these considerations. It is the philosophical!

The Copenhagen standpoint is most definitely insupportable, but nevertheless survived, as NO viable alternative has been established, but the successful solution of the Double Slit anomalies, though they may turn out to be not perfect, do establish philosophically that Copenhagen is NOT the only possibility. It points the way to a very different approach, and if the resources currently dedicated to Accelerators and Colliders, were instead directed at this kind of alternative, the first real progress in a century would finally become possible.

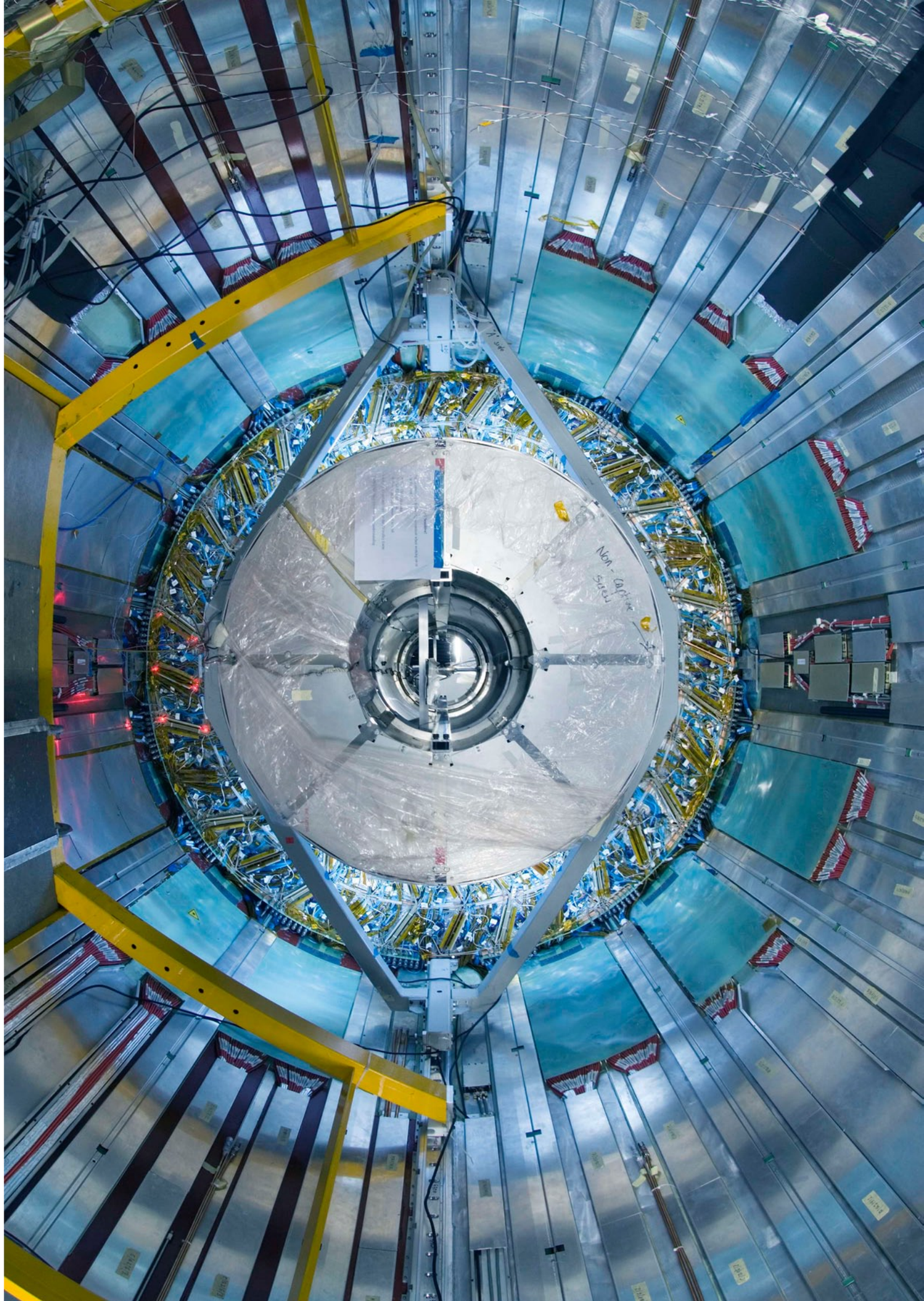


Figure and Ground?
The Dangers of Simplification

The long and indeed philosophical way we are forced to travel in these investigations is a product of the way we always attempt to deal with such phenomena in general. We have learned that the most productive approach is to avoid confusing complexity, and, instead, work to simplify situations as far as we possibly can. So, we select & isolate situations, attempting to leave only what we are seeking: we simplify first conceptually, and then concretely until we have both a revealing and amenable Domain - ideally conducive to our further studies. By now, we are, without doubt, the masters of such isolating and constraining of phenomena in such a way as to "completely reveal" their supposedly "Key Relations".

It has, indeed, become the fundamental approach for all our experimental set-ups, and, therefore, produces not what we think we have revealed, which are the Fundamental and Universal Laws, but, on the contrary, specific and limited relations locked fast into the specially arranged, conducive situations we have erected. Thus, our "Truths" are always distorted fragments – particulars. And so, though we crave overarching and universal laws, we never actually get them. We get a multiplicity of particular laws-plus-their-contexts.

So, with many complex areas as Fields, and indeed ALL actions-at-a-distance and propagations, this fragmentation is multiplied even more.

Yet, before this revelation gets too depressing, it has to be emphasized that we certainly know how to use what we currently extract. Our methods have been very successful, for we know precisely where to apply our "partial truths" – in the very appropriately constrained situations from which we have extracted them! As long as these correct contexts are accurately constructed, we do indeed have places where our laws work: we can predict, and hence also produce!

Our methods equip us for production, but also inevitably disarm our ability to explain why things are the way that they are, and behave in the way that they do, when left to themselves! We are very adept technologists, but not adept *scientists* (though we think that we are), and, most certainly, are nowhere near being even competent philosophers.

Now, the pragmatists will dismiss any such criticisms of both their method and standpoint, because their purposes are in no way compromised by the inadequacies of their approach.

Continuing "Progress" still appears to be continuously assured. But, of course, without the essential development of understanding as well as straightforward use, what we get can only be an aberrant growth.

It is really a maximal exploitation of a partial truth, rather than a step on the path to an ever wider and deeper understanding of our world. [Like the young man who built me a working Amplifier, but could not tell me why it worked, or what the various components were actually doing: neither could he use what he had to design something new].

Indeed, if the stream of scientific explanations ceased forthwith, technology (as with my young electrical constructor) would etiolate and die, like a pea shoot without sustenance. Science is the source and lifeblood of technological progress, and even more important, it can also be the means to understand the world.

Now, returning to our problems with Fields and many other situations, the difficulty is that our isolating and simplifying also walls us off from what we are trying to understand. For such things are not appropriate to such methods: for Fields are certainly NOT isolatable phenomena! Why can I say this? It is because the "Figure" and the "Ground" in many situations are not only inseparable, but also actually mutually defining and determining! We simply cannot separate them without destroying what they are.

For example, is a Field actually erected by its "causing" charge, or is it actually a response of the Background to the presence of that charge? For we usually assume that our Grounds are always totally inert – mere formal references, whereas the holist suggestions outlined above change all of that! The two always have a reciprocal relationship, and perhaps an evolutionary one too.

Now, rather than halting the conclusions here, and arguing whether these assertions fit all cases or not, let us first concede something called *Dominance*.

Though the philosophical basis for the ideas being explained here constitute Holism, they are NOT the same as that early version espoused by The Buddha, though it is still much closer to his position, than it is to the sub atomic physicists of today.

It does, in contrast, admit that things are not all of equal weight, and in many situations, particular relations can dominate to such a major extent that they can be fairly

easily isolated, extracted an then used in the pluralist sense described above as the usual scientific experimental practice. But, “Exceptions always make Bad Law”, and Dominance is not triumphant either everywhere, or permanently.

It is a surface effect, upon a holistic World, where literally everything does indeed affect everything else, and in many crucial areas we have to deal with not only Systems of Processes, but also hierarchies of such Systems too.

A great deal is always going on simultaneously, and our Simplifying, Isolating and Constraining methods in order to extract any usable order does indeed change the overall situations that we are trying to understand. The classic example is, of course, the Weather, but there are many cases where such situations also defy Analysis by our usual pluralistic means.

My favourite is Miller’s Experiment, wherein he attempted to make an emulation of the conditions upon the primitive Earth – before Life had emerged, in the hope that he could reveal something of the developments leading to that revolutionary Origin of Life. Sealing “everything necessary” in a glass containing-system, and adding heat and electrical discharges (as lightning), he set the system in motion, which was as near as he could get to the actual primaeval Weather System, in order to see what might occur.

As we all know, after only one week, the water in his system had already turned a deep reddy-brown, and on dismantling of the system, he was able to show that amino acids had somehow been synthesized. But as to how this had happened, there was no way that he could confirm the processes involved. The absolutely essential isolation from any present-day contributions, also prohibited any time-based Analysis, and most certainly, many strands of changes must have been happening throughout that momentous week, both as parallel simultaneous processes, and as parts of crucial ongoing and changing sequences. So, without any possibility of intervention, NO further explanations were possible.

This is, and always has been, the classic dilemma of investigating a Holist World using the only available methods - pluralist science could get nowhere in such investigations. They seemed to be Unknowable. And in spite of the undoubted success of Miller’s Experiment, it was also the “end-of-the-line” in most scientists’ eyes. Pluralist science offered a great deal more and it was there that ALL the research was concentrated.

So, these inevitable cul de sacs in attempts to develop a Holist Science did dissuade anyone else from embarking on such a seemingly doomed-to-failure route.

Yet, it would be wrong to consign this approach to the dustbin just yet. Darwin’s Origin of Species was a masterpiece of Holist Science, and other major holist contributions have also been made. But, the philosophical ground, and necessary methodology for a general holistic, yet scientific approach has still not yet been defined. It still awaits a generally applicable methodology!

Now, this author has attempted to apply such a method to the infamous Double Slit Experiments, beloved of the currently dominant Copenhagen School in Sub Atomic Physics, and he was finally able to explain all the anomalies involved, without any recourse to Wave/Particle Duality or the probabilistic formulae of the Copenhagenists.And, he did it by considering both the evident “figure” components, but integrated with an active “ground”.

So, with this demonstration the Copenhagen View was proved to be NOT the only possible approach, and he has since embarked upon another particular area of Physics, which has long annoyed him.

It is, of course, Action-at-a-Distance, the propagation of electromagnetic radiation through totally Empty Space, and, of course, the “daddy-of-them-all” *FIELDS*!

So, let us assume the very worst!

Let us say that our “Figure” is really composed of multifarious and mutually determining processes, while our “Ground” is not only very similar in its diverse content, but also both determines the behaviours of the contents of our supposed “Figure”, and is, in turn, modified by them.

Now, here is surely a suitably messy situation to attempt to make sense of. How might we do it?

Well, we do have a vast set of pluralist techniques, that though compromised conceptually, do give us “something”; and what we get is never merely pure invention, it always contains some aspects or fragments of the Truth. So, as long as we don’t wander off down the usual road, we can use these gains in a different way.

Though all gains made by such methods are always predicated upon restricted and maintained Domains, they do include an important measure of what is called Objective Content. So, rather than careering off down the pragmatic sweet, and downhill road to Production, we should gather as many closely related sets of pluralist Results as possible, and attempt to make some sort of conceptual integration out of them instead. And, with such a change of philosophy and of methodology things can change profoundly.

We now consider all the skewed, pluralistic evidence, knowing that it has been extensively processed, and hence treating much of what we have with a measure of scepticism, and instead, attempting to formulate a common explanation, that would, in each biased pluralist set up, produce what has been extracted, but would integrate all cases into a single explanation.

Now, at this point we must address the universally applied frig that is the traditional answer to their “sets of pluralistic results”

That frig is the belief that each pluralistically obtained relation (a Law) is in fact the actual Truth for those factors, and if we simply add all such obtained Truths together, totally unmodified, we will get True Reality. This frig we have named as Additive Complexity, and it is a pure invention: Reality is NOT like that!

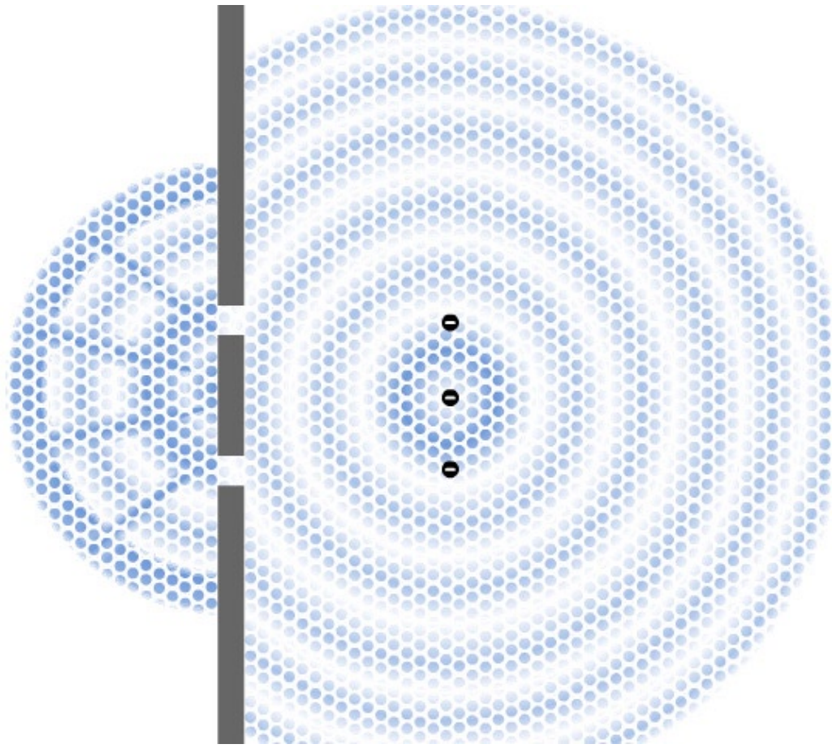
It replaces the true inter-relating integrations with crude *Complication*. The various Laws are summed to reconstruct what really happens.

NO THEY DON’T! What has to be done is to attempt to merge the individual isolations into a functional and integrated whole. That is much more difficult, but is essential!

NOTE: The alternative to the Copenhagen explanations of the Double Slit Experiments that was my own holist alternative was amazingly different in every possible way. And though the Copenhagenists could immediately motor off with their probability equations, they also brought understanding to a dead halt. Whereas, the holistic explanation has opened up theoretical prospects not only in these areas, but generally!

Shape Journal comissioned an animation which attempts to illustrate this Holisitic explanation of the Double Slit Experiment.

Watch it here.



On Scaling Cul de Sacs

Let us consider the usual simplifications, philosophically, that we impose upon Reality-as-is in order to make some sort of sense of it.

As alternatives to the usual prior appeasement of jealous Gods, we settled first upon the conceptions termed Plurality and Holism. These, in a sense, defined each other, for they are mutually incompatible alternatives, when each is taken to the limit.

But, let us be absolutely clear from the outset, in their usual forms neither of these is correct, yet in certain special, found or actually engineered, situations, each can sometimes be close to the truth. So, what are these two basic, simplified standpoints?

The first, ***Plurality***, recognises Form in Reality, and attempts to extract it by "farming" particular situations to make a previously only glimpsed and fleeting relation more or less permanently visible, and hence extractable, and so, hereafter, enabling usable predictions to be made.

The second, ***Holism***, sees everything as affecting everything else, and hence holds that only if absolutely everything involved is both considered and "individually" understood, could any real comprehension of the full causality ever become possible.

NOTE: It might clarify this standpoint if it is made clear that the real developer of this view was The Buddha, and also explains why the understanding of Reality was considered nothing less than a believer's life's work. Wisdom did not come easily!

It is interesting that the clearest expressions of these alternatives both emerged at about the same time some 2,500 years ago. The pluralist approach was favoured by the Ancient Greeks and epitomised in their Mathematics, and in particular by Euclidian Geometry. Whereas it was The Buddha who embraced Holism, and spent his life attempting to internalise "everything" in order to achieve Nirvana, and hence True Wisdom.

Now, the importance of the actual isolation of these alternative views of the true Nature of Reality cannot be overemphasized. For, such dichotomies are always unavoidable, indeed, actually essential in Mankind's efforts to make sense of his World. Such dichotomies abound, and when they appear, always seem to be irresolvable, incompatible opposites.

The most famous such pair, demonstrated very ably by Zeno in his Paradoxes, were the alternatives of Continuity and Descreteness, for in various guises these have never actually gone away – appearing in Newton's and Leibnitz's Calculus, and even in the 21st century Analysis of Movement by the author of this paper (Jim Schofield).

The reason for these is that the actual truth is always inconceivable at any given stage in Mankind's overall intellectual development, and the nearest that could be got to the "truth" could only be embodied in such a pair of mutually exclusive alternatives, and though like rival football fans, the supporters of each alternative will fight for their "adhered-to truth", the actual nearest thing they can get is to keep BOTH and switch between in appropriate circumstances, wherein one rather than the other will give much better results and predictions.

Now, the trouble with such an "explanation" is that it does not tell Mankind what must be done to transcend such contradictions, and, of course, never can! It is a study "from below". It is like an "explanation of Life" being attempted before Life had ever occurred: it is an impossible ask!

But, there are Events in the development of Reality, wherein such contradictions can, and indeed, are, transcended, though they are not on so high a level. After all, our problem dichotomy is concerned with the only thinking entity in our known Universe – Man.

The usual Events are at a much simpler level, but do indeed allow some ideas to be extracted from them.

They are, it is true, exceedingly rare in usual circumstances, and unavailable for any kind of study, but a particular form has recurred in Human Societies many times in our history, and these have been carefully investigated by superlative historians such as Michelet.

I am, of course, talking about Revolutions. And Michelet's subject was the French Revolution of the 1790s onwards. But, there had been an important, similar Event in England in the 17th century, and many others since, with perhaps the most important being the Russian Revolutions of 1905, and the two in 1917. Now, a very important discovery was made by the philosophers Marx and Engels, who thereafter dedicated their lives to not only their analyses of such Events, but their extrapolations to what was likely in the Society of the future.

But, it has become increasingly clear that these so-called Emergent Events occur in ALL phases of development, so the possible range of areas where these can be found has increased significantly in the last century.

So, the area must be studied to begin to understand the true dynamics of developing Reality, has to be these dramatic Events, which because they occur at all Levels in widely different circumstances, are more generally termed Emergences.

Why are they so important?

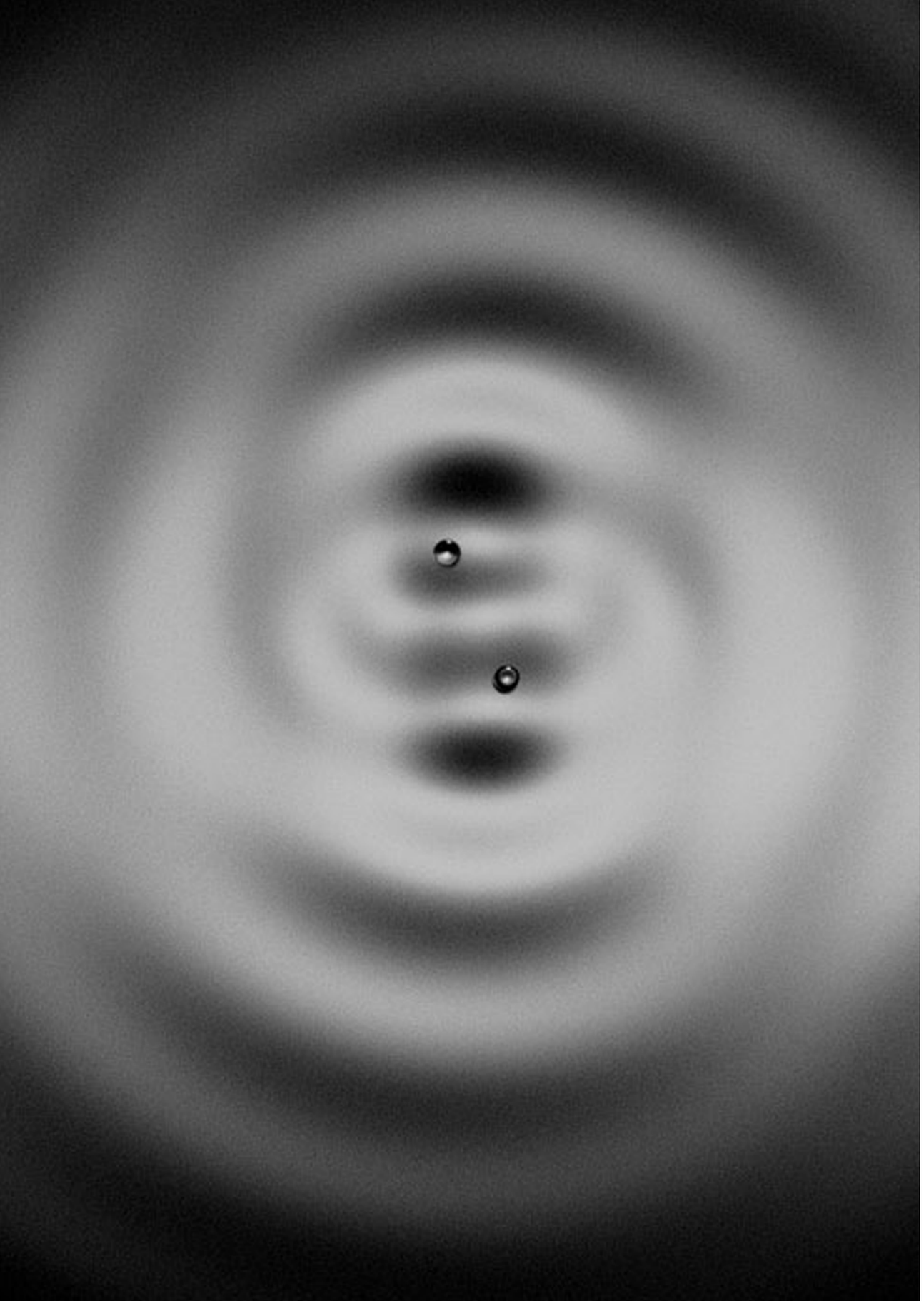
It is because the usual unsolvable dichotomies are similar to the stable situations that prevail most of the time. They are a maintainable balance between contradictory forces, or states, and actually suppress any chance of a resolution.

But, in an Emergence, the prevailing stability collapses via a total dissolution approaching absolute chaos, and new systems are created. It is only in the midst of such Events that such dichotomies are transcended.

So, the cliché of "Thinking outside of the Box" is a simplistic version of this, which assumes that it can actually be achieved by simply deciding to do it. It can't of course!

What is crucial is the crisis situation of the Revolution or Emergence. Indeed, the contradictions must be welcomed, even sought out, and embraced, as the most likely situations in which a resolution can be found.

The solution to the problem of getting out of a cul de sac is to study Emergences wherever and whenever they occur, and begin to tune in to the Real Trajectories of Qualitative Change.



Couder’s Experiment
Event and Substrate Unity Demonstrated

Yves Couder’s experiment, in attempting to emulate the Wave/Particle unity shown in Sub Atomic Physics, used tiny drops of silicone liquid (as his particles) and a vibrating metal plate, covered by a thin layer of silicone liquid, as some kind of substrate. He was attempting to throw light upon the Wave/Particle Duality, which was causing grave difficulties in that area of Physics.

I don’t know how he alighted upon the system that he set up, but it was a surprising route to take. All energy imparted to the system came from the vibrating base plate, for it gave a continuous source of energy input into what became his Substrate (the layer of liquid on top of the plate). His results were extremely interesting!

First, the silicone blob, which was, dropped onto the Plate/liquid substrate oscillating up and down, though it did not regularly come into contact with his substrate, and that was a surprise.

Once dropped, the silicone drop commenced to oscillate above the substrate. And, as the drop approached the liquid (without touching, remember) it somehow depressed the surface a little, which then sprang back, and the drop moved upwards in synchrony. So, a wave seemed to be emanating in the liquid “caused” by the oscillating drop of silicone.

PLAN

ELEVATION

Later images (not explained) seemed to illustrate a different arrangement, with a stationary set of Standing Waves surrounding the drop, which did not move outwards from the drop, yet moved together with the drop, as if they were causally linked. Such paths of movement of both elements of the system, once having been followed, seemed to, somehow, be ”impregnated” into the system, for they would repeat the exact same lateral movements, as if following a prescribed path.

The experimenter suggested that the set up had some sort of Memory. His conclusions were that his demonstration had delivered a “Unity of a Particle, and its Wave”, which, once established, moved around together as a system.

But, of course, to extrapolate such a suggestion directly to explaining Wave/Particle Duality in Sub Atomic Physics cannot be done, as the present conception of Wave/Particle Duality is considered.

But interestingly, it approaches much closer than the current consensus, to my own alternative Theory, which also involves a reactive substrate.

For Couder’s Wave was definitely in the vibrating liquid, while the particle (the drop of silicone) was always above that substrate. Also, the energy driving the system was certainly what was vibrating the underlying plate. And though there was definitely a reflexive relationship between the drop and the wave, no suggestions were made as to exactly what was causing what! They were clearly causing each other!

It is my guess that it constitutes a recursive set of relationships, settling into a kind of stability, which seems to be maintainable for quite considerable periods of time. Clearly, the situation was initiated by the insertion of the silicone drop, but causing an effect upon the thin layer of already vibrating liquid, which not only reacted back upon the drop, but somehow was itself changed to have built into it some form of memory of past paths (perhaps by a slight modification to the liquid's surface tension, that was also limited to where it had previously been and could not propagate throughout the liquid).

What Couder could not draw from his experiment, because it was not in his prior experience, or the immediate purposes for his experiment, were the reciprocal roles of "substrate" and "particle". Yet, in my prior investigations, his substrate could indeed be mapped into a reactive Paving of Empty Space, which I had proposed as being due to many descrete, massless and chargeless, dual particle entities, which I had showed to be possible, and had found out about identical forms observed in High Energy Accelerators (the positroniums), and, with the paving, found it possible, by tracing through reciprocal effects between the initiating electron and the paving, to finally explain the phenomena in the Double Slit Experiments.

Though Couder's Experiment is only an analogue, it is still a very good one, and such analogues are universal patterns of behaviour, which can be caused by quite unrelated things, but showing very similar patterns.

To emphasize the significance of this work for the idea of a Paving of Empty Space, we must make a series of "mappings" between Couder's set up and the theoretical definition of the suggested Paving.

Notice that to make any of Couder's features work required the provision of energy as an oscillation of an entire substrate – in this case his liquid covering of the metal plate, mapped onto my universal Paving, which constitutes a complete continuity, yet is composed of entirely descrete entities, each capable of both propagating energy, and containing that energy as quanta within the individual elements of the paving.

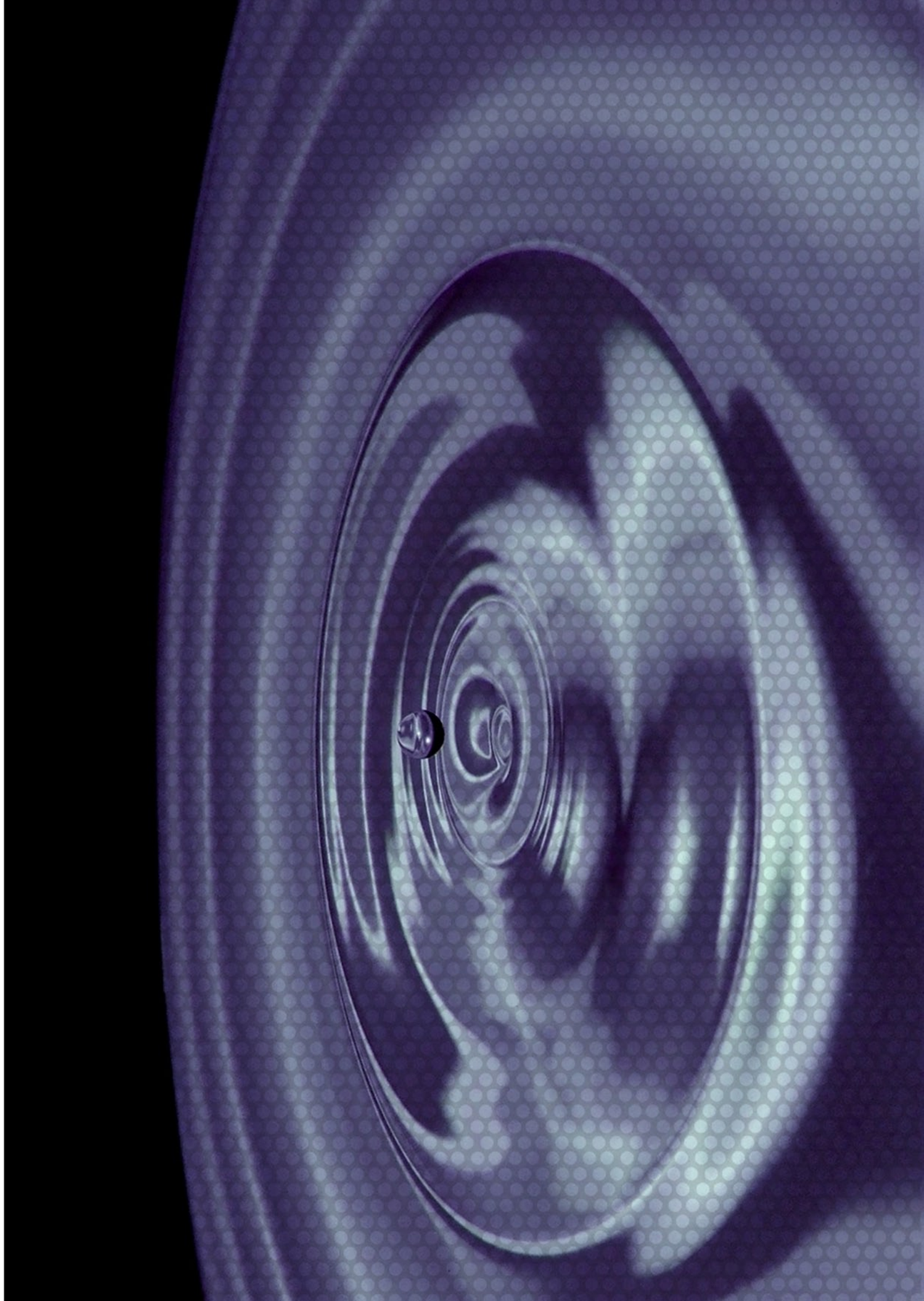
Secondly, the drop of silicone liquid interacts with, and gains energy from, the oscillating liquid substrate, and reciprocally, reacts back upon that substrate to deliver waves within its surface.

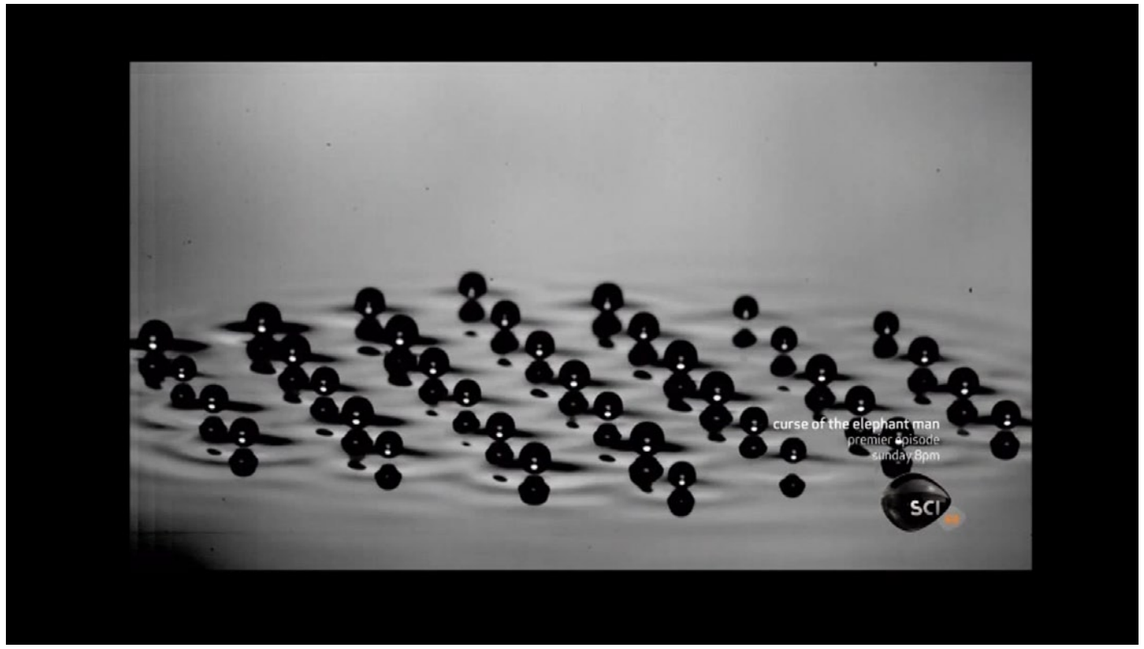
The mapping with the paving is somewhat analogous, as the energy comes from the paving, when a charged particle (say) is brought in (like the drop of silicone in Couder's experiment) and crucially in explanation using the paving, the same form of reciprocal effects are caused. The presence of the charged particle, causes changes in the substrate using energy from the movement of the particle, so thereafter the substrate, can later react back upon the charged particle and affect its direction of motion.
[In related work on Fields the necessary energy involved in the setup and subsequent actions of the field was provided only from the paving. And for a comprehensive theory this was clearly very important]

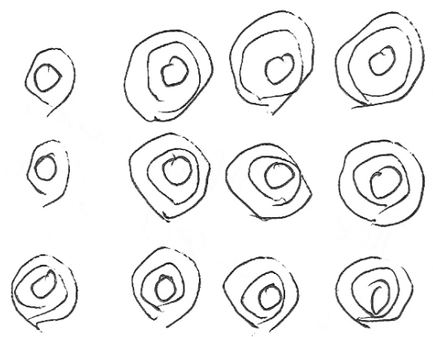
Couder's experiment proves by analogy, several of the ideas involved in the existence of a universal paving in what is otherwise considered to be entirely Empty Space.

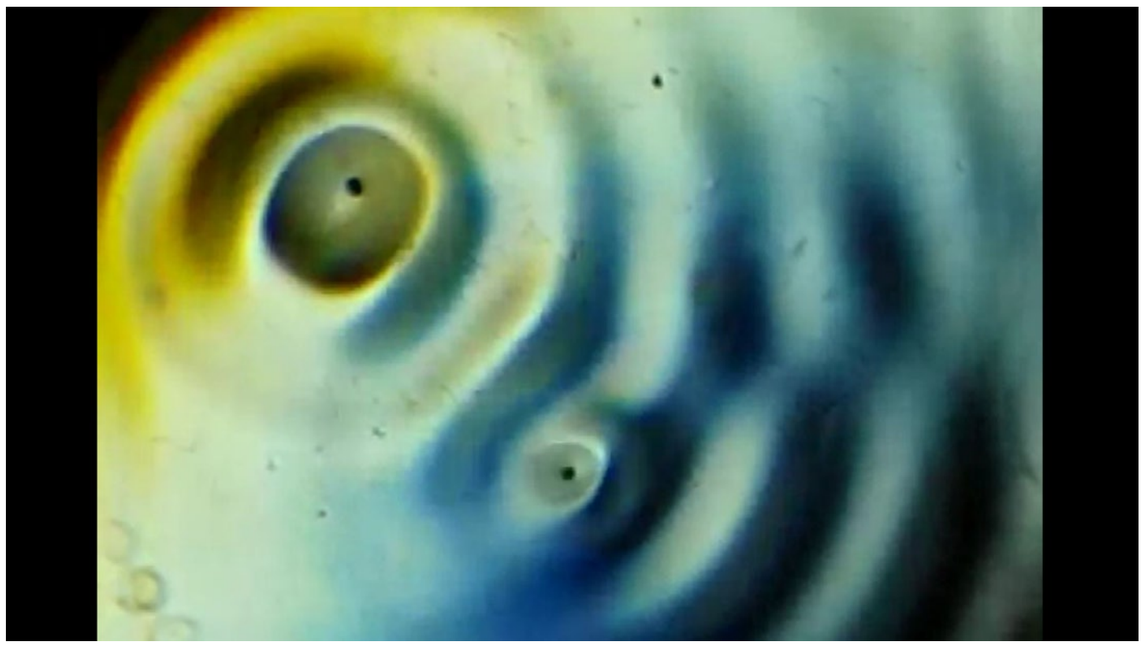
NOTE: I am still awaiting confirmation as to what I seemed to observe in the video I have seen of Couder's work (see below). For though in the high frame rate slow motion pictures, the waves definitely seemed to move outwards from where the silicone drop oscillated, in other clips the serried ranks of multiple drop/wave arrangements seemed to show standing waves, around each drop. Also, the very possibility of such sets seemed to contradict normal wave motions, as they would definitely interfere with one another, for they were occurring in a liquid medium, which should have ensured that happening. The fact that they didn't, seemed to imply that these were NOT waves in the usual sense, but more like a Field, but physically evident in the peaks and troughs of the pattern. Now, though we usually consider waves (and even fields) as infinite in extent, if that were true, there would be interference everywhere. Hence, either they are not infinite, or alternatively they can be ignored beyond a certain threshold distance away from the causing source (Light, though, does seem to propagate infinitely!). The organisation of several drop/wave systems occurring together in serried ranks does seem to imply some sorts of forces between these mini systems.

[VIDEO: Couder's Experiment features in ***Through the Wormhole - Wave/Particle - Silicon Droplets]***









A Second Look At Couder
Addendum

The more you think about this interesting experiment, the more there are features which demand some sort of explanation. For example, “Why do whole armies of silicone drops line up oscillating above the surface of the vibrating substrate as an ordered matrix? What is it that positions them?” And also, “Why is it that the wave appears to be guiding the droplet as they move across the substrate?”

We cannot treat the substrate, as set up by Couder, as a normal liquid. First, it is but a thin layer upon a flat metal containing tray, which is made to constantly vibrate vertically. Thus, the liquid layer moves as a whole. Yet, no evident disturbances are visible on its surface. But, of course, anything not of that plate/liquid system, will be affected by that vibration, So, the affected silicone drop, which does initially touch the substrate liquid, thereafter, according to Couder, bounces up and down without any further contact.

Several conclusions seem, therefore, to be unavoidable. These are:-

1. The silicone drop must insert “something” into the substrate liquid on first contact. The question sis, of course, “What?”

2. That insertion is somehow retained or constrained locally in the liquid substrate (perhaps due to is constant vibration?), and also ensuring that its elicited “wave” is centred and then maintained, at the point where the silicone drop made first contact, and which thereafter continues to influence it by its repeated “close approaches”.

3. Then, on each close approach, of the silicone drop to the vibrating substrate, some “impulse” must be imparted, as the set up can be maintained for days. And, this influence, we are assured by the experimenters, does not involve actual contact, so some form of action-at-a-distance (maybe electrostatic) must be involved.

4. And, the following of previous paths across the substrate, which Couder interprets as some sort of “Memory”, could be due to effects caused by the point mentioned in note 1.

5. The whole thing is certainly a holistic action/reaction set up, with drop & substrate both acted upon and acting.

6. The serried ranks of multiple drops and waves are also profoundly revealing, for it infers relationships between these entities [And as will be elaborated upon elsewhere it has important resonances, with the idea of a self organising paving throughout Empty Space].

7. For, the only obvious way is for an attractive force at longer distances apart, along with a repulsive force dominating at shorter distances, and these (as occurs in the layout of atoms in a crystalline solid) could cause such a layout on the surface of the substrate for these unusual “entities” NOTE: Atoms vibrate too!

The formation of multiple drops, upon the vibrating substrate, into serried ranks along with the path-copying of moving drops, poses a question as to exactly what could have been embedded into the substrate to cause these things to happen. And, it can only be in that substrate, for there is absolutely nowhere else for such a spatial set of directors to be inserted. And, of course that substrate is a continuous and also an elastic sort of medium (in spite of its unusual set up and constant vibration).

Yet, nevertheless, quite local effects involving optimum positions for the drop/wave entities seem to naturally occur) very similar in layout to those that happen in solids, particularly if crystalline. So, that substrate must, somehow, contain consequent forces, with the even spacing (in both directions) with balance points in between, being due to a cancelling out of these forces at particular separations.

Now, very clearly all this is NOT the same as the Wave/Particle Duality as demonstrated in the Double Slit Experiments, with the standpoint of Copenhagen. But, perhaps crucially, the fact that those caused anomalies, inexplicable within that Theory, were fully explained by filling the claimed vacuum involved with a Paving of special, undetectable particles, forming an effectible and affecting substrate, does allow significant resonances with Couder’s work.

Clearly, the presence of a substrate, in both, delivers the significant element. And this, along with the fact that the energy involved in various phenomena in both Couder’s experiment and this author’s (Jim Schofield) own theoretical standpoint with regard to both the Double Slit, and his Theory of Fields, is altogether too convincing to be disregarded.

Couder’s work clearly supports the idea that a particular type of reactive substrate (containing available energy) can do amazing things without any recourse to Copenhagen Wave/Particle Duality, or its idealist philosophical position.

Couder's Substrate & Schofield's Paving

One important difference between Couder's analogue of Wave/Particle phenomena using a drop of silicone onto a vibrating liquid substrate, and the Jim Schofield Theory involving a Paving of Empty Space as used in his explanation of the Double Slit with electrons Experiment, has to be that the speeds involved are very different. For example, a crucial part of the Paving Theory is that the inserted charged particle (electron) affects the Paving, sending disturbances through it in all directions at the speed of light, Clearly, the speed of the electron itself never gets anywhere near that speed, and hence follows its own disturbances (that it is continually causing throughout its passage, due to its charge and energy of movement. Thus, the disturbances get to the Slits (in the Double Slit Experiment) long before the electron reaches them. They go through both Slits continuously, and via a fanning out at each Slit, overlap, and hence set up patterns in the units of the paving, depending upon the distances travelled since the Slits. But remember, this is NOT in the Ether or any usual sort of medium, but in a Paving of descrete units. The electron finally arrives and goes through one or the other of the Slits (it doesn't matter which), and thereafter encounters the pattern of paving units.
Now clearly adjacent units will no longer necessarily be in phase: they can be at all positions within the cycle of the oscillating disturbance, that the electron will encounter. The pattern will juxtapose individual oscillations at all possible points in the common cycle, depending only of the distance since the slits, so the electron could be deflected one way and then the other resulting in a straight through path, or the states of the encountered units could be in phase, ensuring (most of the time) a deflection one way or the other. Thus the expected pattern of fringes will occur on the final detection plate.

Now, Couder's set up has a very different relation between the causing particle (the silicone drop) and the waves caused in the liquid, vibrating substrate. These two entities are locked together fast, and seem to extend over a very local range. The main difference in comparing the two has to be in the independence, once caused, in the Paving, in contrast to the dependence of surrounding waves on Couder's silicone drops. The Couder case is so locked together and dependant upon the bouncing drop, as to be similar to the beats kept going in a human heart by a pacemaker, rather than anything close to a set of disturbance waves caused by a moving charged particle. The bounce of the silicone droplet is directly and closely coupled to the waves in the liquid substrate immediately adjacent to it. And when they move, they do so apparently locked tightly together. The experimenters talked of the wave guiding the lateral movement of the drop, but clearly without the drop, he phenomenon would not occur: so the causality is not all one way!

Yet, an important anomaly in Couder's experiment was that sometimes the waves in the substrate clearly moved outwards from the position of the bouncing drop of silicone liquid, while other released video footage seemed to clearly show standing waves,

Were the latter artefacts of the frame-rate of his recording, or were they actually standing waves? For this could be important in explaining the serried ranks and moving strings of the drop/wave entities.

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