

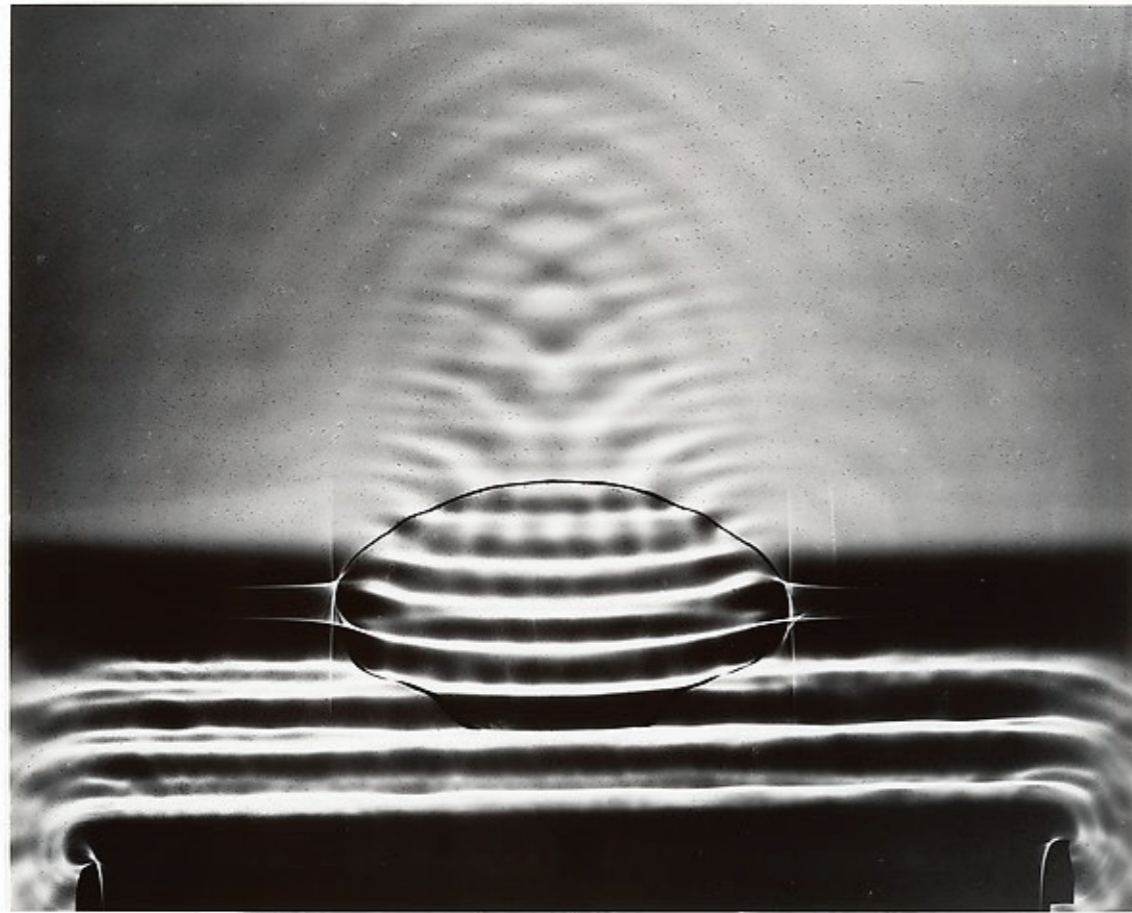
SHAPE JOURNAL

THE SUBSTRATE
THE ATOM AND THE SUBSTRATE - PART 1

HETEROGENEOUS SUBSTRATE / PERSISTING RESONANCES / NEW BIG BANG / INVISIBLE ATOMS

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Special Issue 36

The Substrate

The Atom & the Substrate (Part I)

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Introduction: The Universal Substrate & The Atom

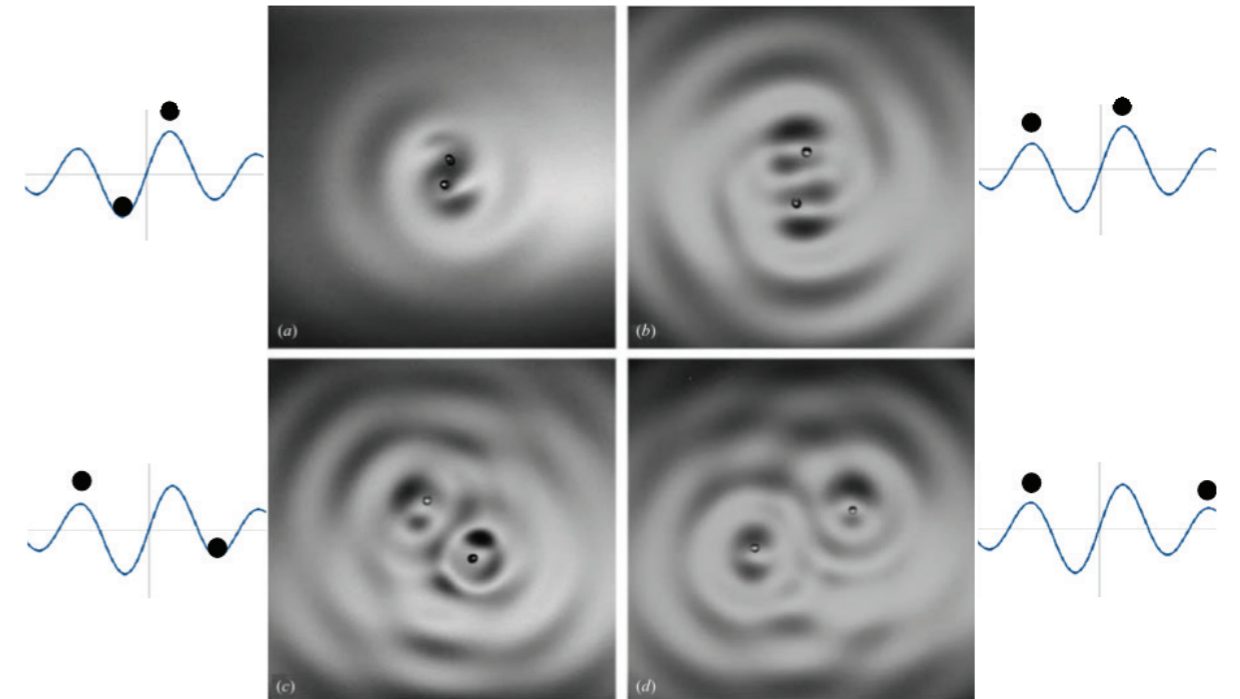


Welcome to the 36th Special Issue of the **SHAPE Journal** and the first in a landmark series outlining an entirely new approach to Sub-Atomic Physics. This will consist of two substantial issues containing work of truly great significance.

Such fanfares are not hyperbole. In the second of these installments there will be a full refutation of the too long incumbent Copenhagen Interpretation of Quantum Theory, both in general, and as a study of the Atom. Finally this regressive interlude in Physics can be stopped and the science re-orientated upon a wholly new path. For not only is this a debunking of Quantum Theory, but of the flawed pluralist position that preceded it.

These two new issues will be published online in quick succession, starting here with *The Substrate* and followed by *The Atom*. The issues tackled within are fundamental both philosophically and physically, and present for the first time, a purely physical explanation for quantisation.

Jim Schofield
June 2015



Acknowledgments

I would like to express my admiration and gratitude for several theorists and physicists, whose prior investigations helped lead me to these new ideas, and without which this theory of quantisation in atoms would not have been possible.

Yves Couder

Couder's crucial experiments with silicone liquid revealed quantum-style behaviour in the macro world, including quantised orbits - but everyone missed the elephant in the room! Couder's silicone bath was an analogue for a universal substrate.

Glenn Borchardt

Borchardt's work on false assumptions in Physics and the problems of action-at-a-distance lead him to see gravity as a push force. See Neomechanical Gravitation Theory and a universal substrate of "heterogeneous distributions of aether particles throughout the universe."

Mohan Tambe

Tambe's recent work on a theoretical substrate that delivers both magnetic and electrical fields in "empty" space provided an important part of the particle puzzle.

David Bohm

Bohm was a great theoretical physicist who rejected the Copenhagen view and instead claimed the answers lay in hidden levels of reality below the atomic.



Photogram: "[Wave Interference Pattern]"
by Berenice Abbott - 1950s

The Invisible (yet Active) Contents of Empty Space

Following a long investigation into various phenomena revealed since the discovery of the Quantum, over a century ago, it becomes increasingly clear that the anomalies that came up could only be addressed in a scientific, explanatory way, by the assumption of a physical substrate filling all of so-called "Empty Space". Of course, such a substrate was not an original idea, for it seems an inevitable conception when attempting to explain what actually and persistently happens there, so it has come up before.

At one time all scientists believed in such a substrate, which they called *The Ether*, and though it was entirely a theoretical construct, it did seem to answer many of the questions posed by phenomena of "Empty Space".

Indeed, it was on the basis of a conceived-of Ether that James Clerk Maxwell derived his equations of Electromagnetism, which are still used to this day!

But, that theoretical medium was never found. Try as they might, the scientists involved could find nothing that actually fitted the bill, and the whole concept was eventually dropped. Yet, similar undetectables have always been considered, and new ones are added to the list of necessary substances all the time, to "theoretically" explain anomalies – from Dark Matter to Dark Energy, and invisible Dimensions galore!

Frankly, there has to be something out there, which is both susceptible to disturbance and positively reactive, but which cannot, by the usual means, be positively and directly detected.

As a theoretical exercise, therefore, this researcher attempted to devise a particle, which was of no net charge, no magnetic effects and remarkably no apparent matter content either. Clearly, the only way, such an entity could possibly exist, was by it being composed of other sub-particles with opposite properties, which effectively cancelled each other out, within a stable union. Now, there is a well-established model that could be used as a starting point. It is, of course, The Atom!

It may not, initially, seem appropriate, until we consider its Form and its widespread occurrence throughout the whole of known Reality.

In the simplest case, the Hydrogen Atom, it consists of a positively charged proton, orbited by a negatively charged electron. And this delivered a neutral entity, but with an evident net Mass and a magnetic dipole effect. But, it is remarkably stable, and its two elements are kept apart, in spite of their opposite charges, by the relative speeds they had, on first encounter, which was transformed into the speed of orbiting, and thus kept them apart. It is not an unusual pattern, for, as we know in Cosmology, Stars, Planets, Moons and even Galaxies follow very similar stable patterns indeed.

The question becomes, "Could we construct another joint particle, on the model of the atom, which could cancel out all the properties of its component parts, and thus become undetectable?" For, if the two components were of exactly equal size and opposite charge, both the net charge and the magnetic effects in the combined particle would be zero.

All that remained and spoiled our intentions was the unavoidable and eminently detectable Mass!

Clearly, the question presents itself, "Could we have sub-particles of directly opposite matter types?" For example, if we used one electron and one positron, with one of ordinary matter and the other of antimatter, perhaps the result might be an undetectable joint particle? But, not only that! As with the atom, it could also contain extra electromagnetic energy in the very same way, by the promotion of the orbits to a higher energy level. And, in the same way could release that energy via the demotion of such orbits.

Doesn't this ring a bell? Have we not defined a physical Photon? It would be undetectable as a particle, but could carry energy within it!

But, as well as existing as a "disembodied" quantum of energy, it could also exist everywhere without any extra energy, and be totally undetectable: it could be the basis of an undetectable substrate – as an "Empty Photon"?

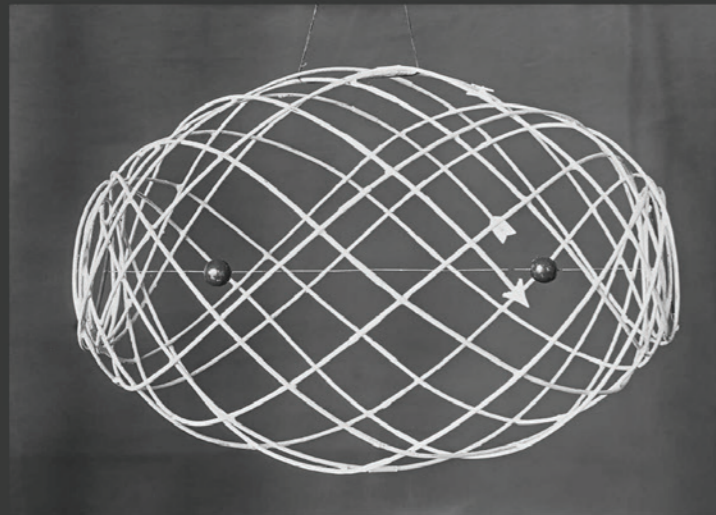
Now, this entity, or something very like it, might well answer quite a few questions currently unexplained in Modern Physics. And, one famous experiment literally cried out for such an entity. It was, of course, The Double Slit Experiment.

But, to play a role in that experiment, this particle would, somehow, have to be literally everywhere, forming some kind of substrate. So, it was, therefore, conceived of as forming a "Universal Paving" composed of these particles – not a liquid or a solid, put a Paving of discrete particles in a close-packed formation, actually filling all of Space.

NOTE: And this would be a new phase of matter, because its inter-particle effects would be almost non-existent. So, without the usual electromagnetic linkages, it certainly would be nothing like a solid or a liquid. And, of course, NO action-at-a-distance would be involved. The substrate, itself, would deliver all communications in a bucket-brigade, unit-to-unit way!

The problems and anomalies of the whole range of Double Slit Experiments were tackled with this paving as a universal intermediary, between the missiles fired at the Slits, and finally recorded upon an ultimate detection screen, and everything was causally explained!

Yes, absolutely everything, including the vanishing of phenomena when things were attempted to be detected in various regions of the experiment.



Invisible Atoms

Let us consider the usual model of the atom, and its ability to hold energy internally via the orbit of its outermost electron. Now, we have a workable theory that limits the possible orbits to a set of discrete radii, so that incoming energy can promote such an orbit, while outgoing energy demotes such an orbit to a lower allowed level. If true, we have a direct relation between energy and these orbits.

If it had only one possible promoted orbit above its intrinsic base level, then things would be different, but there are in fact many of these legitimate orbits, and a demotion is not always down to the bottommost, base level, but can be between promoted levels. Thus, the actual frequency of the orbiting electron is NOT the frequency of the outgoing quantum of electromagnetic energy. It relates to the energy difference between the two levels involved.

Hence, our conclusion is confirmed: it isn't a physically communicated frequency that is delivered, but a frequency directly determined by the energy difference between levels. So, orbits and oscillations are merely the modes of existence of energy, and as physical movements can be communicated from a source atom to something else, with similar capabilities.

The idea of the totally disembodied quantum of energy, in these terms, seems meaningless.

Now, the assumption of an invisible medium, composed of physical, yet undetectable particles, is the better conception for how such quanta could be propagated across what appears to be totally Empty Space. But, in spite of the attraction of this idea, the failure to detect such a medium was a major problem. Science shelved the issue, yet continued to use James Clerk Maxwell's equations of Electromagnetism, which were derived on the assumption of a physical (if undetectable) medium.

It was, as is common when such an impasse is encountered, a pragmatic fix! But, after the discovery of the quantum, and many evident anomalies, this hole in theory, just had to be addressed. Could there be a medium composed of real, yet undetectable, particles, which, on the model of the known atom, could handle these quanta of energy, in such a way as to propagate it over what otherwise would be seen as totally Empty Space? And, if this substrate consisted of mutually orbiting pairs (on the model of the atom), but at the same time neutral in-every-aspect, then the problems could be solved.

It was these considerations that led to the theoretical definition of the Empty Photon or *Neutrtron*.

Defining the Neutrtron

This is a joint particle consisting of two mutually orbiting sub particles.

One is an electron - negatively charged and composed of ordinary matter.

The other is a positron - positively charged and composed of antimatter.

Thus, to our usual methods of detection this entity is *invisible*. And yet its joint orbit could be promoted by absorbing energy, and demoted by its release - just like in an atom. Such a particle could feasibly propagate electromagnetic energy via a bucket-brigade transfer of energy from unit to unit of a substrate (paving of space) consisting of such Neutrtrons in close proximity to one another.

Also, if by some transition too much energy were endowed to such a unit, it would dissociate into its components - an electron and a positron - giving us a physical explanation for the well known phenomenon called *Pair Production*!

While in the opposite direction a separated pair of these same components with the appropriate orientations and speeds, could seemingly vanish by forming a new mutually orbiting pair - giving us a physical explanation for Pair Annihilation.

A Final Point: All the anomalies of the famed Double Slit experiments can also be physically explained by the presence of a universal substrate of these joint entities, without any recourse whatsoever to the consensus Copenhagenist stance.



Compared to the usual Copenhagen-based standpoint, with its Wave/Particle Duality and Probability Mathematics, this alternative was infinitely preferable, and didn't involve the major idealistic retreat of the Copenhageners. It was, indeed, worth investigating, and delivered a theory containing more Objective Content than that which it replaced.

As always, of course, such a theory cannot claim to be the Absolute Truth, but using the criterion of containing more Objective Content, it had to replace the usual theory.

And, the most important unexplained phenomenon in Nature is surely the Propagation of Electromagnetic Energy (such as Light) through totally Empty Space. Could our suggested paving of these undetectable particles fit the bill? The answer was, once again, a resounding, "Yes!"

For, the quanta of electromagnetic energy could be passed on from unit-to-unit, in a bucket-brigade fashion, and the renowned, but unexplained constant Speed of Light would now be merely the speed of transfer from one particle of the paving to the next.

And, to cap it all, this actual particle has been observed in the Tevatron at Fermilab, and there termed the *Positronium*. And though, in those circumstances, it was shown to have an incredibly short lifespan before it dissociated back into its components, that is what you would expect to happen in that strange environment. It was an assumed stable version that would play the role within such a universal structure as a general paving of "Empty Space".

Now, before everyone has a fit, let us be clear what has been achieved here. It was from the outset a purely theoretical construct to see if something like this was possible. The Positronium (or Neutrtron, as its deviser has called it) may not be "the Truth"! But, something like it may actually be involved.

And, as it has turned out in this continuing line of investigations, this particle alone cannot be the sole ingredient that permeates the entire universe, for, in spite of its successes, it has also failed to explain (with its current composition at any rate) several other major questions that also have to be answered for such a space-filling substrate. For example, it cannot explain Fields, both electrical and magnetic, and even more importantly, it cannot explain Gravity.

Yet, why should such a substrate be simple? We like things to be simple and elegant but this doesn't mean that they are! Why should it contain only one kind of elementary unit?

We have a good, general analogistic model, involving the cancelling out of properties via mutually-orbiting sub particles. Could not space be filled with a variety of such similarly undetectable units, but with different contents and modes of existence? Using the same basic premises, it is surely possible to devise other joint particles with different properties to the Neutrtron, which because of their differences may well be able to deliver all the as yet unexplained features?

The necessary theoretical line was obvious.

Could we, theoretically, devise other undetectable particles, which could deliver the other phenomena?

And, in the initial attack upon electrostatic fields, it was attempted using this time, the pair of mirror-image joint particles, which in equal numbers, and moving about randomly could also be effective en masse - for they would cancel out over the population instead of within each and every joint particle. And, by making the joint pairs those of unequally-sized particles, these could deliver effects that the Neutrtrons could not.

Now, this research is still in the early stages, but already several concepts have been considered - the static paving AND the randomly moving, gas-like entities.

But, as with the matter states of Solid, Liquid and Gas, we can conceive of different states or phases, which could act together to ultimately deliver all the phenomena occurring in so called "Empty Space", a space that is in fact anything but empty.

The research proceeds!

Apples & Oranges

Handling Quanta

In considering both the origination and the propagation of quanta of electromagnetic energy, we must go a little deeper in comparing the atom and the neutrutron. For though atoms have their own set of quantized energy levels for their orbiting electrons, which are determined by the nature of the substance of which the atom is the smallest unit, that cannot be said of the neutrutron, for it is supposed to propagate ALL possible quanta from ALL possible atoms. So, it cannot have such a predetermined set of allowable levels: it must accommodate absolutely all possible quanta from all possible sources, within quite wide limits.

Now though the neutrutron handles all possible quanta from atoms, it will not be able to handle any beyond a certain maximum threshold value. For, above that, the neutrutron itself would dissociate into its components – one electron and one positron (Pair Production).

The atom is very different. For, instead of a completely flexible capacity, it can only deal in a fixed range of discrete energy levels, and consequently discrete values for the quanta that it can absorb and emit. It is this very feature that allows the type of atom from which energy had originated to be precisely defined and recognised. While, the necessary intermediary, allowing the propagation of such energy, though similar in many ways, MUST be capable of transferring almost any size quanta. It is even possible to state categorically that it is the type of atom involved, which determines the precise nature, both in frequency and energy amount that are propagated throughout the Universe. The original source always being what determined that, while the neutrutrons of the substrate, have no such limitations, and can handle all sizes of quantum (up to its upper dissociation limit).

Let us probe a little further. The only stable state of an electron orbiting within a particular type of atom has to be in what is termed its Base State. This state is determined by the actual construction of the atom: it is intrinsic to the atom continuing to exist. All possible levels, above this base level, are transitory, unless the context, in which the atom exists, is such as to prevent it unloading that elevated quantum of energy. And, this could only be the case if there was nowhere close for the quantum to be released to.

Now, such a condition is a profound consequence, which is only likely, if all other nearby atoms are already promoted in the very same way. The general state of the substance involved can prevent demotion and release; otherwise, the promoted situation will immediately demote to release its quantum. The only condition is that there is an un-promoted atom nearby to receive that quantum. But, if all the interstices of Space within that atom's vicinity were occupied with already filled neutrutrons, with no built in quantized levels, then, the only option that the quantum would have, would be to stay where it was, within its current atom. Such situations in such circumstances would be normal, as with such ease of propagation, energy would move into a locality until all units of the substrate were at the same level, and, from there, any atoms would be promoted generally to equal levels too.

You can't naturally move uphill, so the quantum will stay where it was. Clearly, we cannot deal with the issues addressed here, by treating an atom and its elevated internal state in isolation. It will behave differently depending upon its Context! Indeed, within a given context, which is everywhere elevated to the same level, the quanta within atoms will stay where they are. But, an atom elevated within a context that has not been so elevated, will immediately unload its quantum to the nearest available recipient. It could be another atom, but in the most general context, it will be to a unit of the substrate - a neutrutron, which, itself, being then elevated, will immediately decant to the next available unit - usually another neutrutron.

Now, because we are assuming a common means of propagation, via a universal substrate of such neutrutrons, whatever the original transmitting atom, and whatever the size and nature of the quantum involved, we are clearly dealing with different entities when talking about atoms and neutrutrons.

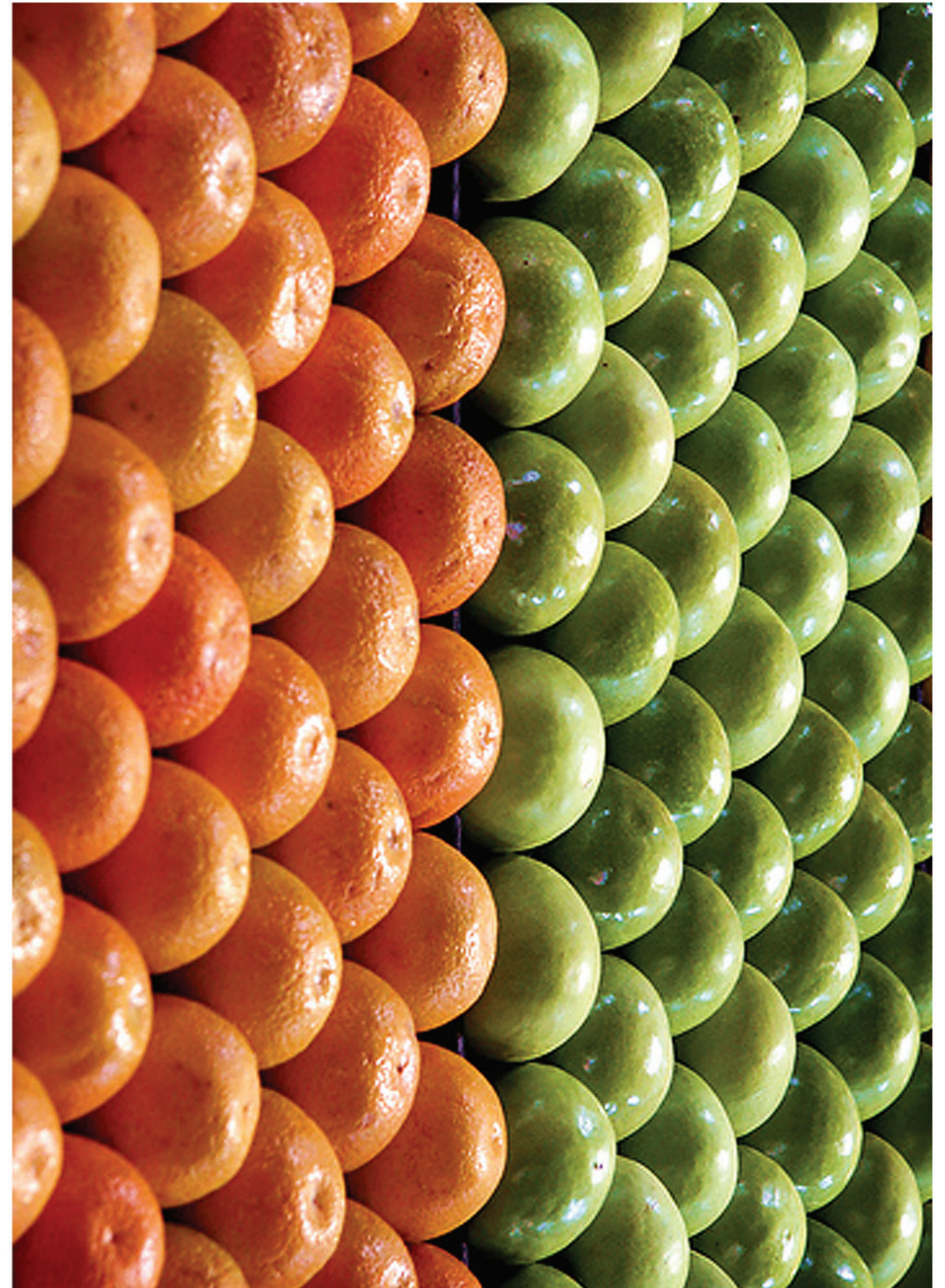
NOTE: In Couder's Walker experiments, he was able to produce his Walkers merely by the interactions (both resonant and recursive) of vibrations within a single substrate, AND a remarkable and contributing sub mode of the same substrate as a bouncing drop. But, when he added an overall rotation to the whole set up, he was able to produce quantized orbits to his Walkers.

Now, the analogy is obvious, and may turn out to be crucially important! The atom with quantization is like the Walker with an overall rotation, while the neutrutron is more like the Walker before the quantizations were produced by the added rotation.

Of course, such analogies are always both simplified and idealised models, but they can, nevertheless, have more Objective Content – more aspects or parts of the truth, and therefore deliver legitimate steps forward: they can certainly replace what so evidently delivers less!

One major implied rule seems necessary to be overtly expressed here. Once formed, a quantum of electromagnetic energy will reside in an appropriate vehicle – be it an atom or a neutrutron, and will not be able to be eroded or divided in any way. It will retain its characteristics in all subsequent transfers between such vehicles.

The problem of the atom seems to be that its structure will only allow certain fixed (quantized) internal levels, whereas the neutrutron has no such limitations (apart, that is, from its dissociation, due to a too large a gobbet of energy transfer), it will take, retain and maintain what is given to it, until the conditions for an unloading occur, when it will immediately deliver that quantum.



Hidden Levels of Reality

What is rapidly becoming clear, following the assumption of a Universal, yet invisible, Substrate, embracing the entire Cosmos, is that several hierarchical levels must exist below that of our literally beloved Fundamental Particles.

Indeed, once the known phenomena of these previously considered bottom-most entities of Reality are situated within such a substrate, rather than the current idea of a totally Empty Space, it produces, immediately, at least two extra levels.

Initially, a substrate was devised as composed entirely of units (neutrinos), which were, themselves, a union of two already known sub-particles mutually orbiting one another, in a closely similar way to the usual model of the atom. This was suggested, initially theoretically, as a means of causing the joint particle's invisibility delivered by quite normal and well known properties, which, nevertheless, made them undetectable directly by the usual methods. The sub-particles were of opposite charge and matter type, yet were exactly equal in size to one another.

The resulting unit, the neutrino, (already observed at Fermilab and there named the positronium), was, because of the cancelling properties of its components, made invisible (undetectable), yet could both hold and deliver gobbets of electromagnetic energy, and hence finally remove the anomaly of so-called disembodied radiation being an oscillation of nothing in a totally Empty Space. It also removed all the other anomalies thrown up by the infamous Double Slit Experiments.

Yet, as Yves Couder's experiments have shown, such a substrate (in his case silicone oil) could, entirely alone, deliver phenomena such as his famous Walkers, without the involvement of any other entities whatsoever. Couder's Walkers were merely phenomena of his substrate alone, affected by a set of oscillations interacting with one another in a remarkable way. So. Any Universal substrate should deliver similar phenomena also! Now, even the suggested extra levels are unlikely to cover all possibilities.

The neutrino, for example, couldn't explain electromagnetic fields subtended into what was usually considered to be Empty Space. And, even when other invisible particles were also included, which could, indeed, deliver such phenomena, there still remained the outstanding problem of Gravity to be explained.

Clearly, this new approach is insistently, and primarily, physical – and not at all formal.

So, Einstein's purely formal Space-Time Continuum will have to be explained *physically*, in terms of a real physical level too! Indeed, it is even more involved than that. Theoretical investigations have placed the new Universal Substrate not only surrounding all of Reality's material objects, but also even within the atoms themselves – filling their inner spaces too, and creating a very different environment from so-called Empty Space. Indeed, within atoms, wholly new phenomena are already known – such as the unexplained stability of electron orbits, and their lack of energy losses, which in unconstrained circumstances would normally be the case in similar circumstances at

other levels. Somehow, the stability of such orbits is achieved physically, and that will certainly require a full explanation.

Note: Physicists familiar with the History of the Sub-Atomic Realm will be aware of the various attempts to oppose the Copenhagen retreat, by also considering Hidden Levels. David Bohm's ideas were of this nature, though he was never able to reveal what any of these hidden levels could be.

But, it must be emphasised that ALL the alternatives (including Einstein's stance), were compromised at a much deeper level. Indeed, all three alternatives rested unavoidably upon an amalgam of contradictory premises, which had been juggled between for millennia. And, the most fundamental of all was the belief in eternal Natural Laws, which could be encapsulated in purely Formal Relations. They all believed this, yet arrived at contradictory positions in attempting to answer the more basic question – “Why?”

With the research intimated here, we are pursuing a similar path to Bohm, but with very different imperatives. First, we believe that many important phenomena cannot be explained without some form of invisible substrate. BUT still constructed from already known particles in various combinations that make them impossible to detect by the usual methods. Already, three quite separate proposals have been addressed

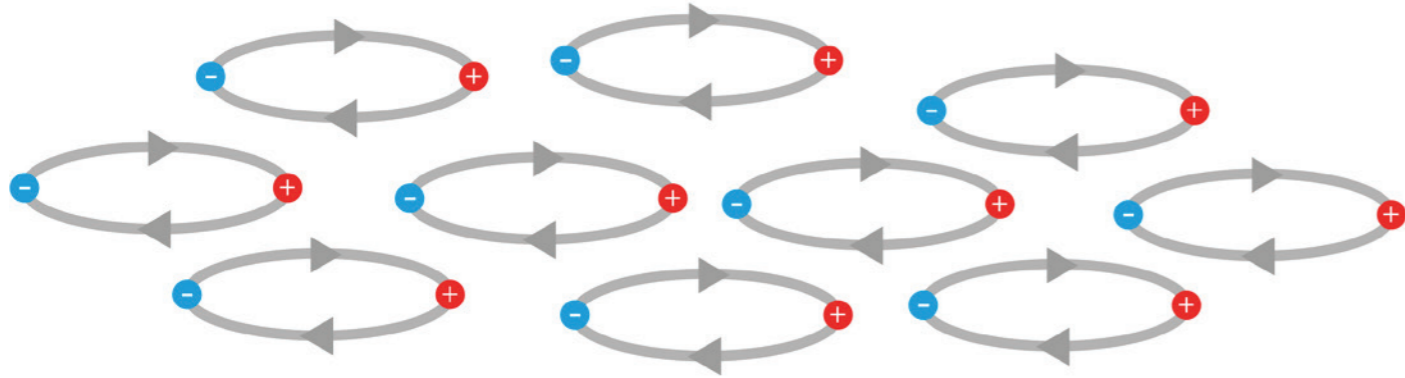
1. Propagation & the Double Slit anomalies (Schofield [U.K]).
2. Electromagnetic Fields via Magnetic Particles (Tambe [India])
3. Gravity via Multiple Levels of “Ethereal Particles” (Borchardt [U.S.A])

But, what seems to be making these new routes possible is the abandonment of the universally adopted Plurality, for the much more real Holism, and a steadfast abandonment of Formalism (Mathematics) as the essence of Reality. It is essentially a philosophical revolution, but still at its beginnings!

“The Corpuscle” by Michael Coldwell (2015)
Artist's impression of a 3D pilot wave in a substrate,
influenced by Yves Couder's '2D' experiment with silicone.

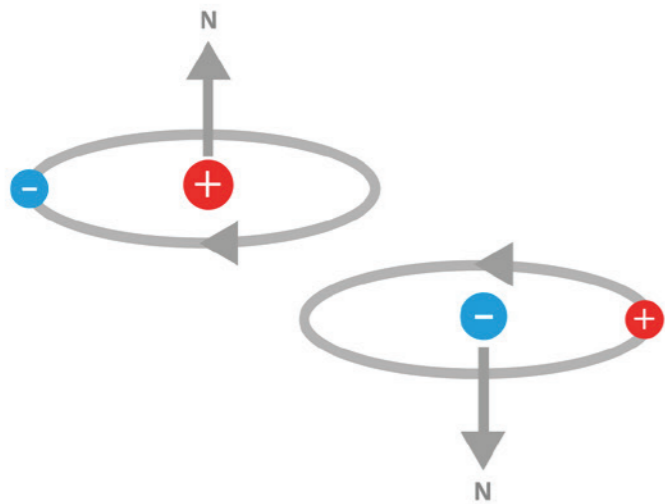
THE HETEROGENEOUS SUBSTRATE

The suggested components of the substrate are as follows



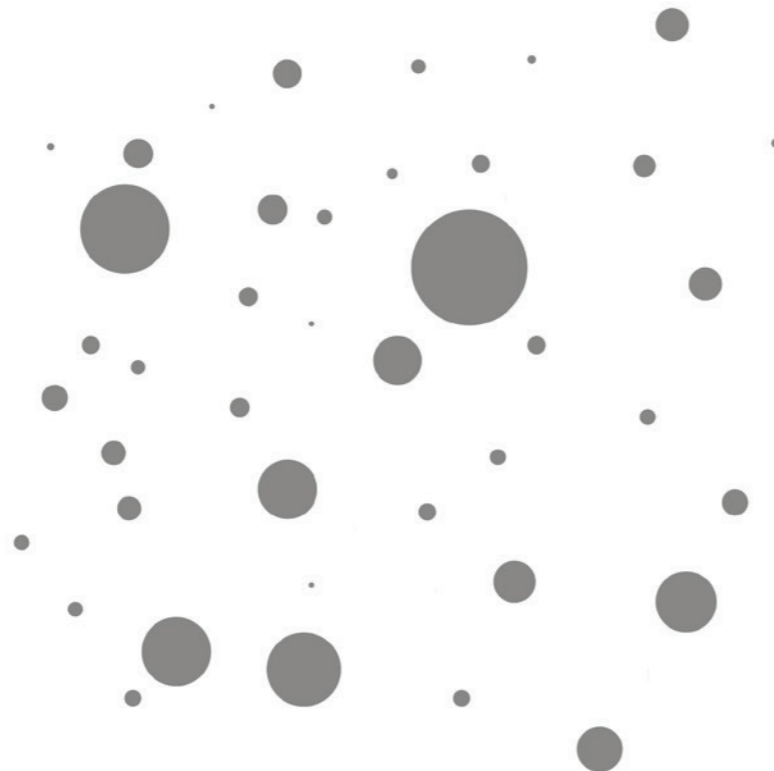
THE NEUTRITRON

Above is a formal diagram of a static substrate of Neutrित्रons, which consist of a mutually orbiting positron (antimatter) and electron (matter), allowing the propagation of EM radiation throughout all space.



THE TWO MAGNETONS

A randomly moving substrate of magnetons which come in two configurations, mirror images in both charge and matter type, allowing the propagation of magnetic fields.



THE ETHEREAL PARTICLES

Right is a formal diagram of a randomly moving and constantly colliding substrate of etherial particles, also neutral in all respects. These particles come in many different sizes, each effecting bigger ones, finally delivering gravity to aggregate masses.

I intend to construct an analogistic model of this universal substrate composed of all three above particle types, in the manner of James Clark Maxwell's model of the Ether.

The Heterogeneous Universal Substrate

This work represents my first attempt to construct an analogistic model of a Universal Substrate - a sea of particles permeating all space - in the manner of James Clerk Maxwell's model of the Ether. This new model will attempt to explain propagation of light, electric and magnetic fields, and even gravity, in terms of a heterogeneous "paving" of the Universe.

The proposed components of this substrate are depicted opposite - they are the *Neutrित्रon*, the *Magnetons* and a series of inert "Etherial Particles". I have written much on the neutrित्रon (empty photon) before, but these other particles are new considerations.

THE MAGNETONS - These two differ from the neutrित्रon in being composed of a pair of particles of different size, which dramatically changes the form of the pair of components in each, and gives each a magnetic moment. They conform to the same principles of "invisibility" as the neutrित्रon in their mix of opposite charges and matter types. The two magnetons are effectively mirror images of one another, so that in a random mix of equal numbers of each kind, the overall result will be neutral in every respect, including a cancelling of their magnetism.

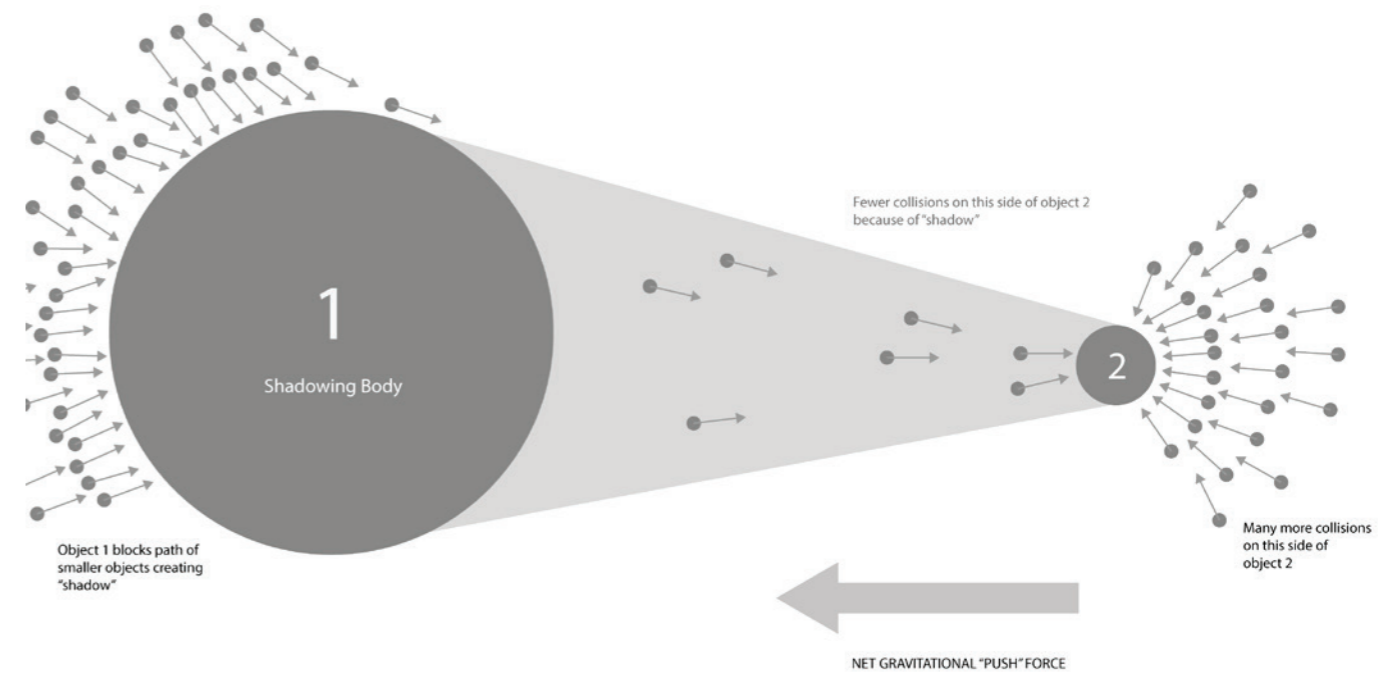
THE ETHEREAL PARTICLES - Now these elements of the substrate were devised purely as a physical explanation of gravity, by means of the "push" effect of their collisions. They are neutral in every respect, but are of different sizes (literally infinite in extent going downwards to ever-smaller sizes).

The key function is termed "Shadowing" - bigger entities shield adjacent particles from some collisions in the direction of the shielding body, and hence resulting in a net preponderance of hits towards that body. With a host of such sizes, the overall results everywhere is for movement towards larger bodies.

The idea is illustrated below.

GRAVITY BY SHADOWING

Based on Glenn Borchart's theory of gravity via an infinite scale of Etherial Particles - gravity as a push force!



These are not all the products of this theorist's work alone. The Neutrinos and the Magnetons are my inventions, however that conception of magnetic fields in space was originally introduced to me by Mohan Tambe, while the idea of "Aetherial Particles" causing gravity was developed by Glenn Borchardt.

The original inspiration for the heterogeneous substrate came from James Clerk Maxwell's conception of the Ether, a diagram of which is included below.

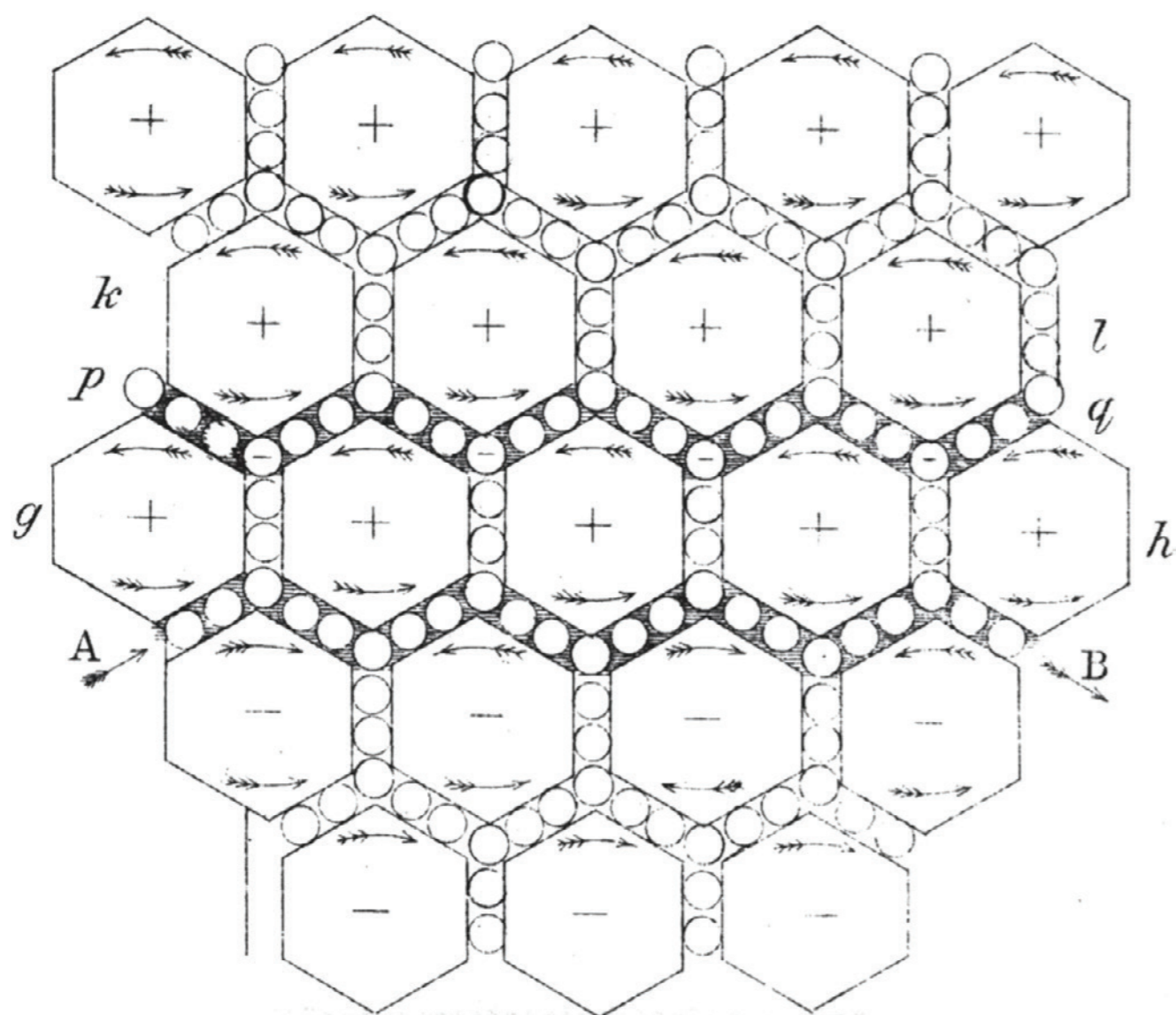
Notice that his substrate is also heterogeneous. It is composed of static "vortices" and moving "electrical particles". So if we admit a certain amount of Objective Content to Maxwell's discarded model (remember we still use his derived equations for electromagnetism), we should at least attempt to update it - including our current suggestions as to how a universal substrate could remain undetectable.

And crucially we must not lose sight of several important properties of our proposed components (above).

First, they are all, either individually, or in-collection, neutral in all the usual measurable ways. But, they act together differently.

The neutrinos form a relatively static paving (see Schofield), While the magnetons normally form a random, gas-like cloud, wherein it magnetic properties cancel out (see Tambe), but when concentrated by the presence of a charged particle, will gather around it, in concentric shells, to deliver a Field.

Also, in the presence of an externally applied magnetic field, these magnetons will line up along so-called magnetic lines of force. In fact, they are the actual cause of such lines of force, building chains outwards from some source to link opposite "magnetic poles" together, and in doing so create the Field.



Finally, the "Aetherial Particles" are considered to be in vast quantities, but extremely small, though of a vast range of sizes (see Borchardt). Their effect in space will be of cancelling out collisions, but in the vicinity of much larger masses, a shielding effect caused by net directional push forces, which are said to constitute Gravity.

Now, clearly, just treating each set of these different components separately is a pluralist method. And, to an extent such may well be a reasonable ploy in Space. But, as soon as they are mixed with matter particles of much larger sizes, and even with driven flows of these, the situations will certainly differ markedly.

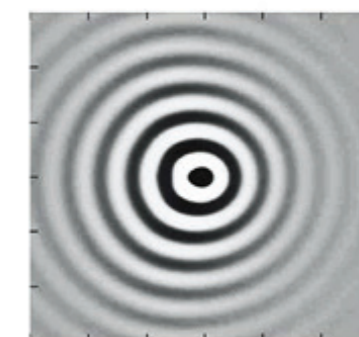
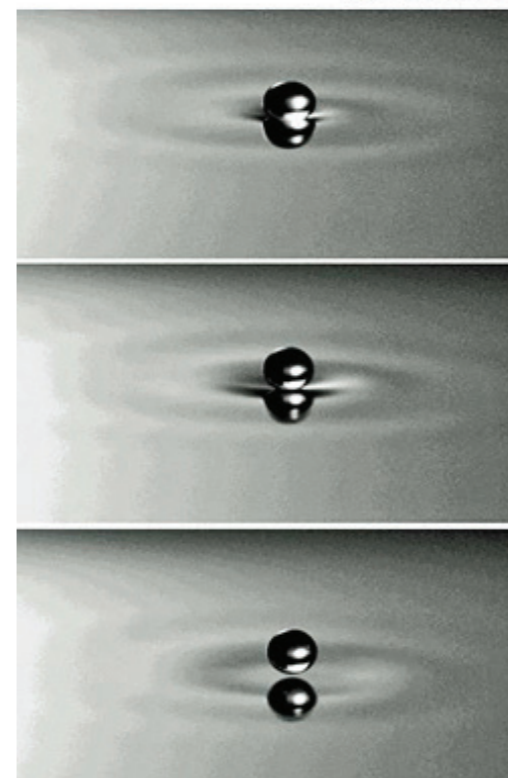
The problem to determine is "How?"

The only thing I can think of is to follow Yves Couder's lead, and construct at the macro level, experiments that enable us to investigate what might be happening at the micro level.

Of course, such a construction will not be easy. Couder, in his experiments, reduced his contents to a single substance - silicone oil, consisting of a falling drop and a vibrating tray of the very same oil. His active forces are mere oscillations, and with such a minimalist set up, you would think that what he actually managed to achieve would be impossible. But, the opposite was the case! He effectively removed any accidental causative inclusions, and his adjustments then boiled down to merely adjusting a few parameters of the various vibrations involved.

It was a remarkable effort, and amounted to a significant breakthrough in experimental methods. To succeed with our objective, will be even harder, for, somehow, we have to include three different components at different levels. But, as with all macro analogues of micro entities, it is unlikely that a single contrived set up will suffice. We are likely to have to take partial models, and then make the integration theoretically.

In the Couder-Fort model for deBroglie waves, particles "bounce" above or below a 2-D surface, due to an external energy of vibration which has been applied to the entire system



"deBroglie waves" created by bouncing oil drops



July 6, 1995 in crops

Substrate as Sump and Source

With no action-at-a-distance considered possible in a totally empty conception of space, this author proposes that all effects across such distances must be communicated by some form of substrate.

Even an electron orbit within a Hydrogen atom cannot be directly explained by a totally disembodied “force of attraction” between opposite charges – a positive one in the nucleus, and a negative one in the electron. Instead, the orbit of the electron must involve a constantly applied deviation of the already built-in movement of that entity to make it become an orbit.

So, if there can be NO disembodied forces acting across empty space, the question must be, “How could the original movement of the electron (before capture and at that time presumably in a straight line) be diverted in this way?” Clearly, it couldn’t possibly happen without the simultaneous presence of the positive charge in the nucleus and its own negative charge.

So, the first thing must be, as the free electron approaches the nucleus, their aligned fields in a real substrate and composed of magnetic substrate entities, which we will call *magnetons*, must interact. They must have been originally affected by the positive nucleus in one place, and the moving negative electron in another, to build real material fields of concentric shells to finally form unified fields.

It is then this distortion of the substrate, which, thereafter, determines the path of the electron. The latter will suffer constant deviation to its course, which, only in ideal conditions, results in an orbit.

What is special about this sub-world is that it is stable!

It doesn’t constantly leak energy, due to the work being done on the electron to divert it.

[Remember, in the Double Slit Experiments, the new explanation was due to a kind of interference-like alignment of the substrate beyond the Slits, which diverted, or not, the electron depending upon its path (indeed caused by the very electron which had made that pattern to be established in the substrate)]

Now, there is no such thing as perpetual motion, and particularly in such a thing as an orbit. Remember, if the changes are never reduced, and remain constant throughout. So the situation will require energy, from somewhere else, to allow such a stable entity to continue to exist! And as that certainly does not come from the charges, which remain exactly the same throughout, it can only come from a literally infinite substrate, which in one sense is the catch-all energy retrieval system involved.

The substrate, therefore, takes on another role apart from its various interactions with material objects and charges.

It must, as this theorist has maintained from the beginning of these investigations, be capable of holding and propagating energy. This demanded an atom-like structure involving two mutually-orbiting sub-particles, which could absorb energy by the promotion, and release it by the demotion, of such internal

orbits. The rest-mode of such substrate particles was originally taken as being empty of such extra energy loads, and was termed as an “Empty Photon”. So, of course, when “carrying”, it would be equivalent to – a Photon.

But, there is so much energy criss-crossing the Universe all the time, that such Empty Photons were probably a necessary simplification, and a more likely scenario, especially in equally affected localities, might well be for the elements of the substrate to contain a small amount above their base orbital state.

This would be inevitable in localities, where all elements were holding the very same gobbets of energy, for then there would be nowhere for the energy to be decanted to.

Clearly, such a substrate would not only be a catch-all for lost energy, but, in addition, could make it available locally when required, and which thereafter could be replenished from further afield in this universally connected substrate.

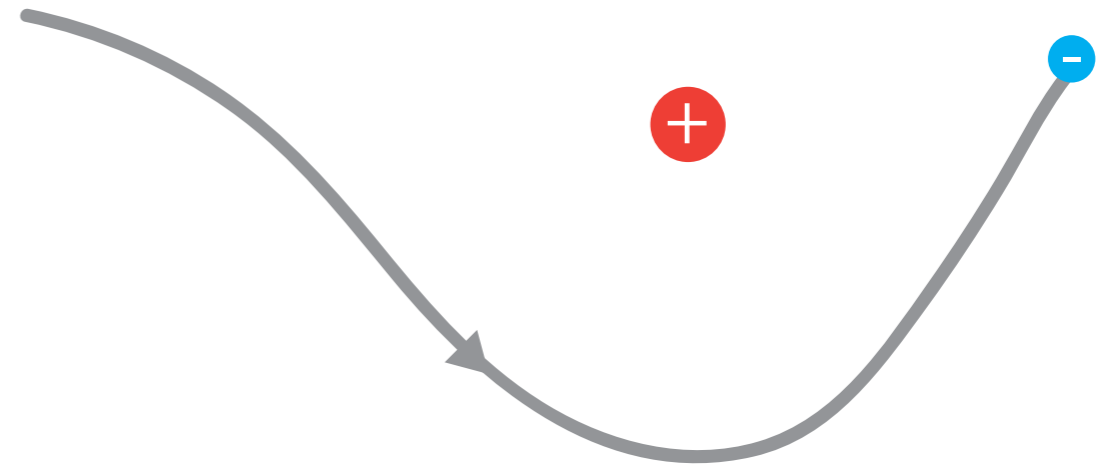
The substrate could then be both Sump and Source – attending at the phenomena within it, and catching losses, as well as providing energy when necessary.

FIELDS BY MAGNETONS - 1

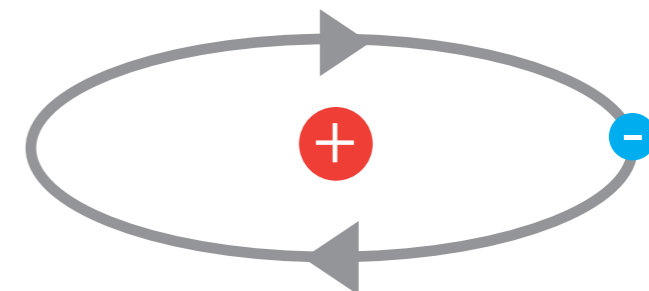
Of course not all electrons encountering protons are captured to produce Hydrogen atoms. So, the most general case must be the one in which the encounter results in no continuing relationship. The two charged entities carry on after their encounter.



In such cases the aligned magneton will link, connecting the two, and thus deviating the relative paths, but, they will then break apart until there are no connections remaining



What happens when the electron is captured?

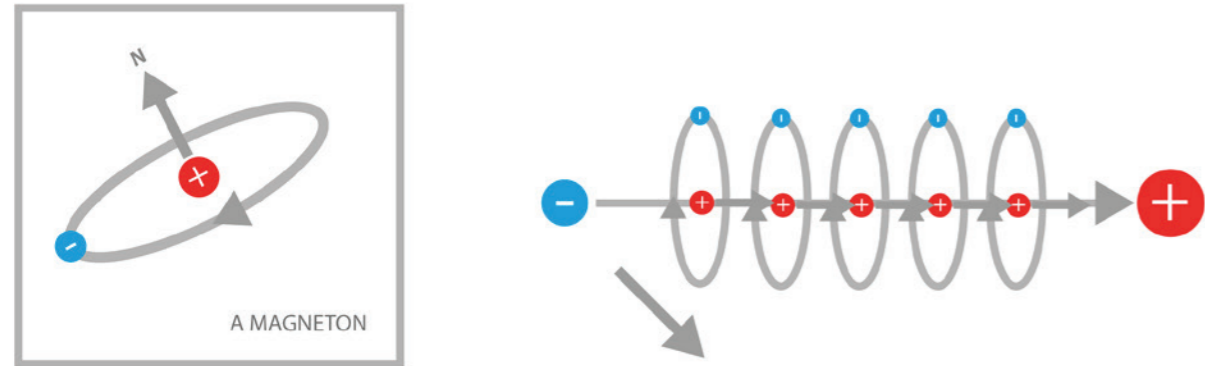


FIELDS BY MAGNETONS - 2

Aligned magnetons produce fields around positively and negatively charged particles.



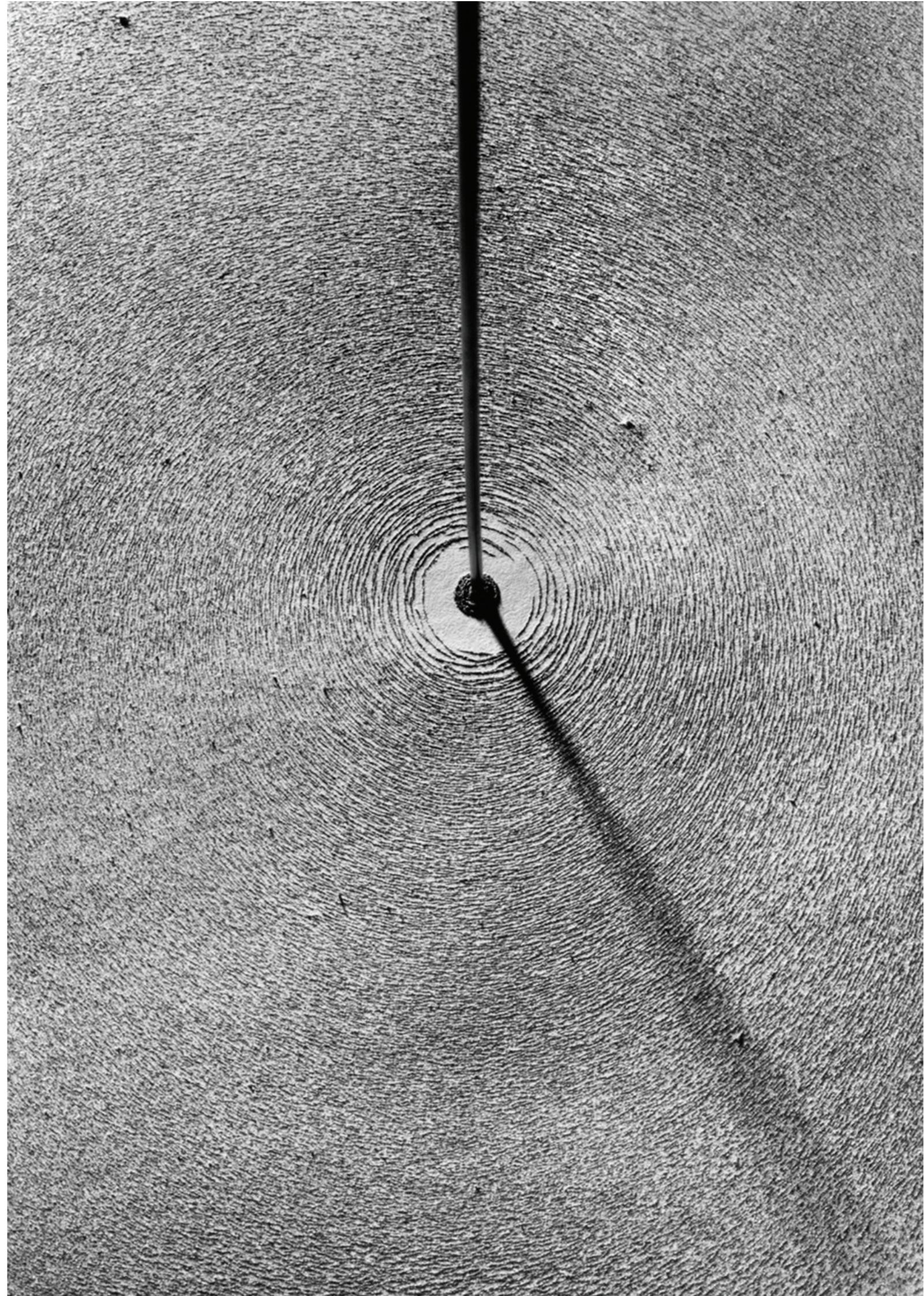
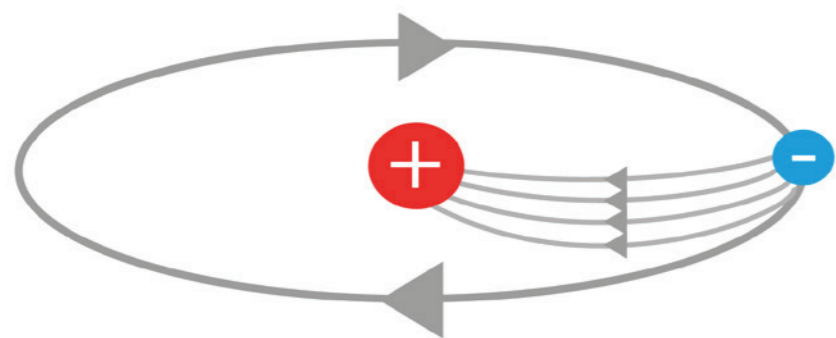
Strands of Magnetons link up connecting both particles.



The strand distorts the direction of the electron. On closer approach new strands form increasing deviation.



Strands form from the fields of the two charged particles.





Physical Oscillations, Spins & Rotations

How they inter-relate via Resonances and Recursions

In addressing Couder's Walker experiments theoretically, we have the crucial problem of his added, overall rotation, which turned out to be essential in producing the quantized orbits of his Walkers, for it is also crucial, when WE then attempt to carry over the analogy into the atom. For, there does not appear to be any overall rotation in the atom, as a whole, that can be clearly and appropriately mapped from Couder's Walker.

Now, as distinct from oscillations, rotations also deliver Angular Momentum, and presumably that could also be delivered by a classical spin of an extended entity too.

It seems important to quite basically consider the relationships between oscillations, rotations and spins to have any chance of understanding just how these basic forms of movement can produce even more involved systems, not only as demonstrated by Couder's Walkers, but also possibly within the atom.

The purely formal relationships are well known, but may well be a red herring, as they are only formal, whereas what we are interested in here are most definitely physical. They will only be explicable in physical terms concerning the properties of the substances involved, as well as their frequencies, and physical relationships such as resonance and recursion, will undoubtedly be crucial.

The usual kind of (carefully devised and organised) experiment is to add two same-frequency and same-amplitude oscillations together, BUT orientated at right angles to one another. This always produces a circular result in their common plane. It certainly isn't an orbit, but merely a formal description of what two such oscillations can produce. NO causes for the oscillations are included, or reasons why they should be so well matched, or even why they are so orientated. Clearly, any absolutely essential physical narrative and explanation would be vital in really investigating real world instances involving such things.

As posed mathematically, it has NO active physical elements at its centre in the resulting circular motion. But, that can be because, as usual, we are abstracting from concrete Reality, only what we can deal with easily, and, thereafter, using purely formal means to "explain" the real situation.

But, formalised, disembodied circles don't occur in concrete Reality: everything that does occur has concrete reasons for doing so, NEVER just abstract definitions. Physically, there are always causes, and these are embodied in the properties of real, physical substances. You cannot have disembodied pure formalisms. Those are what we extract to enable our strength in reasoning – namely Formal Logic, to be applied in various ways.

Now, in these circumstances, you can see how vitally important the concept of a substrate must be! For, instead of disembodied forces, somehow, reaching across Empty Space, we have direct effects upon a physical, universal substrate by other

physical entities. The purely formal equations that we cherish are simplifications and idealisations of real, concrete Reality, but stripped down drastically in order to only consider ideal Forms (as obtained from Mathematics). Clearly, in choosing this methodology, we purposely isolate and simplify Domains within Reality at large, and their included relations, to use what we find there to our advantage. But clearly, we DO NOT have to understand why these things occurred there.

Yet, the most important part of such investigations IS NOT the idealised Forms, but the real physical causes which actually make such things happen. Limiting ourselves to exploration of Form alone, effectively abandons the possibility of explanation! The Purity of Ideal Forms seduces researchers into thinking that they have alighted upon the primary drivers of Reality. They haven't. They have only managed to describe the perfect forms, which, in carefully arranged and maintained circumstances, do tally with Reality.

But, that is just Mathematics, essentially, and Technology pragmatically. Science, on the other hand, is supposed to reveal "Why?" things happen the way that they do.

What are required are investigations of physical instances of all those formally described and clearly related movements, and attempt to explain them causally. Without such an objective we are limiting ourselves to doing Mathematics alone. And, useful though that can be, it cannot actually explain anything: it merely describes its Form.

Couder's Walker experiments, using only a substrate, various oscillations and a rotation did something very different from the usual type of experiment. His results were not such that he could then "do-the-math" as scientists usually do. Instead, he had manipulated real physical causes until the oscillations-involved produced a stable entity composed entirely of his substrate – his "Walker". And, then, by adding just a forced rotation to the whole set up, he produced quantized orbits of his Walkers.

We miss such real Science, by an over-emphasis upon Form.

Clearly, to answer the really important questions in Science, we have to "do a Couder", and insist that we leave our blackboards alone, while we conceive of, construct, and then investigate set ups like Couder's to physically get to the bottom of what is involved and why!

Now, what exactly are oscillations, rotations, spins and orbits physically? Certainly appropriate formal equations cannot answer this question. What are involved, in all of them, are physical causes – producing these movements as particular effects. For example, if you kick a free-lying stone, it won't oscillate in the way we are considering here: it will just be moved to another position.

But, strike a tuning fork, and an oscillation is precisely what happens. The energy put into the fork first moves its prongs one way, but internal forces, within the substance of those prongs, then bring them back, and, indeed, overshoot. The energy put into such a fork causes it to oscillate, when opposed by “returning internal forces” And very similar explanations can be connected to all oscillations.

Just describing such movement says nothing about why it acts as it does. Indeed, as a scientist, myself, I am well aware of how we tailor equations to fit collected data. WE seek appropriate ideal Forms from Mathematics, and piece them together, with adjusted constants until they fit!

But, physically, all things that oscillate must be part of a substance, in which the basic units are locked into a stable arrangement – stable, because any distortion of the arrangement is countered by the very things that made it stable. So, the input of energy is then transformed into allowed movements about that stable configuration.

So, oscillations infer such a substructure: without it, the entity hit will not oscillate. It will merely move, as a whole, with the applied energy – turned into Kinetic Energy, the energy of translational movement.

Now, of course, these are idealised explanations, and particularly in the latter case, infer the involvement of a discrete entity. When we consider elementary particles we assume that they are such too.

If we allow ourselves to explain things physically, we arrive, as always, at the dichotomy of the discrete and the continuous, and in spite of the Greek, Zeno, then Hegel and finally Marx, we still slip into the belief that these concepts are merely aspects or views of something beneath them both: the difference is merely organisational. [Indeed, when attempting to oppose the Copenhagen distortion of theories at the sub atomic level, David Bohm, looked for hidden levels below that being observed to explain what was going on]. But, neither approach really delivers what is happening.

Our simplifications and idealisations, `put onto these forms of movement, are, indeed, helpful, but as long as we only treat them formally, we will miss out on the true physical inter-relationships involved. In effect, “the tail wags the dog” – we let the formal description turn into a Natural Law, and “explain” what is going on solely on the basis of a tailored, ideal description. The formula developed becomes the driving force of the phenomenon, and that is simply NOT true!

Now, I am well aware that this will be challenged, so I will have to prove it by asking a question.

Can you explain why Couder’s experiments involving only a single substance (his substrate), by means of various oscillations delivered stable entities, which he calls his “Walkers”. It certainly isn’t trivial! Neither can it be achieved purely formally. It is, in fact, momentous, for by simply adding an overall rotation to his set up, he produced quantized orbits of his Walkers.

You have to explain why this was the case!

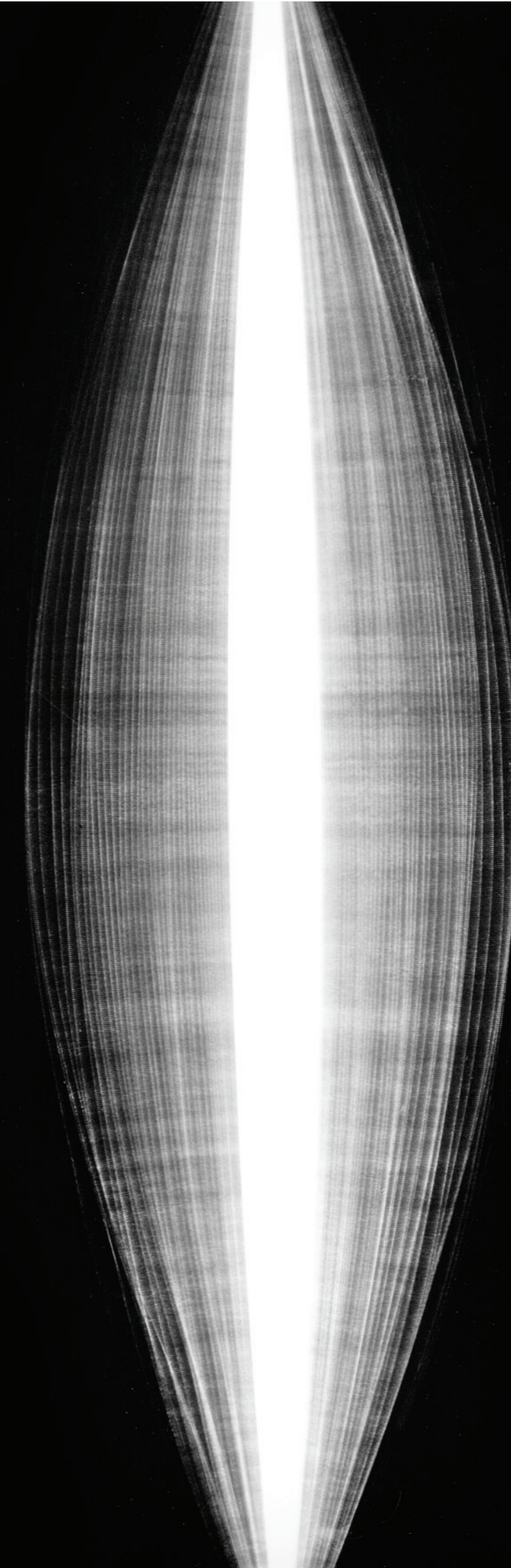
Now, immediately, the answers to these questions become vital. For almost a century, physicists have “explained” quantization in terms of unusual types of equations, which for the first time are interpreted probabilistically. In other words, they cannot deliver predictions, except of whole collections of cases.

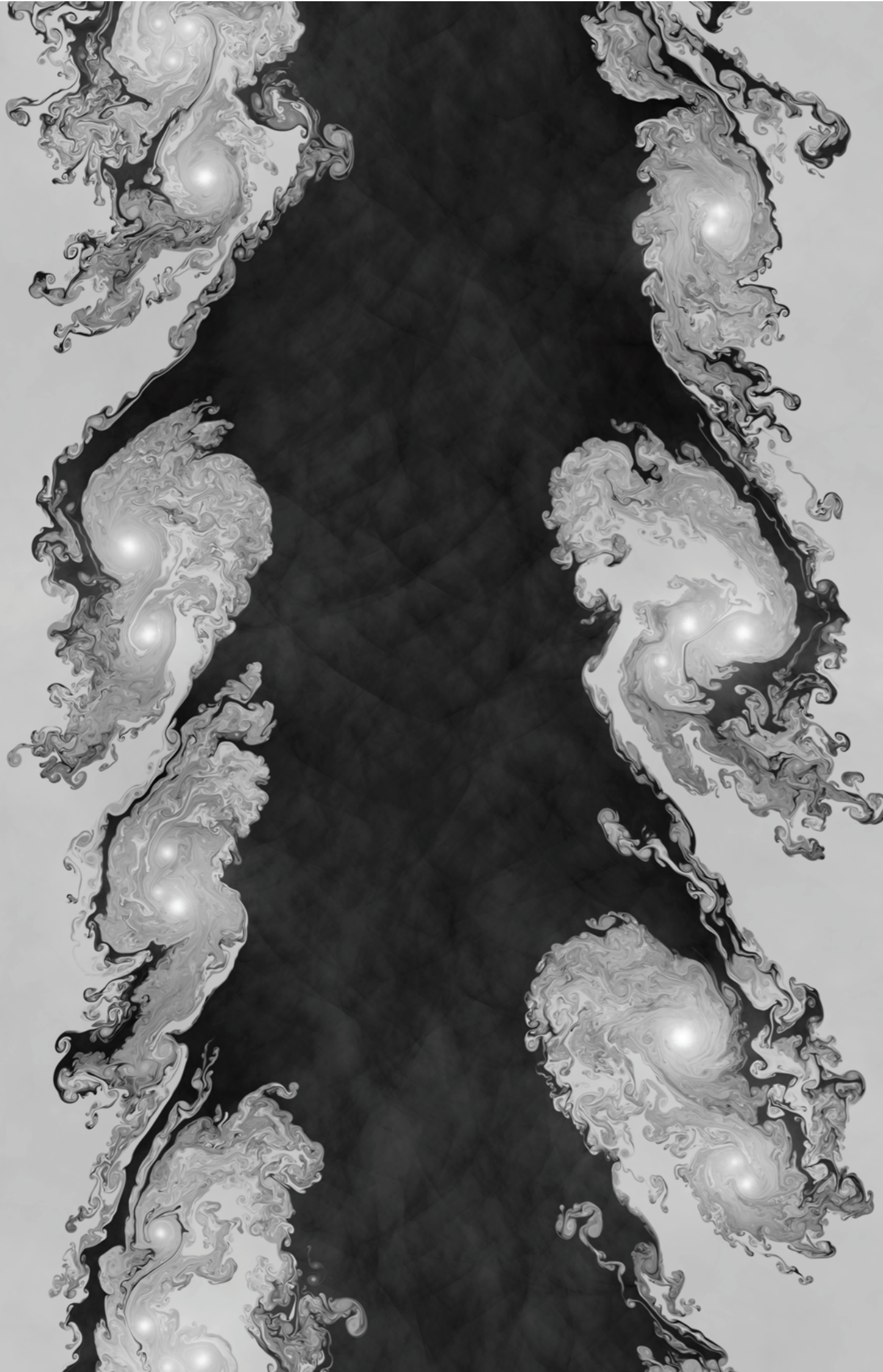
And, as well as Natural Laws, we have been saddled with Natural Constants – like h – Planck’s Constant. And, the purely pragmatic uses of all this are certainly not real Science. They are just Technology (at its worst!).

Clearly, there are real physical relationships involved, which we routinely ignore, and concentrate solely upon Forms, and their pragmatic uses. Indeed, our main assumption is that the ground for all our investigations is a totally empty Space, and the consequence of such a stance, precipitate Action-at-a-Distance, and all sorts of desperate speculations.

This researcher has decided upon a basis, which is more likely to approach how the real world actually is. For, he has taken a holist position (as distinct from the usual pluralist one), and he assumed a Universal Substrate, which responds to events happening within it, and responds, acting back onto those phenomena recursively.

NOTE: To see what this means, just consider the atom. If his assumptions are correct, not only will the atom be surrounded by a reactive substrate, but will unavoidably also include that same substrate *within itself*. Now, consider the electron orbits within an atom, affecting, and in turn, being affected by such a substrate.





Turbulence in Space

The Effect upon Cosmic Events of a Universal Substrate

If we are to seriously consider a Universe-wide substrate of space consisting of undetectable, but real, particles in the form of a three-dimensional Paving, we cannot presume that it will be uniform or basically the same in all locations. And, this is because there will be, quite evidently, certain local differences due to what else is present in particular positions. And, with the universal connectivity of this suggested substrate, whatever differences there are will be universally communicated without any major hindrances.

These differences, plus the ability to propagate, will unavoidably cause different situations and their widespread propagation via flows of various kinds.

Now Mankind already has an abundance of reasonable Models, to use as a starting point for further investigations as to what will happens in various circumstances' and at different times – especially if you commit to such a concept as the Big Bang, as the commencement point of our current Universe.

The possible models are suggested by what happens in the seas and atmosphere of our planet, the Earth. And, if we feel that we need to go further we could certainly consider what happens in the cauldron that is the prodigious atmosphere of the planet Jupiter.

And, even this set definitely delivers some amazing phenomena, just due to energy, either from the Sun, or internally generated from either the remnant heat-of-creation, or current radioactive processes.

So, as we usually do, we can, as an approximation, consider some versions of those phenomena also occurring in the Universal Substrate, especially, of course, in regions where the intrusion of other sometimes mighty bodies, which will definitely affect things in their vicinity.

We already know that “storms” on our local Sun, can create vast outpourings of particles with prodigious energy, which can actually reach, and affect, our Earth.

So, with an intervening substrate, we will immediately get very different local zones across the supposed Cosmic Paving. For example, they could be those closely adjacent to a body like the Sun, those in the regions between the two, and even in those in the “shadowed” areas behind planets.

And, we can presume streams of concentrated flows too, and their effects upon the substrate with consequent following effects on other things caused by the substrate.

Immediately, again taking evidence from the models mentioned earlier, we would expect something akin to vortices to occur.

Could Maxwell have thought this when he constructed his brilliant model of the Ether?

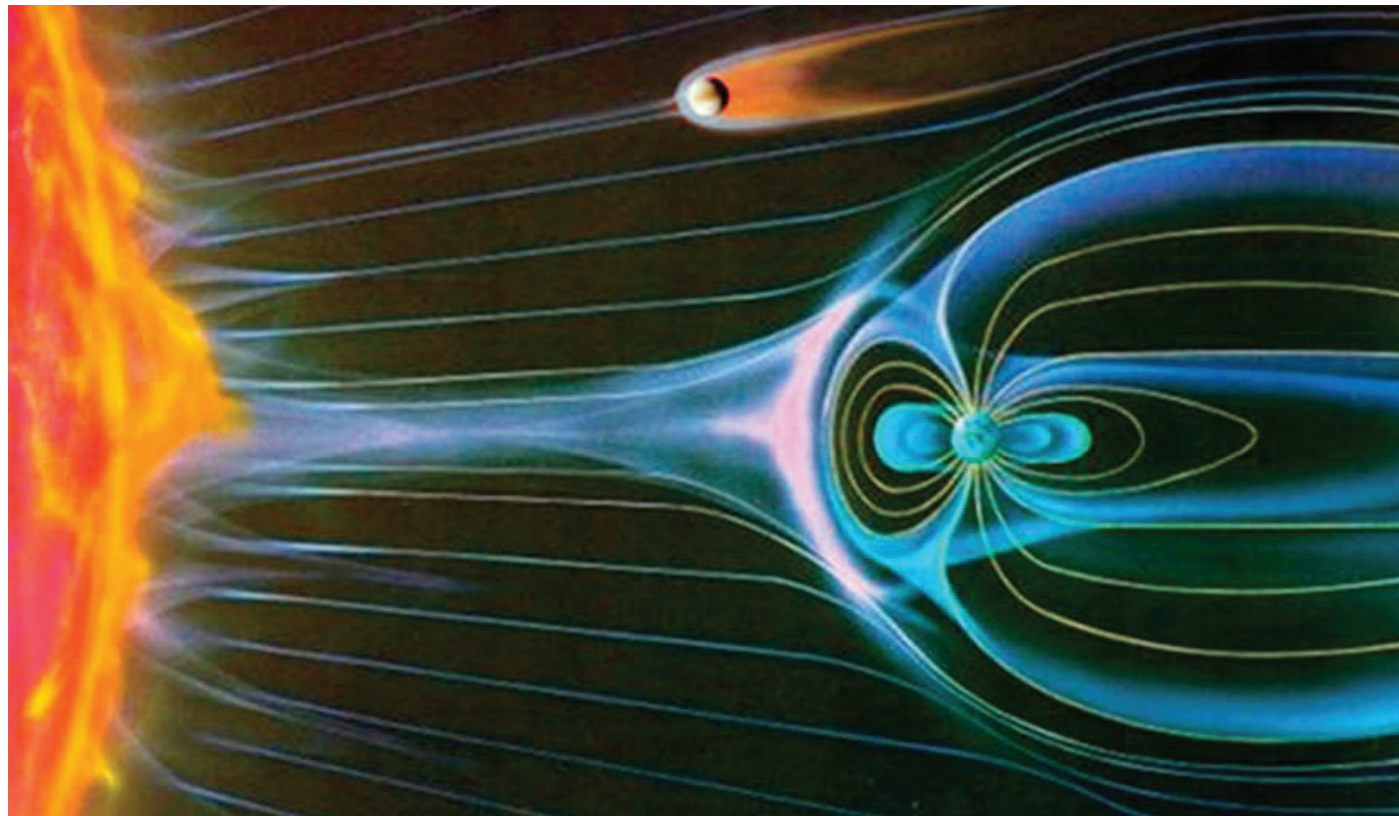
But, and it is a very big but, most of the known phenomena in these media, occur in finite, limited circumstances, whereas the Universal Substrate will be absolutely infinite in extent (or effectively so).

And, this will have many consequences. For example, any disturbance, or local anomalies, will take time to be communicated across the Cosmos. And, with such an enormous potential area, this will inevitably mean that by the time one situation has had its effect on some distant position, the original point will be likely to have changed considerably. And, of course, it means that effects from many different causes will be arriving in various areas at different times and in different sequences, so this too will result in differing conditions all over the place.

Also, all propagated effects will, in their travels, also be undoubtedly affected by the different regions through which they will pass.

So, the important mechanisms for feedback, entirely in terms of frequencies of oscillation via media, that Yves Couder set up in his brilliant “Walker” Experiments, and those naturally evident in lakes and seas on Earth, as well as in Jupiter’s atmosphere, would seem to allow recursive effects to also occur.

Let me emphasize this strongly - Couder’s discoveries in his specially designed experiments can demand a complete re-definition of the cornerstones of Modern Physics, and that also means cosmology too! Indeed, within the inner spaces of atoms, and all other micro-level entities, such analogues seem highly appropriate, but NOT in the expanses of so-called Empty Space. They would there tend to be both local and temporary transient features.



Yet, I may be wrong: one of the most beautiful animations I have seen makes the magnetic field of the Earth visible, and with different colours, also shows the solar wind, both affecting, and being affected, to either swoop in at the poles, or be diverted completely around the edge of the whole field.

As soon as these possibilities are considered, Maxwell's model of the Ether, with both stationary vortices and moving flows of "electrical particles", seems to be a very wise idea to pursue. And, of course, it did indeed produce his famous Electromagnetic Equations.

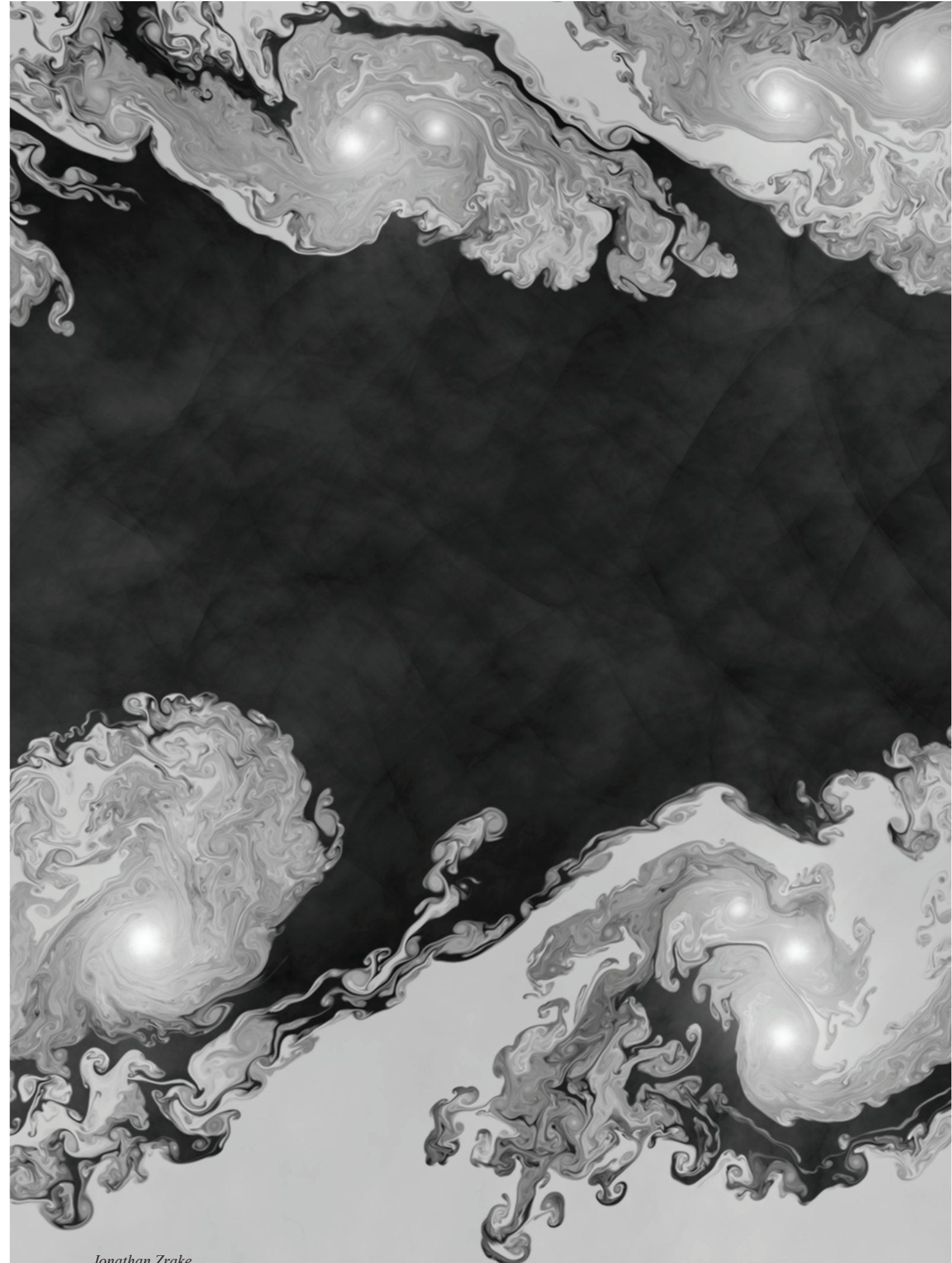
Yet, though we consider local stable areas, where something similar could appear in the Universal substrate, these phenomena could never be permanent, unless, as in Couder's brilliant series of experiments, a constant, maintaining source of energy were involved. For, there, Couder managed to produce resonant effects, coupled with recursion, which actually resulted in stable and persisting entities – his so-called "Walkers". But, for all this, we still cannot ignore what effect might have been produced, within the important processes of aggregation. Do you doubt that something like streams and vortices could occur? The simple "Gravity-does-it" model is almost certain to be an over simplification, and Einstein's purely mathematical description does nothing to really address the causes involved.

NOTE: But, considering Couder's constant source of vibration in his substrate, and hence delivering the essential required energy, it was strictly local, and out in the vastness of Space, thing would be very different. For example, any continuing source of energy – like a star, would not produce an even homogeneous effect, as was produced in Couder's set ups, but, in contrast, a declining effect-with-distance, as ever greater volumes would share the delivered energy.

Thus when carrying over Couder's findings, we must take this into account. [Indeed that might make such features more likely as every point would be different from every other, and collisions could be significant]. On the other hand, in local, limited, finite situations, as in the atom, something much closer might be possible, and a version of Couder's finding deliver a relatively close match.

In fact, Jim Schofield's theory of the Double Slit Experiments could also be considered as relevant here too. For, in that theory, the movement of charged particles caused propagated disturbances in a supposed substrate, which arrived at the Slits, long before their cause, and then "interfered" on the other side, to in turn, affect the causing particles when they finally passed through.

We can consider that some parts, of a centre of aggregating-matter, may also have similar effects upon the underlying substrate, which could then recursively have its own effects in turn. All that would be necessary would be for the disturbances caused to then meet their own cause again and re-interact. Temporary orbits, or even near-orbits around a centre of aggregation, may well provide such circumstances.



*Jonathan Zrake
Mara running Kelvin-Helmholtz simulation*



Positive Turbulence

Here we have the classic “V” formation that geese adopt in flying long distances. The question must be, “Why?”

It is said that the leading bird has a significantly harder job, but the rest have it much easier entirely due to this formation.

And, similar things happen in cycle races, when, once more, the temporary leader works the hardest, and that position must be regularly shared around a relatively small leading group. Even in motor racing, a following car can get a kind of tow from the car in front of it, as long as the gap is small enough.

Now, though there may well be other reasons, it is clear that there is one thing common to all of these examples, and many others. But, what is it that the leader does to the air, which benefits a close follower?

If it is like any other thing ploughing through a medium, it will certainly cause the formation of vortices and other consequent disturbances of that air. The question then is, “How do these vortices assist following entities in these race-like arrangements?”

And, even more amazingly, could all of this apply even at the sub atomic level if there were a Universal Substrate?

For, within the atom (taking Hydrogen as the simplest example), we have problems to solve if that substrate exists not only outside the atom, but also within the relatively vast spaces that are evident there too.

We, therefore, have to consider disturbances in that internal substrate, caused significantly by the orbiting electron (in its larger orbit), and much less so, by the by the central proton (in its much tinier orbit).

The presence of such a substrate immediately posits the question, “Why does that orbiting electron NOT continually lose energy to that substrate, and, thereafter, because of the continuity of that substrate, with the rest of that universal substrate outside the atom, is not that lost energy carried to be a complete loss to the atom? And hence, why do such internal orbits not constantly decline – losing energy continually to the substrate at large?”

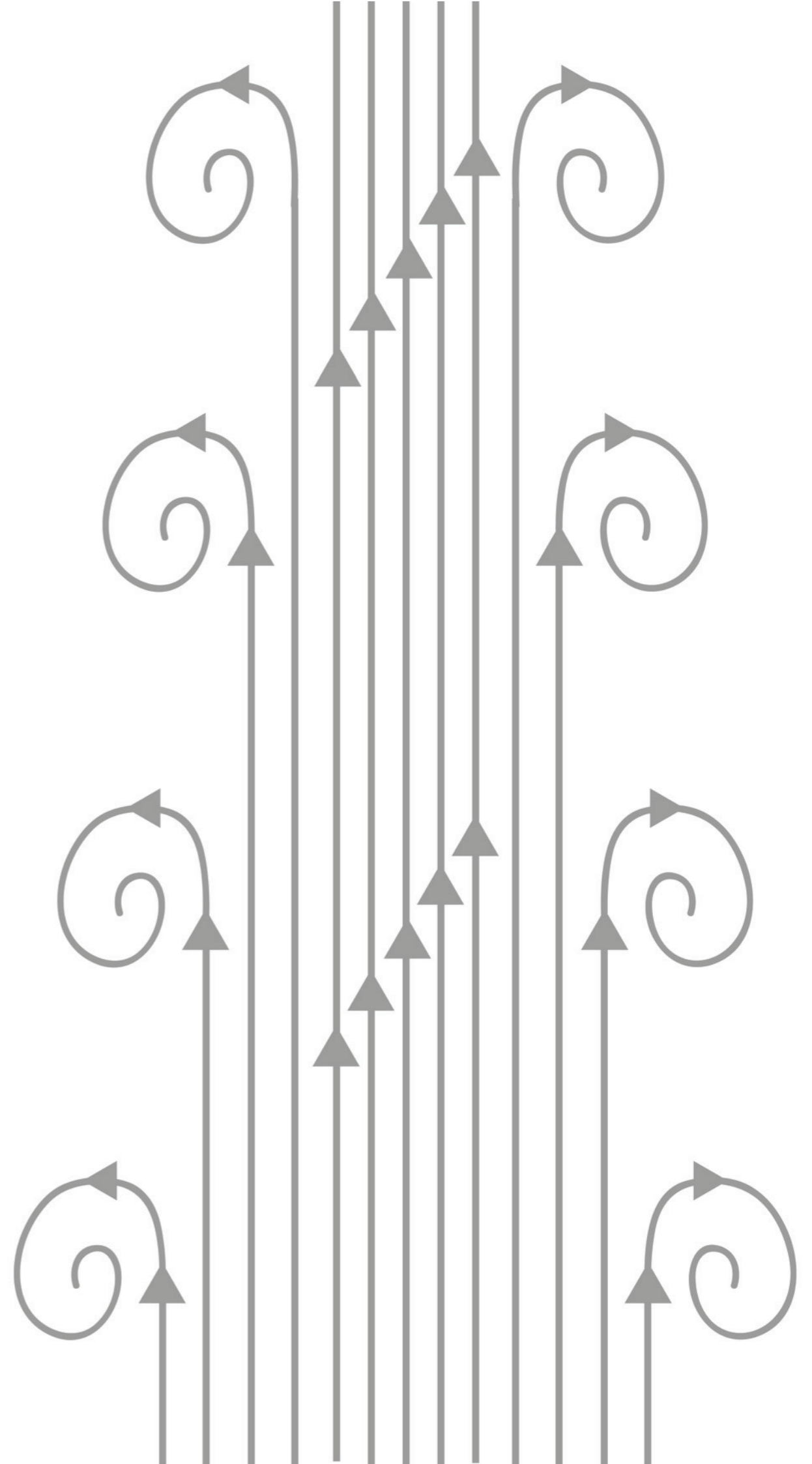
You can see why the initial points made in this paper might well be relevant.

Also, it turns out that James Clerk Maxwell, in deriving his brilliant Electromagnetic Equations, assumed that the (universally believed to exist) Ether, involved vortices as well as what he called “electrical particles”.

Now, if we insist upon considering the same happenings within the atom, in the same way as occurs with linear passages through such a medium in the open, we will find NO easy answers.

But, of course, what we have inside the atom must be different. The electron appears to be orbiting the nucleus at a very high speed, while continually re-traversing the very same path. Indeed, this certainly means that it will be constantly re-encountering the disturbances it created on prior orbits and will unavoidably interact with them. Hence we could clearly have recursive effects back onto the electron.

NOTE: This theorist was able to show such recursion in his alternative Theory of the Double Slit Experiments, in direct contradiction to the Copenhagen version of what was happening there. This researcher had to seek some form of feedback, to the causing electron, from its own earlier-created disturbances. And it was this effect after passing through BOTH of the Slits, that set up a pattern in the substrate, to then affect the later arriving electron, and deliver the effects observed upon a receiving screen.



So, the task was clear, there had to be some form of recursion happening to the electron in orbit from its own prior effects. It was also clear that that the smaller enclosed orbit of the central proton, would also encounter similar phenomena, but for now, we will concentrate upon the main electron orbit.

Clearly, because the quantized energy levels of the electron orbits, in the atoms of different elements, the differing nuclei must play a role in determining the quantized energy levels involved.

Can the disturbances caused by an orbiting electron, somehow be limited to staying within the atom, and hence be involved in recursion, which maintains the orbit with NO leakage whatsoever?

But, how would this work?

We have to assume that even inside the atom, the usual vortices will be formed by the passage of the orbiting electron, so let us consider these entities a little further.

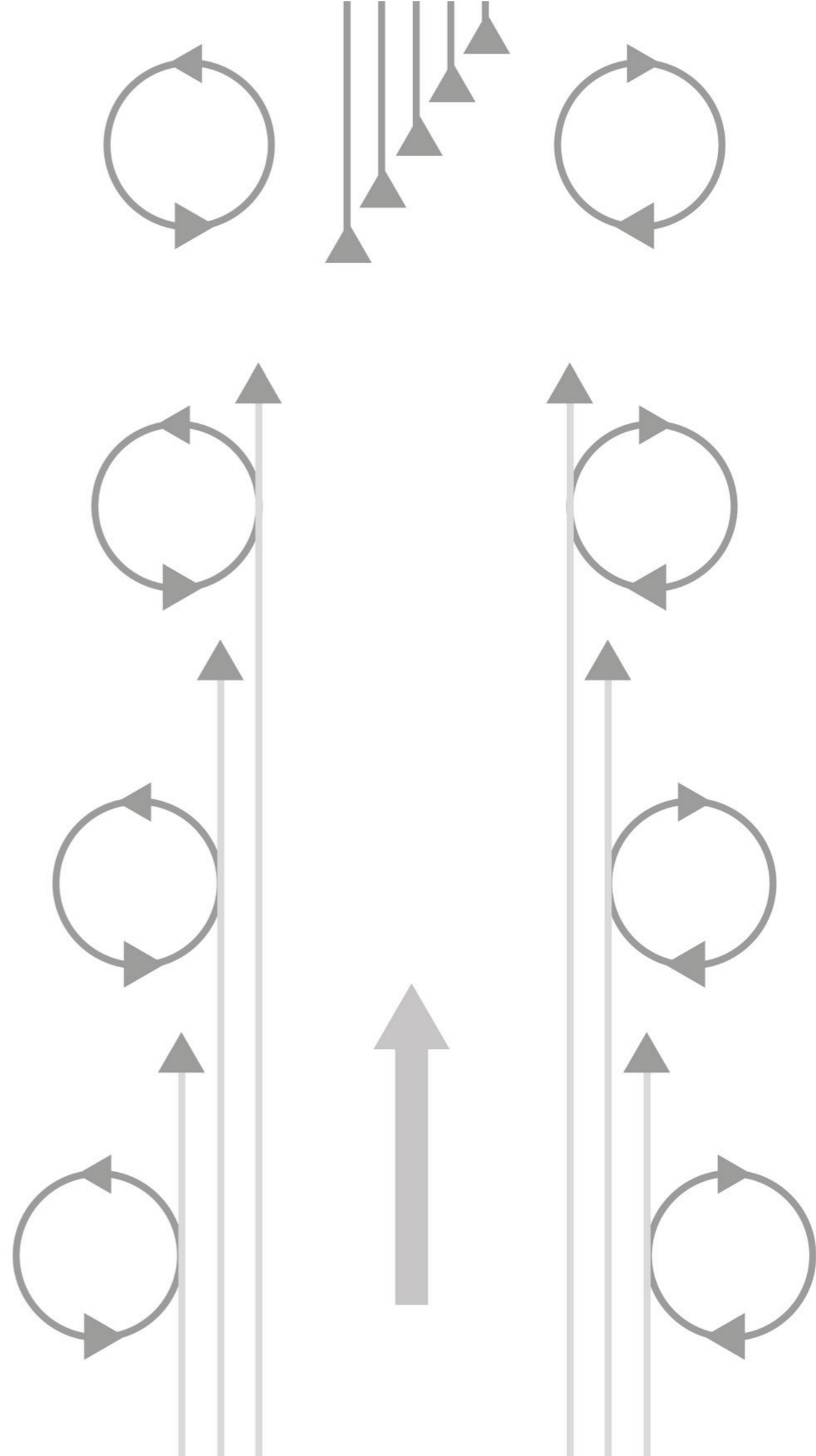
A Flow with Vortices

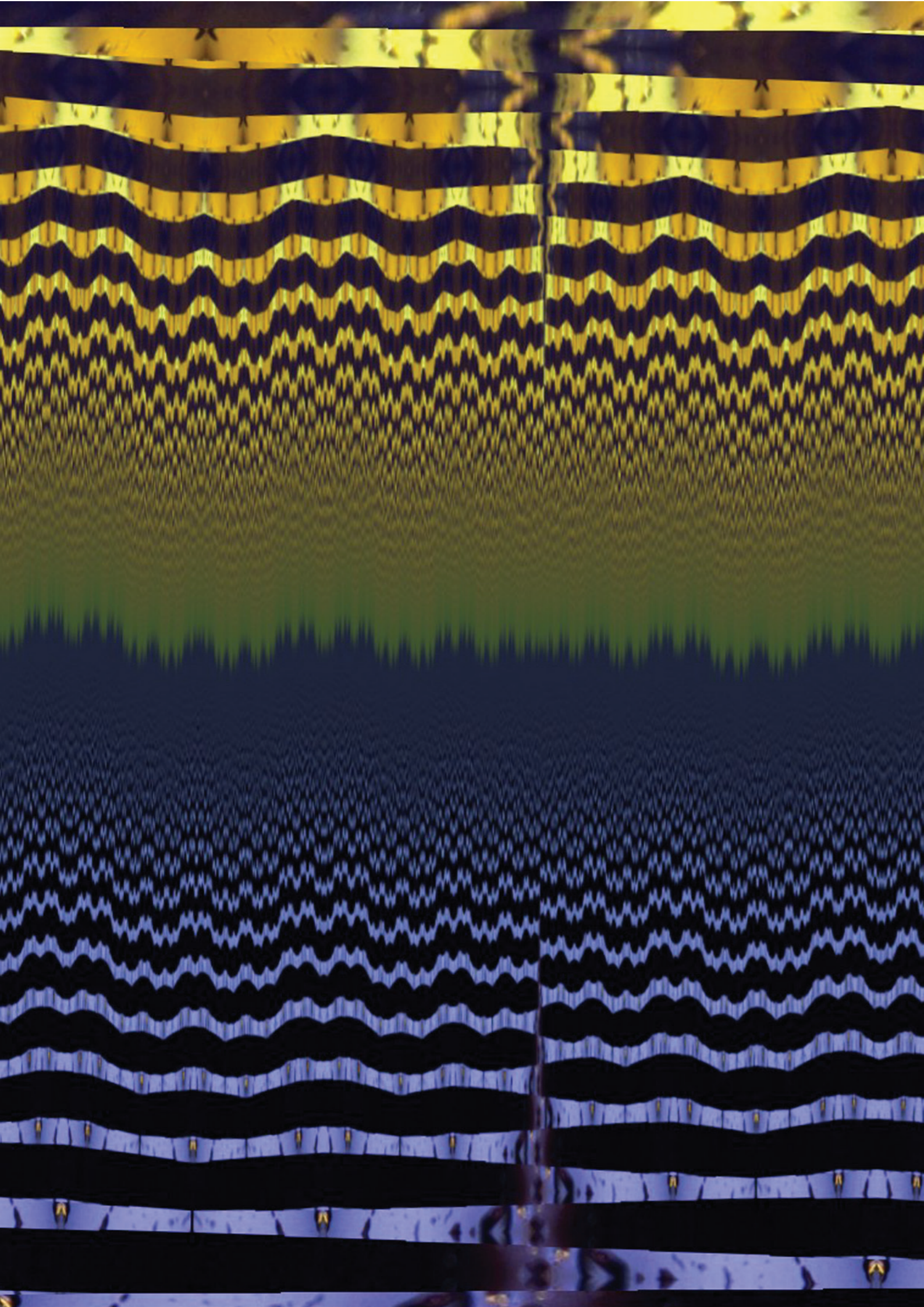
To the right is a large diagram of the effect of a stream passing through a still stretch of water.

Adjacent to the stream a series of vortices are generated, taking some energy from the driving stream, and because of the “shear effect” of the moving stream against the still water, it causes these spiralling vortices.

Maybe, if instead of a continuous stream, we have a finite entity causing these effects, then, following its passage, the still-remaining vortices will effectively *re-create* something like the original stream in the medium, which can pull following things forwards too.

We therefore have the germ of an explanation for what can happen differently within an atom. This must obviously be pursued.





What is Recursion?

From early in my education, I was puzzled by the idea of recursion. For, it seemed to mean, when something caused a change in something else that could then, in turn, affect the original cause.

I wasn't at all happy. For, it didn't fit into the usual cause-effect paradigm, for you would think of such a happening as then being complete – finished. But, if this recursion could happen once, why could it not happen again? Could the now changed source again re-affect its previous target, but this time in a different way: indeed, how many iterations of this kind could actually happen, and where would they ultimately lead?

It was, of course, ordinary, everyday thinking, based upon human actions in that ordinary world. But, let's face it, given enough time, there would be nothing to stop recursion happening almost anywhere, AND more than once!

NOTE: Of course, looking at such possibilities, we have to consider Stability. If our initial effect changed a stable situation into a less stable one, multiple recursions could escalate into an avalanche of changes, taking things a very long way from their starting point. But, alternatively the changes made could make very little difference overall or even make the situation even more stable, so that a continuing sequence of such recursive affects would be conducive to a strengthening Stability. The, surprising, yet most interesting case, would be when such multiple recursions pull a situation from a non-stable situation into a strongly stable one. Though seemingly unlikely, this is precisely what Yves Couder has achieved in his brilliant "Walker" experiments.

There is, though a significant problem.

Are all caused effects necessarily limited events? Are they mere incidents, or are they continuing?

For, if such things carry on, and involve more recursions, we will have a process that is unavoidably changing-with-time. For, such an extension involves a cycle of effects, which must affect all the things involved – the original cause as well as the initially affected entity, Both of these could change with each iteration.

Immediately, we have to take our supposed recursion and go-round-the-loop-again, and ask the crucial question, "Could not the changed cause again affect the previously affected recipient?"

NOTE: Now, of course, there is a trivial case, when there are lots of causing entities and effectible targets. Then, one continuation would be for multiple effects caused to different things. Nevertheless, even this limited version could generate a situation where all the resources available for change would be used up, so the process would finally terminate.

Or, alternatively, the preponderance of changed targets could dominate and trigger off a different consequent set of processes.

The question, of infinite regress, is not too far-fetched, as when a single tumbling rock can precipitate an avalanche, for example. But, perhaps the more interesting case is when there are different changes, with each and every iteration. Well, certainly, the most common answer will be, "No!"

For, what we then get is a kind of Stability – a self-enforcing stable state, where the cause and effect lock into a then un-effectible result.

But, when this is so, we have to ask, "Why?" What actually made the final situation self-sustaining?

Yet, if we bring resonance into our considerations, we may be getting towards that required explanation. And, that is because certain things have naturally resonant frequencies (as in the infamous, self-demolishing bridges), so these might deliver the amplification of particular frequencies, to cause a locking-in energy into a different system.

Maybe, when one oscillation causes another to increase its amplitude (and gather in extra energy), then why should not the reverse also happen? Could not the two absorb energy from elsewhere, and concentrate it into their natural frequency. Could such a pair keep each other from dying away?

Now, such "stabilities" may seem permanent, but it is unlikely that such will be the case. It is more likely that, on each iteration, though maintaining the system, certain changes happen, and in time, the locking-in may be lost. And then, seemingly out of nowhere, it would appear that a permanent stability begins to dissociate.

Sustaining Substrates

Consider two things which vibrate naturally at the same frequency. Entity One is set into oscillation, and via a substrate, containing both, communicates energy to Entity Two, which also begins, by resonance, to oscillate also.

Now, if for some reason Entity One subsides, while Entity Two does not, could not Entity Two communicate energy back to Entity One and cause it to resonate?

Now, clearly, this could only occur and persist if energy is being supplied from elsewhere.

NOTE: In his Walker Experiments, Yves Couder proved this by supplying a constantly vibrating substrate within which his experiments were performed. In an everyday situation, it would be like a Dad, giving his daughter on a swing, another push to keep her swinging. But, in a more natural situation, what could the supplier of energy be? In the famous collapsing bridge it was the wind, and we have mentioned another thing – the substrate in which our set up occurs.

Now, if such an overall system (including the substrate) were finite and local, there would be no chance of that substrate being the required persisting source of extra energy.

But, if it was effectively infinite, and could therefore be affected by all sorts of events all over the place, THEN, if this was a propagating kind of substrate, it could be constantly spreading any energetic insertions to all parts.

It could be the source of a sustaining insertion of energy for our supposed dual system.

As already mentioned Couder achieved his remarkable “Walker” experiments by providing a constantly vibrating tray of substrate as the ground for all his experiments. And, in addition to his persisting, stable “Walkers”, he also by also adding an overall persisting rotation managed to endow his walkers with quantized orbits too!

Clearly, after very careful adjustments, Couder took what would normally be a merely transient phenomenon, and turned it into a sustained stability down ultimately to his supplied oscillating ground.

Postscript: Slow, Creative Oscillations

The above muses upon recursion and cause can become very interesting indeed, if the time scale is greatly extended.

Let me try to give an example.

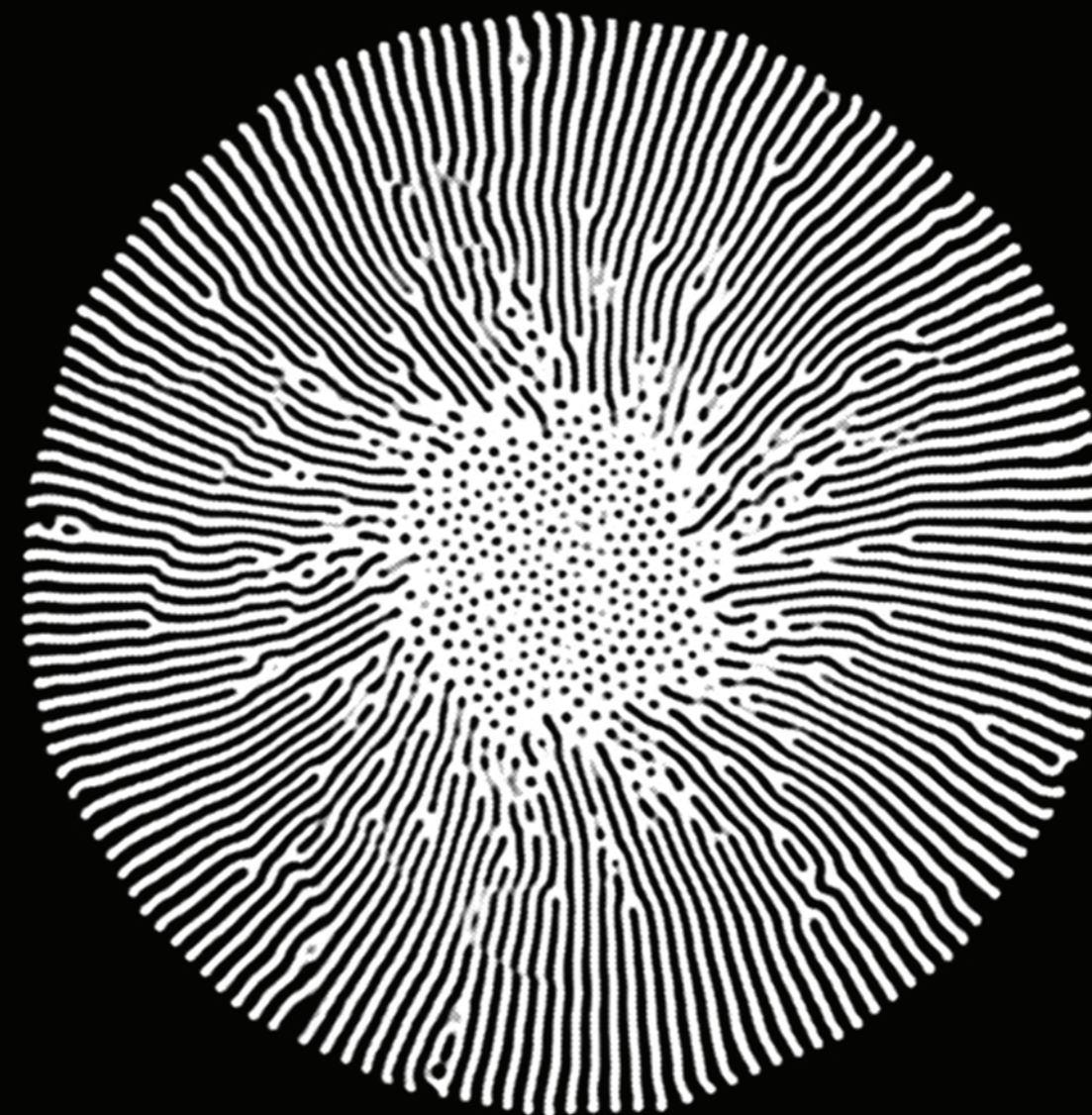
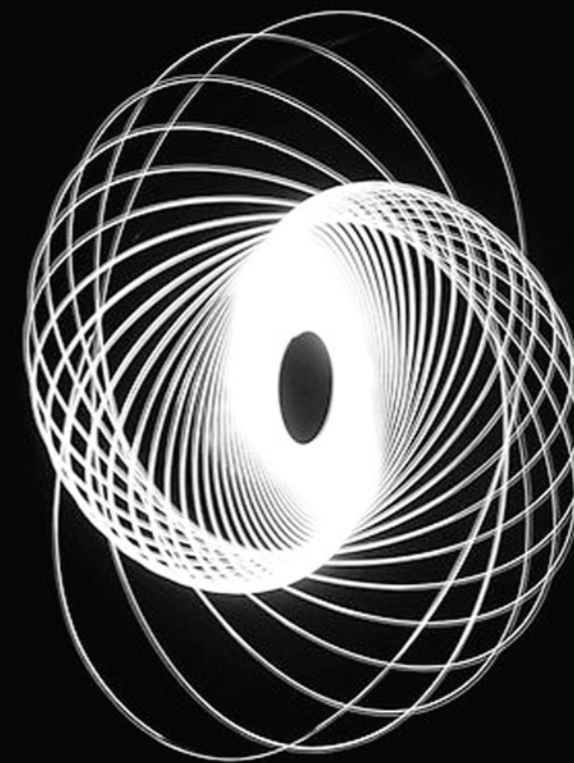
When Photosynthesis first occurred on Earth, it allowed the following burst of living entities, we call plants, to spread across the planet, but a waste product of this living process was Oxygen. Now, then it had no role in extending life, and was, anyway, also almost exclusively chemically combined into available substances to be precipitated onto the floors of oceans. The amount left in the atmosphere was tiny.

But, finally the plants were so numerous that vast quantities of Oxygen were produced both in the atmosphere and dissolved in the seas. And, this allowed the emergence and development of animals, which couldn’t make their own food, as plants did.

So these new living organisms ate plants as their only initial food supply, and it doing so strongly affected the evolution of those plants to make forms like Grass dominant in large areas of the planet.

And taking such a trajectory even wider and slower, we will doubtless be finding such effects-becoming-causes, and arriving at new, long term stabilities... but never forever!

All the illustrations for this paper were created using different forms of video / optical feedback (recursion)





The Big Bang (with a pre-existing substrate)

The rush to simplifying infinities and singularities of most suggested accounts of this almighty cataclysm, usually termed The Big Bang, is NOT followed here.

The usual conclusion of that position on the outcome of the event, involving nothing but pure, disembodied Energy is also rejected, as is the belief that absolutely NO material fragments of any kind being involved. For such assumptions are clearly made to allow formal considerations to be easily manipulated, without the messiness of Reality confusing the perceived-to-be-essential considerations.

And, it also is conceived to “validate” the standpoint of the usual investigators, who clearly believe in abstract, Formal Laws as the actual producers of absolutely everything in the Universe. Their perceived task then becomes, as the Americans like to put it - Doing the Math!

But, this alternative analysis avoids both their stance and consequent methods like the plague, and considers that there might well have been some sort of gigantic break-up of most matter, resulting in the predominance of the most fundamental fragments, but the assumed Singularity is omitted as merely a formal over-simplification, and any real collapse would be both much messier, and necessarily so, to be more real than such placeholders can ever deliver, disabled as it is, to produce their for their Required Beginning.

So, looking first to a cause for the Big Bang, and considering some kind of enormous collapse, with a consequent cosmic explosion, it will be treated in terms of known collapses and explosions though on a much smaller scale (such as Novae and Supernovae).

The Big Bang will NOT be identical to these much smaller examples, but starting with them is always infinitely preferable to the usual open-ended speculations of the formalists.

We do, however, assume an explicable cause for the collapse, in terms of those known examples on the lesser scale. When a star collapses, it only occurs when it is running out of resources for its current form of nuclear fusion, and the forces of Gravity finally predominate and a wholesale collapse is the inevitable outcome. So, upon a Cosmic scale, whatever was keeping the Universe apart could also be running out, and Gravity again could cause the resulting collapse.

Also, rather than some inexplicable Inflationary cause for expansion, we are much more inclined to imagine a result of the collapse generating the production of vast amounts of energy (this time by wholesale Nuclear Fission?).

But, there is another assumption involved here, that has been the result of many decades of study into the many anomalies of the Copenhagen Interpretation of Quantum Theory, which turned out to only be possible to physically explain, by the presence of a Universe-wide, undetectable Substrate (and crucially, one

composed only of already known components). So, in this alternative theory, it will not only have to deal with the coming together, under Gravity, of material entities of all sizes, but also the effects of this upon the universe-wide substrate – defined as undetectable and an all-ways-neutral medium.

And, a Substrate, which may well have been similar in composition both before and even after the collapse, and hence NOT a causal part of the cataclysm at all, though it will, indeed, have been affected by it. Though it would generally stay where it was, extreme local effects would certainly move about some of its composing units, and sometimes dramatically, with a consequent recursive contribution being the result.

But, neutral or not, though it may not have been, of itself, pulled into the general collapse, it will, unavoidably, have been pushed, by collisions, if only because the process of such an absolute avalanche of matter rushing towards a single centre, would involve it more and more as the process proceeded, banging into both other matter fragments AND those of the neutral substrate too, and, of course imparting energy via these collisions.

Clearly, if the substrate mostly remained as we consider it before the Event, it would then propagate the energy it received from the inwards avalanche, but deliver it in all directions in its usual bucket-brigade fashion. And such propagations would be performed internally, within the units of the substrate (see a fuller description in the Special Issue entitled *The Theory of the Double Slit Experiments* of the SHAPE Journal).

Of course, affected units of that substrate would also, and unavoidably, be set in motion, in the very same direction as the collapse, while glancing blows would certainly set off abundant local in the substrate too. But, a full appreciation of this complex of effects will all depend upon the various speeds involved. Presumably, the propagation of energy in the substrate, being at the Speed of Light, will be dispersing that energy much faster than the causing physical collapse. The calamity would, therefore, already be generating an outwards flow of energy via the substrate, as well as conducting a fraction of that substrate into the melee.

Certainly, following the general collapse, there could only be an almighty explosion and a consequent gigantic expansion, with enormous driving energy in The Big Bang, though significantly added to by nuclear energy, as proved by such collapses in merely individual stars (the range of these will be presumably vastly extended from what we know of Supernovae).

And, that too would, once again, NOT leave the left-behind substrate unaffected. If our other considerations are correct, the likelihood is that the colossal outwards flow would again, via collisions, cause effects in that substrate, and that a great deal of turbulence in the substrate would inevitably result.

And, as usual, in such flows, vortices of the substrate would be likely, and these could then affect the outwards flow itself in a recursive way. The outward would have been the cause of these effects in the substrate, but also the recipient of those effects to, in turn, cause changes in the flow. [All, of course, caused by collisions only!]

We can only assume that the usual quiescent and stable structure, of the substrate, was thrown into turmoil by multiple collisions, then via discrete vortices with contained energy thereafter affect the original causing flow itself.

Now, such a range of conjectures clearly requires confirmation via experiment. But, as usual, we cannot replicate the actual conditions themselves.

So, as Couder did with his Walker Experiments, we have somehow to construct a reasonably adequate Analogistic Model out of resources available to us at the macro level, and hence capable of being set up in the laboratory.

What we will have to research is an analogous type of explosion in a static, quiescent medium. And, to get anywhere useful, we would have (if possible) to do what Winfree (and Gomatam et al, independantly) did in their research into chemical reactions between liquids, where he used oscillating reactions, with differently coloured outcomes to show clearly what was going on. To do something similar, in our proposed experiment, we would have to use a medium that would change in some evident way at different densities or speeds, to reveal what could be happening in the Cosmic Process that we are attempting to model.

Such an experiment would never be an attempt to produce a perfect model (nor any kind of purely formal model), but rather to get ideas of what, physically, might have been happening in an obviously unobservable Big Bang!

Indeed, whenever any kind of a medium is involved in any kind of a dramatic occurrence there are always “shock waves” of qualitative effects – different to the usual kinds of propagation. So, it would be to recognise caused structures and their subsequent developments and dissociations that would be the primary purpose.

Now, if we were to allow the explosion to include various sizes of pieces of matter, driving through a relatively static substrate, there will certainly be a tendency for it to be set into rotational vortices. And, I reckon that the motion within these discrete entities will be initially at right angles to the direction of causing motion.

Now, that alone means that the directions will be perpendicular to the direction of flow, so it could insert a kind of local “polarization”, though rotations, other than in a single plane, will definitely be possible;

NOTE: in both Winfree and Gomatam’s studies of reactions between liquids the 3D forms surprisingly turned out to be “Toroidal scrolls”, so clearly what might be happening in the situation we are considering is also likely to be similarly complex.

Now, as the whole range of causing flows will NOT be in a single direction but all going out radially from a single centre, absolutely every possible direction will be involved, overall. So, though, if unaltered, all these flows will spread radially from that centre, the presence of a substrate and its vortices (with their sideways displacements) will, at least early on, produce effects which will change that ideal pattern.

From the outset TWO effects seem likely. First, there will be the turbulent effects upon the substrate. And second, will be the “polarizing” sideways effects back onto the flow by the turbulence in the substrate.

Clearly, some revelation of exactly what would happen, would be a major purpose of the suggested macro experiment. The lateral diversions of fragments of matter would be the most important, though, as the process moved further out, it is likely that as greater volume of the substrate were involved the effects would be more and more diluted, and a simpler, and easier to model situation is likely to develop.

The task of the experiment would be to reveal the developments involved over time.

Clearly, in the areas very close to the presumed origin of the Big Bang, the effects upon the remaining substrate will be both dramatic and indeed chaotic, but as the explosion proceeds, things will become more analysable.

Indeed, at much further out situations, most of the substrate will be in its more usual quiescent and stable state, with just local areas of disturbances. And, finally an idealised static substrate will be the universal state, when beyond the reach of the current explosion.

One possible result of considering things beyond that limit, could well be that the nature of the unaffected substrate there might well be different, and the recently revealed Red Shift anomalies at such distances may be explained by these studies if taken to their conclusion.



*"Tall Tree And The Eye"
by Anish Kapoor (2009)*

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Here is a brief list of some interesting books and papers that got me thinking when working on my Substrate theory. By no means do I agree with all of the ideas therein, but each has something unique to contribute to this debate.

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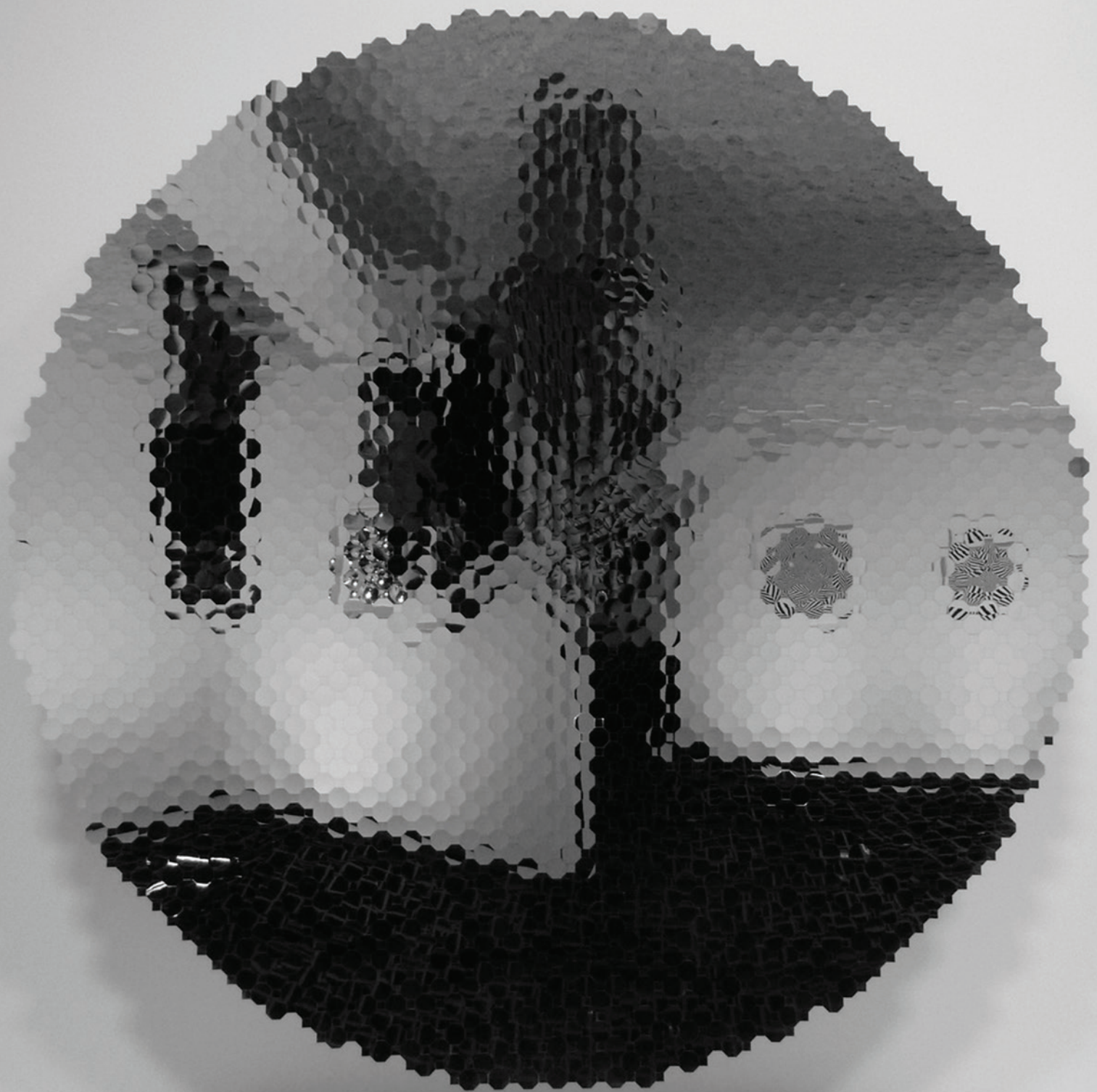
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