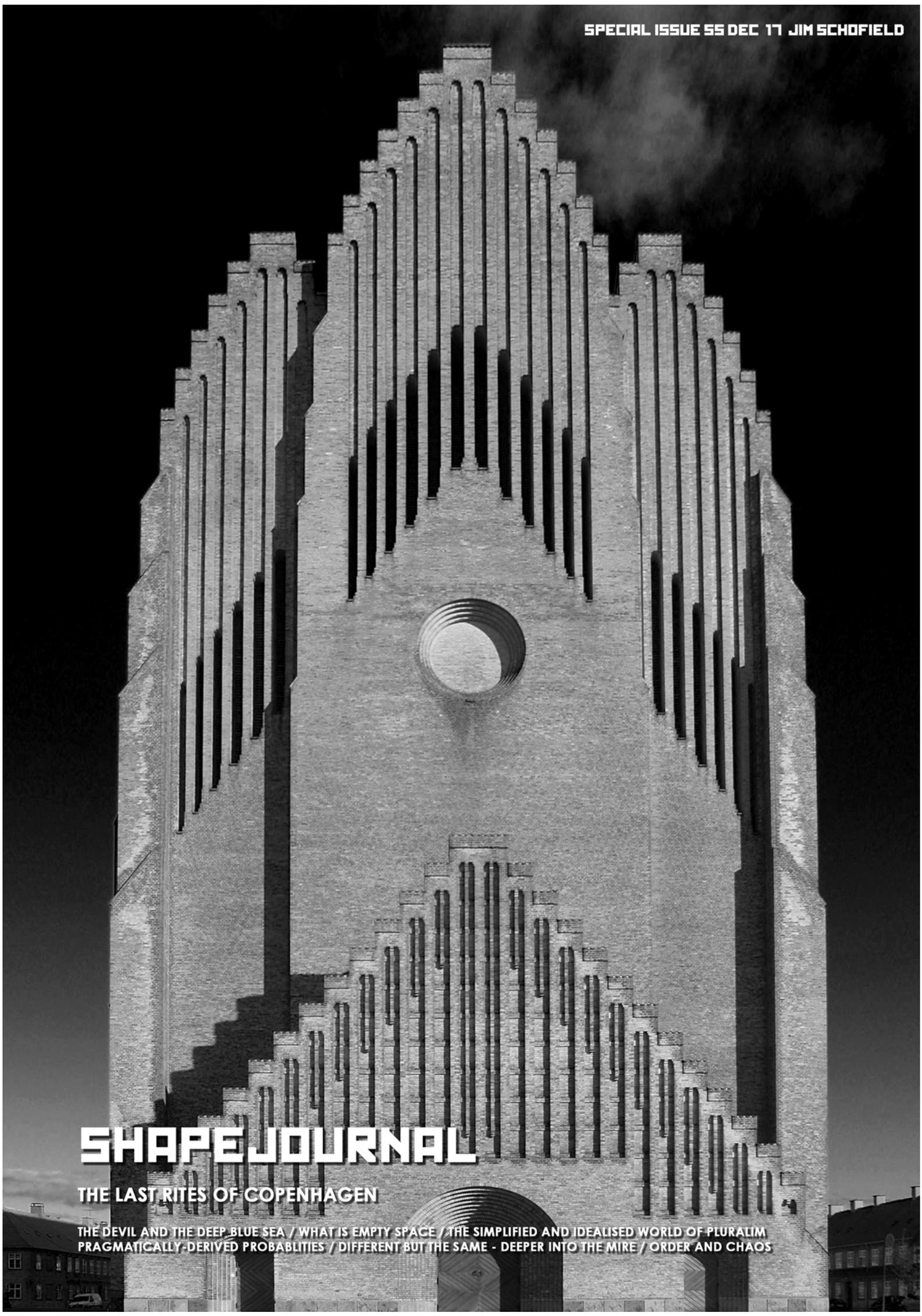


SHAPE JOURNAL

THE LAST RITES OF COPENHAGEN

THE DEVIL AND THE DEEP BLUE SEA / WHAT IS EMPTY SPACE / THE SIMPLIFIED AND IDEALISED WORLD OF PLURALISM
PRAGMATICALLY-DERIVED PROBABILITIES / DIFFERENT BUT THE SAME - DEEPER INTO THE MIRE / ORDER AND CHAOS





The Last Rites of Copenhagen

Special Issue 55 / Dec 2017

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Updates to Copenhagen only sink it deeper into the mire...

Between the Devil and the Deep Blue Sea

by

Jim Schofield



Two things separate the consensus in Modern Physics from its Dialectical alternative. And, they both extend concrete effecting-&-affected Reality into thus far unemployable areas.

The first of these is in the as-yet-unrevealed Material World below the current level of Sub Atomic Physics. And, the second is in the matter that constitutes so-called Empty Space.

The devil and the deep blue sea...

Many of the inexplicables of the Copenhagen Interpretation of Quantum Theory reside in the failure to penetrate these two areas, along with the as yet unexplained, but clearly existent, features such as Charge, Magnetism and Antimatter, all of which seem ideally suited for explanations at a currently undetectable lower level. While, at the same time, the many anomalies such as Action-at-a-Distance, and Electromagnetic Propagation, which not only cry out for a Universal Substrate, but have been explained in such terms, along with every single one of the anomalies clearly evident in the Copenhagen explanations of the Double Slit Experiments.

And, hosts of other quandaries seem to require the same sort of knowledge in exactly the same areas - such as Dark Matter, Dark Energy, and even Quantum Entanglement.

So, perhaps we are looking for currently unobservable entities with masked properties?

This theoretical physicist decided that such studies would be the ideal place to start, particularly as the phenomena of the whole set of Double Slit Experiments seemed to cry out for an intervening Substrate.

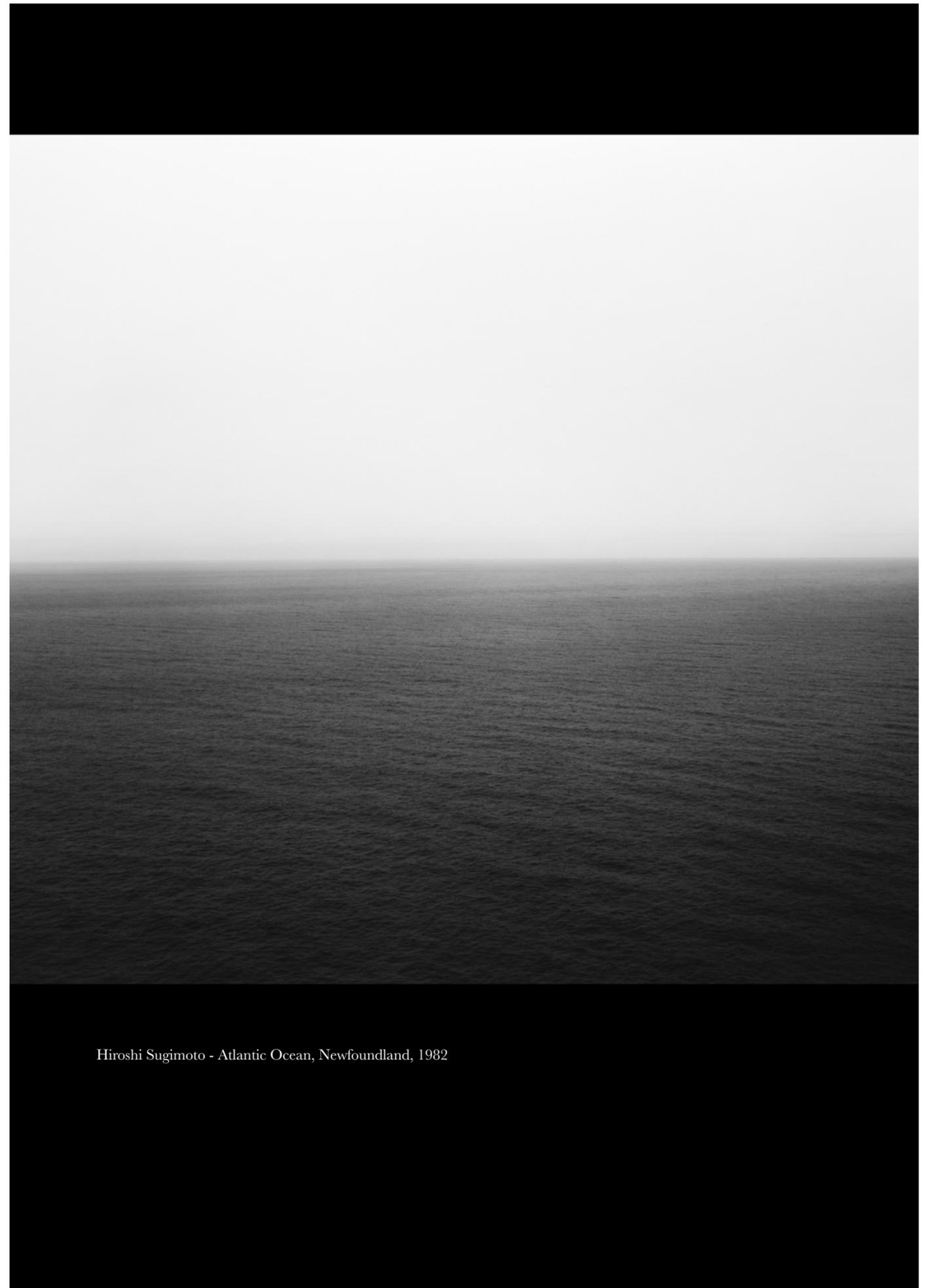
Could a totally undetectable unit of Substrate be devised, which could actually explain physically every single one of the current Wave/Particle Duality anomalies?

The place to start was obvious - The phenomenon of Pair Production. For here, without acceptable explanation, two different particles - one negatively charged, and of ordinary matter particle - The Electron - and the other a positively charged, and antimatter particle - The Positron, somehow were initially resident together(?) in a totally disembodied goblet of Pure Energy - an extremely High Energy Photon...

What?

And that's not all!

Some magic threshold was passed, causing this goblet of Pure Energy to re-form into two diametrically opposite forms of "matter" and move off in opposite directions with the same speeds. Clever stuff this Energy!



Hiroshi Sugimoto - Atlantic Ocean, Newfoundland, 1982



Did you know it could do that?

Well, the proof is supposed to reside in the phenomenon of Pair Annihilation, wherein an electron and a positron encounter one another and duly vanish in a giant puff of Energy!

But, what if that is not the case?

What if these mutually capture one another into a single joint orbit? They would be kept apart by the orbiting, and there are two ways the energy of the separated Pair could be involved in the new entity:-

ONE: As in the atom, the joint orbit could be promoted to a higher level.

TWO: The joint particle could move off with Kinetic Energy too.

And, what would be the characteristics of the new joint particle? It would have NO Charge, NO Magnetic Moment and exactly equal amounts of the two kinds of matter. It would be undetectable but capable of carrying individual quanta of electromagnetic energy - like a Photon, or even by passing that energy on, and hence carrying absolutely NO available energy - like an Empty Photon.

Oh, and did I forget to tell you - it has been observed!

It was in very High Energy circumstances in the Tevatron Accelerator at Fermilab, where I assume it was detected by its association with a Pair Production Event.

This particle deserved a thorough theoretical investigation. For though neutral in all the usual ways of considering such things, it is both very small, and because of its neutrality could approach others of its kind very closely indeed. But, it has a spatial separation of its component parts. What would happen if two such particles got so close together that the charge and magnetic effects of a component of one of these was close enough, momentarily, to interact with a component of the other?

The answer is devastating! The natural state of a close-together group of such units would be to form a loose association, with individual units oscillating about equally-spaced positions in a 3D structure, which I have previously called a "Paving"!

Think about it!

You could not design a better Substrate for the Propagation of Electromagnetic Energy than this, because:-

ONE: the equal-spacing makes the Speed of Light the speed of transfer across that spacing.

TWO: The oscillations will facilitate quantum transfers from unit-to-unit.

THREE: the direction of transfers will have been delivered when the quantum first entered the Substrate, and will thereafter be replicated in the oscillation-direction of each involved unit, and hence will be passed on with each transfer!

FOUR: the Paving is both easily dissociated into free moving units, and just as easily reformed when left to itself undisturbed.

FIVE: So the units can exist temporarily in other modes caused by interloping energetic particles - thus enabling dissociation of the Paving, and consequently the creation of both Streams and Vortices.

SIX: In the special case of electrons orbiting within atoms, the paving along-the-pathway of the orbit is both dissociated, and the effects regularly renewed with every subsequent orbit. And this is also true of vortices all around the orbit. And energy transfers in both directions between orbit and vortices actually determines the Quantized levels.

SEVEN: In the Double Slit Experiments ALL the anomalies can be explained in terms of disturbances in the Pavings, and recursive interactions between waves in the Substrate and effects on the causing particles.

Whether all this is perfectly true is NOT the real point here!

The purpose of this entirely theoretical research was to show alternative explanations are possible, and to undermine Copenhagen - it has done that IN SPADES!

What is Empty Space?

...and how do we define such concepts?

There was a time, long, long ago, when if everything material was removed from a defined region, all that would remain there - the mythic Perfect Vacuum - would be Totally Empty Space.

But, it delivered too many problems, so it was replaced, much later, with an all-pervading, elastic, yet mass-less Universal Substrate - this was called The Ether!

But, that too, though it explained many previously inexplicable features, also delivered even more unacceptable problems.

Neither of these made sense in terms of what they had to cope with - both with interloping, material bodies, and in effortlessly-propagated Energy.

Clearly, both definitions of the Stage or Ground, on which all phenomena were seen to perform, or even our assumptions as to the nature of matter, or maybe even both, were obviously inadequate. We should never forget that we Homo Sapiens are animals, descended from Apes, and hence, initially, at least, would have similar mental processes. It, therefore, seems to me that no-one will ever determine what-happened-and-why, without an understanding of what occurred, for one seemingly everyday pragmatic reason, which, in the case of Mankind, led to a veritable Revolution elsewhere in its thinking!

So, yet another diversion will be essential (though, understandably, NOT rigorously pursued here).

Like some of the Apes, early hominids found stones and sticks that they could use, but then with Homo Habilis (Handy Man), they began to actually make

tools out of brittle-but-sharp splinters of stone called Flint! The method involved surprising kinds of hitting it with a hammer stone - termed "Knapping", and to give some idea of the sophistication involved, a history of hominids over several million years has been traced in detail via the developing cultures in flint knapping. And here is where the necessary parallel development which took place in the brain associated with such ever-more-subtle manipulations in both tool-making and tool-using, which took the hominid mind to a wholly new level - culminating in Man! Nevertheless, the lateral developments into new areas of thinking certainly did not happen immediately.

The clear inadequacies - mentioned earlier, were both unavoidable, while, at the same time absolutely necessary, because though such conceptions were never all-embracing, they did make some sort of sense in particular situations: They could work predictably well in those circumstances. And, as what was going on, at that stage, was still a long way from Science, and was merely a simplified, pragmatic form of Technology - encapsulated in the phrase - "If it works, it is right!" Such Knowledge was valuable in given circumstances.

But, as such, none of the properties attached to particular situations, could either explain them, or any others that were similar. At that stage, explanations were not even expected, just the realisation of reliable patterns. which could be used for prediction in a single context alone.

So, what was actually being thought about, sought and used at that time? They were all one-off pieces of Knowledge, and only later, via similar descriptions to similar things, did it begin to broaden what was being thought about and done.



So, what were these individual properties, and which of them could be applied to a selection of different things? The most obvious ones were not knowingly intrinsic to items, but superficially applicable, such as Shapes, Colours and Counts! And of these, the latter was originally the most useful, allowing a quick way of ensuring that everyone in the group was safe, or that a newly found place to live had sufficient resources to maintain the group, for a time at least. Interestingly, in tiny hunter/gatherer family-groups, counting beyond a handful was not required, but after the Neolithic Revolution, involving increased numbers in static farming communities, with seed-for-planting and domesticated-animals. counting, necessarily, extended remarkably.

So, finally, having touched upon some of the means used by Mankind, in describing Reality, we can perhaps make an initial stab at defining what kinds of descriptors were used, in spite of absolutely no genetic means handed down from prior ancestors, as to how to do it!

We call such descriptors Abstractions.

And, though these have a measure of Objective Content, that is, though, never the same as its Truth, the best we can usually get is a pattern that is similar, in some respect, to the actually causing Truth that we seek. Indeed, literally all of these Abstractions are actually aspects of something else, and are latched-onto because of the similarities involved. Sadly, in spite of what we think, and in spite of some actually helpful use of the Abstraction in Prediction, any attempt to use such in Explanation would most likely fail.

Now, the usual Trajectory that occurs with such Abstractions, is that another Abstraction - settled upon with regard to another aspect of that same sought Truth, delivers another pattern that contradicts the first.

So, if there has been sufficient confirmers to the old Abstraction, then the new one is dumped, while if that is not the case, the old one will be dumped in preference to the new one!

Now, if you are wondering about the significance of all this preamble, consider the nature of Empty Space with the two usually attached Abstractions.

Sadly, our Abstractions over millennia were NOT units of knowledge of the Truth, that could be gradually summed, inexorably, towards the objective of Absolute Truth. But, at best, a collection of mistaken abstractions concentrating upon fragments of Objective Content - merely reflecting aspects or parts of that sought for Truth, but literally always encapsulated in distorting but formally similar contexts.

They could be, and sometimes were, effectively used pragmatically, but efforts to use them directly in attempts at explanation, literally always led, in the end, to irresolvable impasses. They were certainly NOT The Truth!

But, Mankind was indeed Homo sapiens (Thinking Man), and though his initial chosen route was on the wrong path, it was upon the right "landscape", and with the collecting of Knowledge, and its social sharing, there was sufficient for some to raise their eyes above their current paths, see the others too, and begin to think about the emerging "Landscape's topology and causality! Exceedingly rare, initially, but with ever-increasing numbers, particular individuals began to make "Abstractions of Cause" about related phenomena, but these initially at least, by the recognised "Thinkers" of the time, inverted the real relationships between Pattern and Cause (not least because the first ever developed intellectual discipline was what the Greeks (whose creation it was) termed Mathematics - the detailed study of such patterns.

And the Inversion involved the extracted Forms of Mathematics as the causes for concrete, physical phenomena. So, the first step was to see the Landscape, but only from its current, apparently fixed pattern, and not from its landscape changing causes - from an Idealist, rather than a Materialist standpoint!!

Clearly, as the account develops, it becomes increasingly clear that the developments achieved were rarely in the right direction. But, Mankind was, indeed, attempting to pull itself up by its own sandal straps. And, the major Qualitative Changes, as is always the case in significant development, will require a plethora of undermining crises, and a consequent, co-ordinating whole System collapse, to enable any chance of a true Emergent Breakthrough.

And, though many Crises have indeed occurred, they have been in different areas at different times, and each one "solved" by sectioning off specialist areas - always bounded by the irresolvable impasses, surrounding the stable areas within, still sufficiently amenable to the prior assumptions and methods.

Now, as already established, the required overall Emergence has not yet occurred, but with certain basic disciplines, such as Sub Atomic Physics, the contradictions and impasses abound to such an extent that the addressing of the most glaringly wrong, must be tackled immediately, not merely to break Sub Atomic Physics out of its self-imposed and debilitating shell, but to, in so doing, cleave a major cleft deep into the general consensus stance too.

That attack upon the Copenhagen Interpretation of Quantum Theory - the major tenet of that area of Physics, is now well underway, but, as a consequence of that, the current question about the Nature of so-called Empty Space also appears to be solvable with the new stance.

Two hundred years ago, the idealist philosopher Friedrich Hegel in his Thinking about Thought area of study, managed to solve all Zeno's Paradoxes and indeed the whole class of what were termed Dichotomous Pairs of contradictory concepts that couldn't be decided between merely using the methods of Formal Reasoning. He did it by investigating the assumed premises underlying each. He found that by correcting those premises, in most cases by including new ones which distinguished clearly between them, the usual impasses could be transcended. So in tackling the problem of Empty Space a missing premise - that of an undetectable Universal Substrate, was added in, and the age-old problems in that area were all adequately answered - as also were all of those in the Double Slit Experiments that had led to Wave/Particle Duality.

The Simplified and Idealised World of Pluralist Science

When Early Man, confronted by a complex and confusing Reality, finally decided to attempt to make sense of it, the very nature of Reality was, most certainly, not actually immediately conducive to a buildable, coherent, consistent and comprehensible system.

So, to begin with, he extracted individual phenomena that were the easiest to deal with, and found particular things that he could do with them. The only principle available to him, at that time, was the one he had inherited from his forbears - "If it works, it is right!", which was, much later, termed Pragmatism.

But, in time, he found that if he could effectively "hold a situation still", or even better, change the context, to make things easier to study, so that he could then extract some relation or "Law" that could be successfully used, but even then if, and only if, he could always reproduce that required, modified context.

Man had found *Simplification*, to aid his attempt to make sense of parts of his world.

But, an even more powerful process could be applied to situations, that improved things even further for he could then adjust what he extracted into a much more useable Form. The arable field that had to be studied, in order to work out how much seed was necessary, or how much fencing could enclose it, could be seen as a perfect Square or Rectangle, and this, though approximate, made the necessary calculations much easier to carry out.

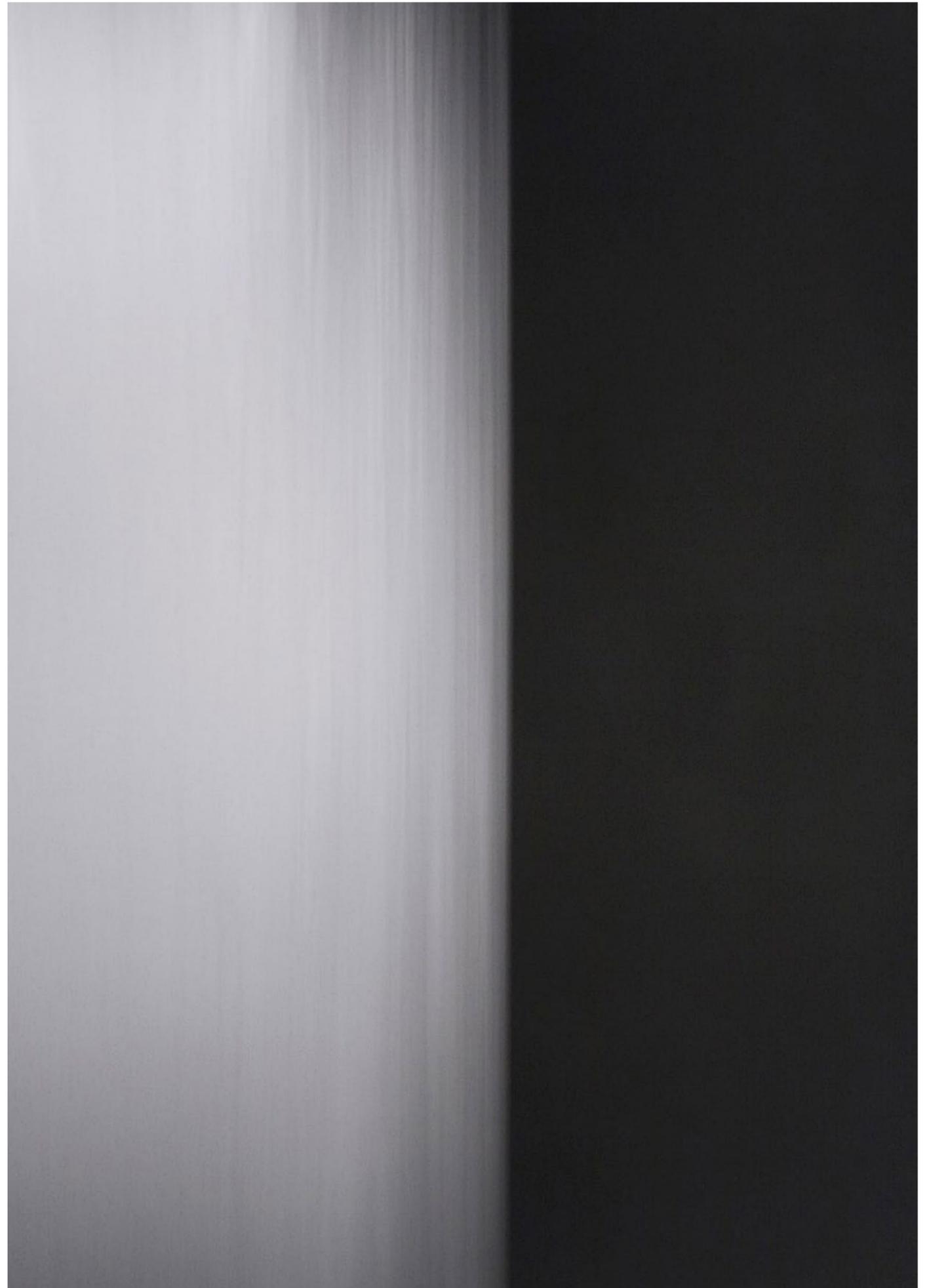
Man had settled upon Idealisation, to aid his necessary tasks.

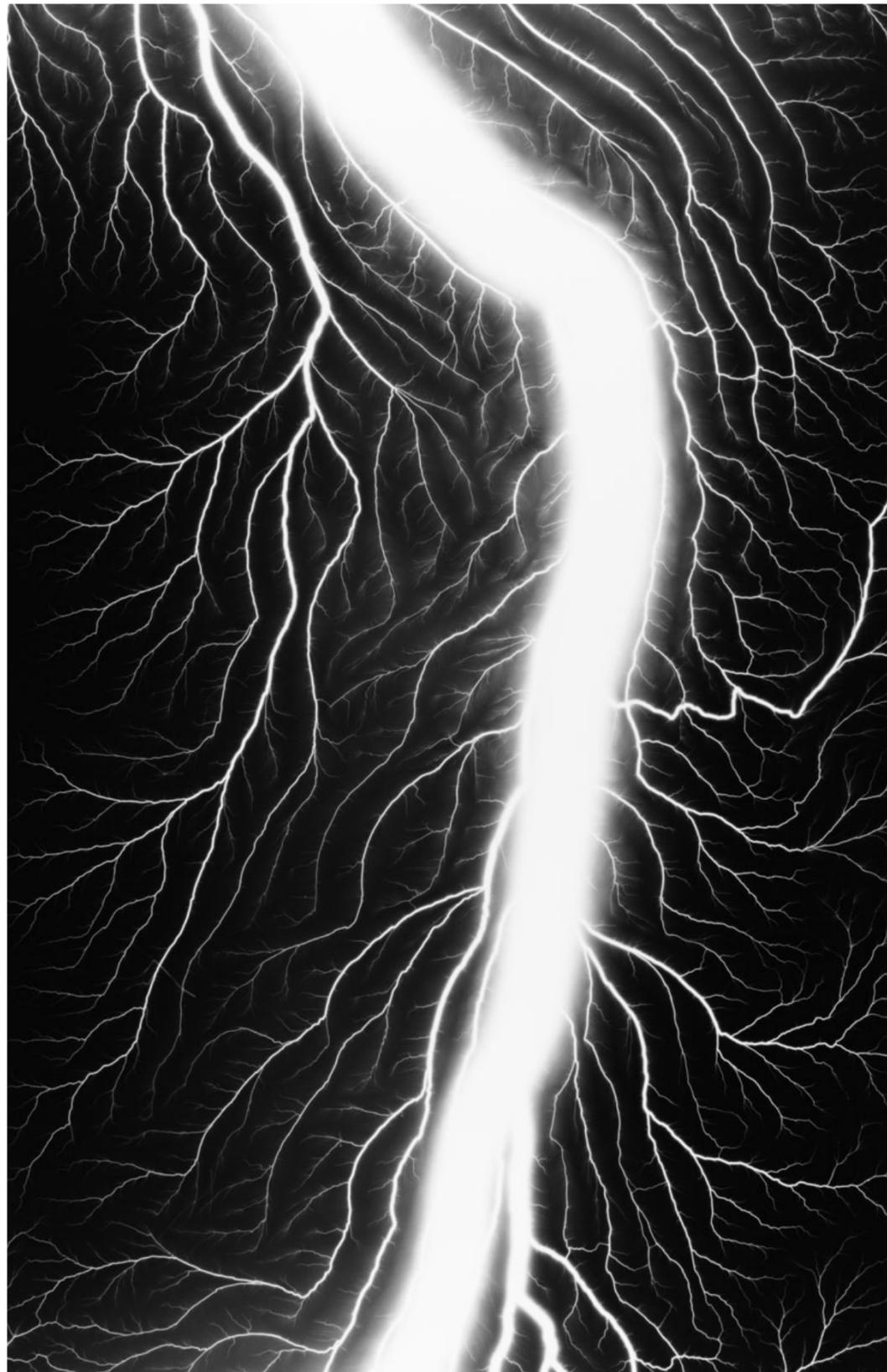
Let us attempt an illustration of what he had begun to do, using a piece of land as his problem. The land was not exactly flat, and had various features within it. The landscape undulated and contained the odd stream and various clumps of trees, but his method involved representing that landscape by a kind of Net, (perhaps of squares) which he could, flexibly, "fit over" the actual landscape, and use that, instead, for his consequent calculations. The net certainly ignored many features of the Land, but nevertheless could approximate to it very well, flexibly-following its depressions and ridges to map them all onto a net, which could be "flattened" for easiest calculation.

This joint application of both Simplification and Idealisation was a significant step forward, and enabled many things to be addressed fairly well. But, when it was extended, beyond the described measuring problems, things began to go wrong!

For example, a process could be measured throughout its performance over time, and a Form from Mathematics fitted to that data. Once again, in order to achieve the measurement it had had to be simplified, and maintained as such. While, the mathematical form was, unavoidably, an Idealisation of what was actually going on. Now, the Mathematical form was duly fitted up to the data, and was then assumed to be an eternal Law of Nature, to be used everywhere it was able to be effectively applied.

This was another invention, later termed the Principle of Plurality, and implicitly defined a set of Laws that were both fixed and separate from one another. Now, though all of these were revolutionary, and enabled many methods and processes with useful outcomes, they were all pragmatic fixes, and did not accurately reflect





Reality-as-is! And, as the applications were extended to ever more areas - suitably simplified and maintained as such, the fitted-up, idealised formulae were mistakenly endowed with having actually caused the phenomena. From pragmatic methods and useful forms, they were converted into Natural Causes - and that they were most certainly NOT!

But, these did, nevertheless, transform the World of Mankind! It wasn't Reality-as-is, which was being revealed, but a fast extending set of different artificially achieved situations that could be both arranged for, and maintained as such, both during investigation, and during their effective use. But as to Mankind's Understanding of Reality, that was being regularly misdirected - not only idealistically, when making equations the actual drivers of Reality, but also theoretically in limiting explanations to mere summations of pluralistic "eternal Laws"!

Pragmatic objectives were reasonably well served, but real Understanding was increasingly crippled, so that anomalies, crises and even unpredictable calamities were impossible to understand, or act against!

And, crucially, the forced Stability required for all investigations and usage of phenomena. also helped persuade Mankind that Stability was the natural and desirable situation in Reality. Real Qualitative Change, Development and Evolution did not figure in such a Worldview.

Let us be crystal clear how a complex, real world situation had to be studied.

First pluralistic experiments had to be undertaken, merely to expose, one-at-a-time, what factors were acting together to deliver the original situation. These would naturally all be acting simultaneously to deliver the final result.

But, to control that process, as it naturally occurred, was totally impossible. So, the conclusion was to repeat each single factor set-up and process, in a sequence-over-time, as an alternative, but controllable way of replicating the original natural process. But this would be as a sequence, each separate element of which would be under our control and directed to deliver, at the end of the whole sequence, our required final outcome.

Naturally, none of the individual factors would work as they did in the natural, combined and simultaneous process, for each individual process was isolated in order to control it, and would exclude the cross effects of all the other, when they occurred simultaneously.

The assumption that the above was UNTRUE and that the factors were totally independent of context, the Principle of Plurality. While the assumption that they DID affect one another is the Principle of Holism!

The processes implied by the former meant a correcting description of what was being done as actually Pluralist Science. While processes implied by the latter, though rarely attempted, make what was being done a Holistic Science.

Needless to say, what Mankind has been using over the last few centuries has been Pluralist Science. Prior to that, if it merited such a title, what was being undertaken was *Pragmatic* Science. And what is generally required in the future, though almost entirely absent today, will be Holist Science!

The Profound Consequences of Basic Assumptions

Prehistoric and pre-human Developments

The means by which the hominid line, and ultimately Homo sapiens, has dealt with observing and interpreting their World, was not, and never could be, both direct and analytically sound! It just had to be erratic and inadequate primarily because of Evolution.

Developments in evolution are never directed but actually retrospectively-selected by the efficacy of the organism - carrying that change, for both survival and successful reproduction, and would only come to be a property of the given species, when competition gradually repeatedly-selected in favour of the specified carrier, so that generations of that carrier's offspring would come to dominate the whole population, or, at least, a significant fraction of it.

Such Darwinian Natural Selection, would normally not select for superior intelligence or acute conceptions, for far more dominant factors would swamp such things, in the absolutely primary struggles to survive and reproduce. As stated earlier, physical survival and successful reproduction would be determined by other very different properties of the organism concerned. Early hominids were certainly not evolved to *Think!*

Indeed, for most of the evolution of that line the only crucial cerebral conception was also common to many other animals too, namely the purely pragmatic idea of, "If it works, it is right!" And, such a stance involves no analysis, no reasons for it being the case. The question "Why?" was never even asked!

Mankind's Initial Intellectual Steps

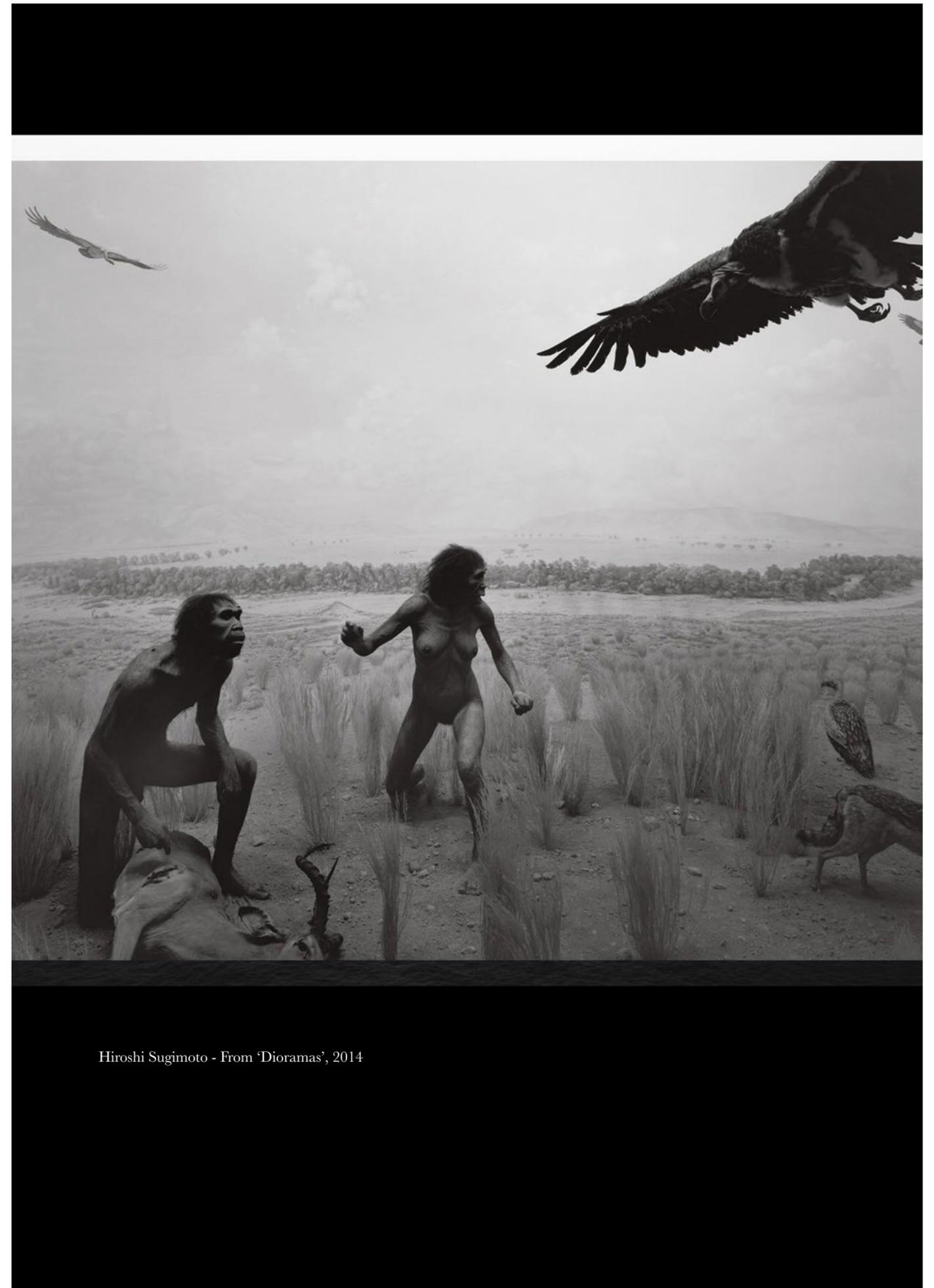
So what we could term higher-level "intelligence-and-thinking" were NOT selected for in Mankind's Evolution. Indeed, such things were, very much later, *socially* achieved. Man had to, intellectually, "Pull himself up by his own bootstraps!" - and, where possible, pass-it-on socially.

But, such a process must initially be a catalogue of failures: how could it be otherwise? For we are not addressing successful actions, but meaningful explanations. Getting it wrong, many times, would be inevitable. In fact, getting it right, would always be impossible. And, that statement is not restricted only to the very first moves in that direction: it is always the case!

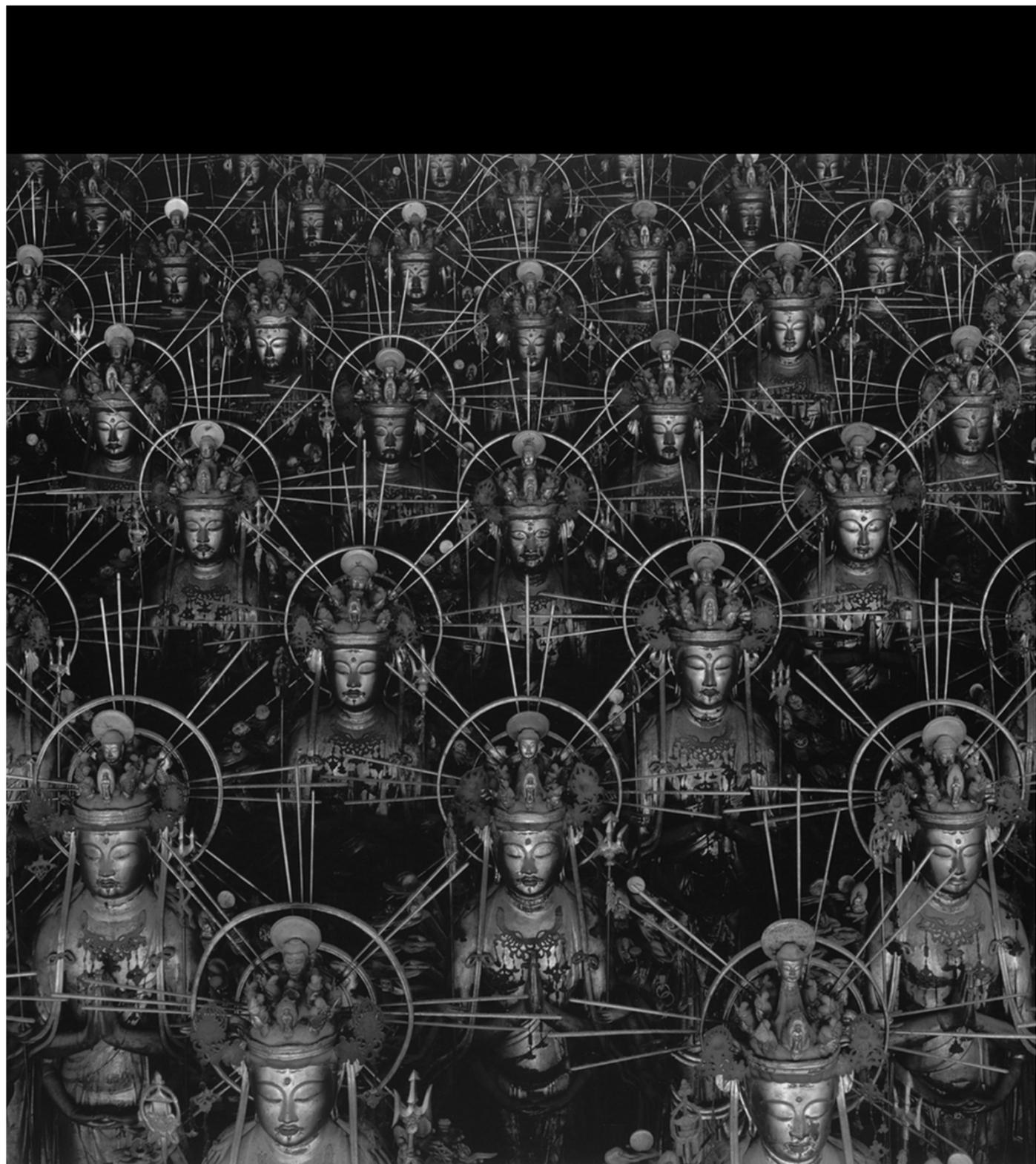
So, is it a case of, "Give up now, you'll never do it!"? Well, not exactly, for elements or fragments and, sometimes, useable models, of the Truth can be found. It isn't so much seeking Absolute Truth, but maximising *Objective Content*.

Yet, it was easy for our ancestors to assume that unassailable "facts" were everywhere, and they seemed to be "unchanging". Though it was clear that Reality was complex, it seemed, particularly in certain circumstances, to be amenable to analysis. But, the presence of so much presumed "Stability" was a misleading feature of a far more complex and changing World.

Indeed, at one tempo, everything seemed fixed: while at another absolute everything was in constant change! Even this was realised, so that Man soon attempted to "hold things still!", in order to investigate them. And, to a significant extent, it worked.



Hiroshi Sugimoto - From 'Dioramas', 2014



Hiroshi Sugimoto - Sea of Buddha, 1997

The First Leaps Forward & Debilitating Assumptions

And, very early indeed, these revelations of “fixed things” were extrapolated to all things at all levels, and what later came to be called The Principle of Plurality - where not only all things, but also all relations between them were seen to be due to eternal, unchanging Natural Laws. So, a consequence of assuming Plurality was the tenet of Fixed Natural Laws.

Now, almost simultaneously with the ancient Greeks settling on Plurality, the exact opposite conception - The Principle of Holism, was being defined by The Buddha in India, which rejected the fixity of all things with the phrase. “Everything affects everything else!” - based, of course, upon the living world, which is, self-evidently, in a state of constant change.

But, of course, both are Abstractions from Reality, one, Plurality reflecting Stability, and the other, Holism reflecting Change. Interestingly, these assumptions seem also to be mutually-exclusive-opposites, but somehow, they both reflect certain aspects of Reality.

Emergence of the Doubters!

Now, also, at about the same time, though after the Greek revelations, Zeno of Elea found several sets of situations in which the pluralist stance in Formal Logic inevitably led to situations with two alternative and apparently diametrically opposite concepts could not be decided-between by the purely formal rules of reasoning: a situation, which could lead to impossibly contradictory outcomes. Surprisingly, in spite of Zeno’s Paradoxes no progress was made in this area for a further 2,300 years.

The Dialectical Revolution

The situation in the western tradition (in Greek Plurality) was not addressed until at the beginning of the 19th century the idealist philosopher Friedrich Hegel in his area of study, Thinking about Thought, he tackled the frequent appearance of Dichotomous Pairs as evidenced by Zeno’s Paradoxes and realised that the problem resided in the premises assumed - being the same for both possible contradictory concepts, and realised that they were usually “the same common sense assumptions for both”, which was most certainly incorrect.

Hegel embarked upon a study of every single Dichotomous Pair that he could unearth, and set about the task of revealing the premises assumed, and thereafter the necessary corrections to remove the usual impasses. He went even further exposing that many situations were a temporary balance or Stability, between two opposites, and developed ways of dealing with such situations (impossible with Formal Logic) via what he termed The Interpenetration of Opposites! Hegel was fighting pluralistic Formal Logic with a holistic stance. For Reality was NOT a summation of eternal Natural Laws, which in Logic were fixed statements, but confluxes of multiple factors all affecting each other, and usually finding a balance somewhere along a variability between two diametrical opposites. Stabilities were possible at many points along that line, but could in varying conditions drift-or-speed to either end, or even, on occasion, flip from one to the other.

The General Malaise!

Now Hegel was an idealist, so he was only concerned with Human Thinking, but all the revealed flaws in Logic were also true about all the other intellectual disciplines of Mankind. For they were all consequences of the Revolution in all disciplines brought about by the “Invention” of Euclidian Geometry, which had preceded all the other developments, in Ancient Greece, at that time. Indeed the even nascent Science was already an amalgam of Materialism, Idealism and Pragmatism, also wedded indissolubly to the Principle of Plurality.

Pragmatically-Derived Probabilities

The Gas Laws in particular, and most Heat Laws, are not formulated theoretically but pragmatically, involving overall or average data - about such things as Temperature, Pressure or Energy.

Indeed, many directly measured things are not intrinsically-caused-properties, due to individual elements and their individual properties, but overall features of collections, of, sometimes, very-mixed populations, usually measured by some "averaging" device, something like a thermometer or pressure gauge, and abstracted into a named feature: indeed, multiple components are invariably simultaneously involved.

In such circumstances it is either impossible or meaningless to either measure or attach a value to a single discrete particle: the measurables can only be overall or general characteristics.

The data is gathered over time, or linked to some other controlled and varied factor, and a general form of a relation between factors is identified by mathematical means, then fitted up to the data to deliver a Natural Law. A usable Law is in our hands, without any causal understanding of what is actually going on, or even what underlying factors and features are involved.

In effect, the measured experiences-alone, were sufficient to deliver-the-law. And, it was inevitable that the first real science would be of this nature, for explanations would be impossible at that early stage. Indeed, we were making Abstractions from the very outset of the discipline!

Any explanations of what is actually happening at the underlying, multiple-units level, was always the result of theoretical considerations, arrived-at, after-the-event by attempts to explain physically what had actually occurred. Indeed, there was an historical phase when these were the only investigations and derivations possible!

Now, perhaps surprisingly, if the sets of data varied over many repeated full-range attempts, though not our usual objective, a Probabilistic Law could still be formulated, but instead of a given value being delivered for a certain circumstance (as with our usual methods), the probabilistic law would instead give a probability for every possible value in each circumstance.

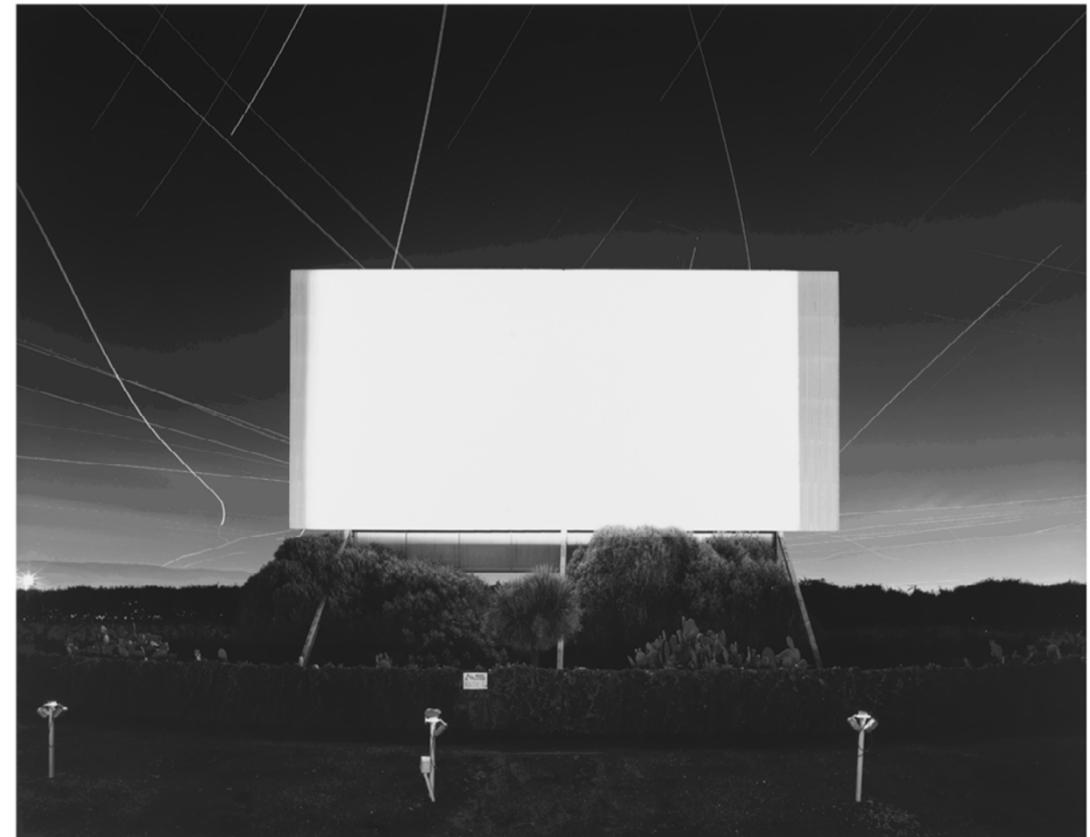
Now, where have we seen this before?

Of course, it is in the Copenhagen Interpretation of Quantum Theory, wherein a Wave Function delivered all the probabilities for all possible positions!

But, whereas, in the former example, the probabilities came from many sets of previously measured data, in the latter a wave-like form was found to work instead!

The excuse was that the electron was "acting like a wave", but a *physical explanation* could be that those results could be influenced by an underlying, and electron-affecting substrate, which could have such Wave-like properties!

Indeed, this theorist has investigated what would happen if just such a substrate, with all the usual wave properties, was theoretically included in a test bed of the Double



Slit experiments. And, he managed to explain every single one of the many anomalies, in ALL those experiments, without any difficulty!

His conclusion was that the assumption of a currently undetectable Universal Substrate delivered *more Objective Content* than the Copenhagen Interpretation.

While, as intimated earlier in this piece, the same assumptions explained why the Wave Function in the Copenhagen Interpretation was able to accurately deliver what it did.

Once again, the problem is the Principle of Plurality!

For, a Holist approach can easily cope with the interactions of the two "systems", especially when there is a time interval involved, where the moving electron only-later-on encounters the waves that it-itself caused, after their conversion by the Double Slit.

Though this is still only a muse, the possibility of explaining why the invention that is Copenhagen works pragmatically is initially addressed, and along with other current papers will plot a way out of the dead-end of that idealist wrong turn, back into Explanatory Physics!

Different, but the Same

Updates to Copenhagen
only Sink it Deeper
into the Mire...

I: Adjustment to Copenhagen

The following quotes are from an article entitled “Consciously Quantum: How You Make Everything Real” by Philip Ball, in New Scientist (3151), of 11 November 2017.

Though meant as a support for a recent embellishment of The Copenhagen Interpretation of Quantum Theory, they do, in the initial paragraph, inadvertently admit what that so-called “theory” actually is.

It is certainly NOT a Theory, because it explains absolutely nothing!

So, what is it? Let us clarify!

The first quote is:

DOES REALITY EXIST WITHOUT US?

To even ask this question opens the door to a profoundly Idealist Stance, does it not?

“things only become real when we observe them”

Yes, definitely idealist!

“It is basic for physics that one assumes a real world existing independently from any act of perception,” he wrote in a 1955 letter. “But this we do not know.”



This last quote from Einstein reveals the total inability of Einstein’s branch of Classical Physics to combat the Copenhagen Stance. For, though he starts in a materialist vein, but then, when thinking of his own purely mathematical contributions, he simply has to legitimise them!

“physicists have found it maddeningly difficult to write the observer out of quantum theory, a coherent description of reality, with all its quantum quirks, can (still) arise from nothing more than random subjective experiences”

Three important things arise from this!

First, the concept of the “observer”, rather than the physical effects which are necessarily involved in the act of observation.

Second, it is certainly not an attempt at a coherent, consistent and comprehensive *Explanation*, is it?

And finally, “arising from random, subjective experiences”? Do they know nothing of *Abstraction*?

“abandon any notion of fundamental physical laws” - so, the fundamental 2,500 year old premise embodied in the Principle of Plurality, is finally doubted here - but not for long!





Since the gains of the Ancient Greeks, this principle has been paramount: all Laws are both Eternal and Separate. They can neither change, nor affect one another, and merely Sum to give all aspects of Reality - that is Plurality! The alternative Principle of Holism, as defined by the Buddha (at about the same time as the Greeks' alternative), is still anathema - to this day. Yet it merely affirms that "Everything affects everything else!"

"it would turn our deepest preconceptions about reality itself inside out"

Well, one of them for sure! But, you can see what the real bottom line actually is, from the following quote:

"When it comes to forecasting how the world will behave, quantum theory is unsurpassed:"

Well, there it is! The primary objective becomes *use*, rather than understanding. But, such a defining objective is never "integrating", but, on the contrary, it results in "dividing" into "things only having the same pattern". And, therefore, necessarily, only "unifies?" in terms of a common Pattern or Form.

It dumps the seeking of Explanatory Causes, for only "Descriptive Forms" instead! It therefore ends up mistakenly making Forms the Causes of phenomena, rather than mere descriptions of how they appear.

"Electrons, for instance, can sometimes display behaviour characteristic of waves, even though they seem in other circumstances to behave like particles."

The key error here, which leads to that confusion, goes back to the criticisms of Hegel, who denounced the inabilities of Formal Logic Type Reasoning, in certain qualitatively-changing areas, and revealed that the causing-errors were buried in the *implicit assumptions*, in the premises underlying the situation, which were either incorrect or missing!

As this theoretical physicist has demonstrated, the cause of the Copenhagen anomalies is the omission of an effecting-and-affected, undetectable Universal Substrate, as the inclusion of just such a Substrate has been shown to remove every single one of the anomalies in the ill-famed Double Slit Experiments.

So the "superposition of all possible observable outcomes" simultaneously, is only selected as one of them by observation, simply illustrates the omission of the actual effects caused-to, and then caused-by, the intervening Universal Substrate.

"This doesn't mean they exist in many states at once, rather that we can only say that all the allowed outcomes of measurement remain possible. This potential is represented in the quantum wave function, a mathematical expression that encodes all outcomes and their relative probabilities."

But, note the absence of any physical explanation whatsoever! The Wave Function, a mathematical expression of the probabilities of all possible outcomes, STILL cannot say what happens and why! It jumps to a single observed outcome due to the so-called Collapse of the Wave Function, which explains NOTHING! The belief that all the possible outcomes co-exist, until the measuring incident funnels the possibilities down to a single one.

The holist view makes infinitely better sense!

For it always has multiple factors happening simultaneously, but usually revealing only the current overall balance of the whole group in a natural Stability. But, it also explains how such a balance can be undermined, and, in certain situations, result in the particular different outcome.

True, wave functions should be involved, but expressing a formalisation of wave properties of an affected-and-effecting physical Substrate!

In the Double Slit Experiments the electrons are always particles and the Wave Effects are imposed upon it by the Substrate. The electron doesn't change from being a particle to being a Wave - how could it?

"the collapse of the wave function no one really knows what that means either. Some researchers think it might be a real physical process, like radioactive decay"

NO, such a stance is the default position of the Copenhagenist consensus, and to transcend that terminating impasse, will require a great deal more than is being offered here.

“Others still say that there is no point in trying to explain it – and besides, who cares? The maths works, so just shut up and calculate.”

That common view encapsulates the underlying pragmatist attitude - “If it works, it is right!”

“quantum mechanics tells us only what we should expect when we make a measurement, not what causes that outcome”

This view, by Niels Bohr, is the pseudo-philosophical excuse for the failure of a purely pragmatic, descriptive system. Of course, the measurement itself cannot deliver a cause: that is the purpose of an Explanatory Theory, which is “the baby they have thrown out with the bathwater”!

The so-called “philosophical” support, for the Copenhagen stance, was revealed very clearly in Werner Heisenberg’s book *Physics and Philosophy*, which should be read, if only to reveal the weakness of that standpoint. “What alone matters is our faith in the West!”, Heisenberg concludes in his book!

Yet, though what they claim pragmatically is correct, and their method does indeed encapsulate a means of prediction using probabilities, that has become their only possible path, because real Explanatory Theory has been totally abandoned!

Let us make the position clear: making a measurement, in certain circumstances can indeed determine the outcome, It means two things:-

1. The situation is a “tender” balance between a nexus of factors, and
2. the measurement intervenes and becomes a component in the outcome

Theory alone can take us beyond the impasses inevitable when only description is used: for that isn’t, and can never be, causative - unless, that is, you are an idealist!

“What if reality can’t be described without invoking our active involvement?”

This is a handy assumption to prop up the currently consensus position!

But it is neither always the case, nor when it does seem to be so, the quandry is unsolvable by referring to established Explanatory Theory, which can indeed either resolve it directly, or, alternatively, indicate what extra premises should be included.

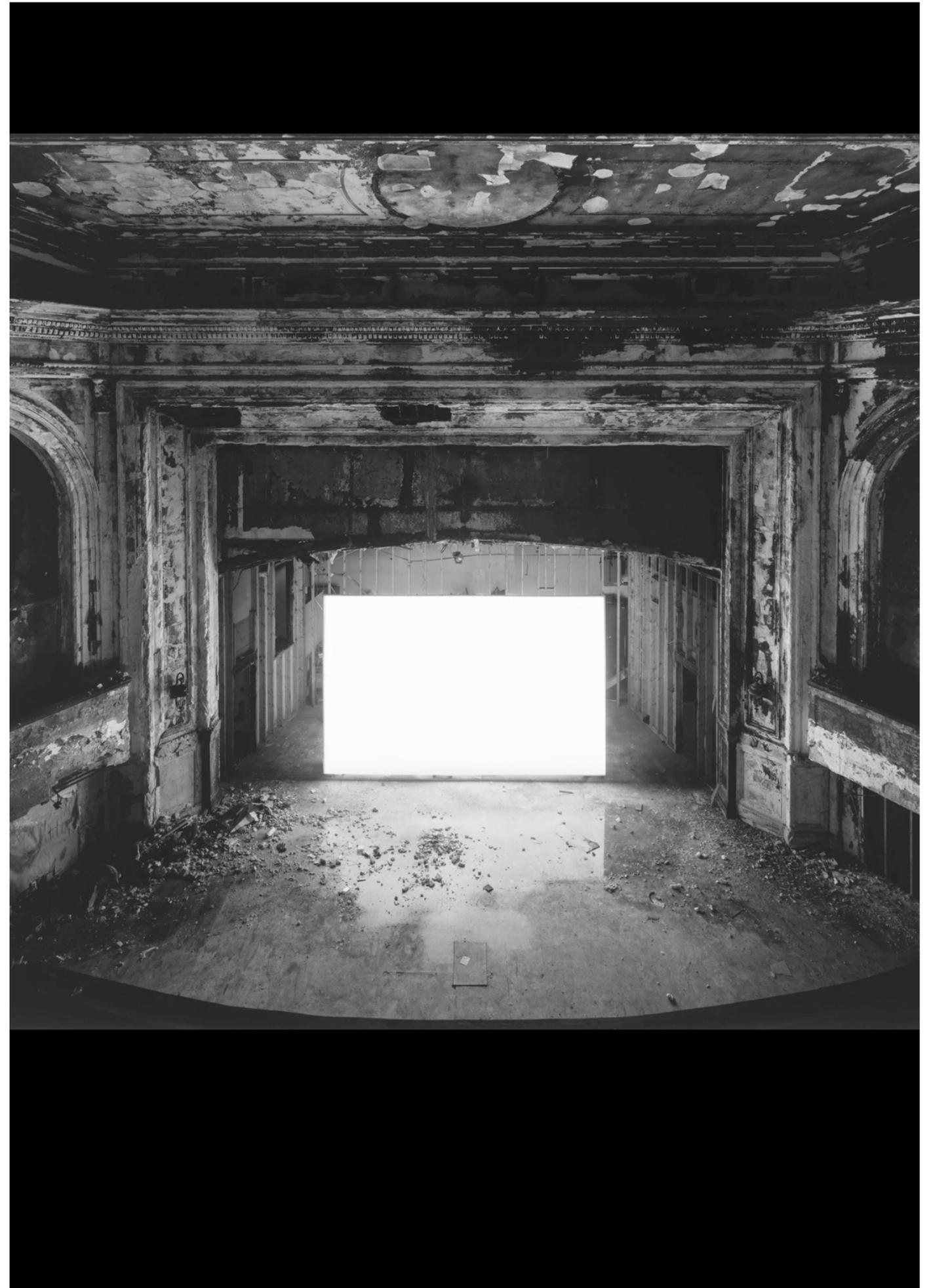
The article more or less insists on the above quote, and proceeds with a discussion of alternative suggestions, but as a theorist who has successfully used all of the solutions described above, it is clearly a discussion limited to being between those still locked into the dark cell that is current Quantum Theory!

I feel the review, thus far, makes further treatment of these ideas unnecessary. Though after an extended consideration in the article, our “philosophers” conclude with:-

“there are no ‘facts of the world per se’. Rather, there are only facts for each observer.”

or, “Give up now, you’ll never do it!”

The New Scientist article, thereafter, goes on to a different tack, which is addressed in Part II of this review!



II: It's all Probabilities

This Second instalment maps a distinct current trend in criticising Copenhagen, via a return, via Probabilistic Laws, to something like the initial historical approach to Gases and the like.

In other words "prior-experience" is built into what we expect from an experiment, and so also modifies what we extract. The modern attempt to formally include this is based upon Bayesian Probability Theory:-

"'Bayesianism' comes in: it refers to the classical theory of probability, initiated in the 18th century, that assigns probabilities on the basis of what the observer already knows to be the case."

Fuchs and others devised a modification which they called QBism! Where, when some model is assumed, in order to set up the Wave Function to be used in the Copenhagen Interpretation: it unavoidably will involve past experiences and discoveries - even if they are considered to be Laws of Form independent of particular situations and components!

"and..... these beliefs can be updated as the observer takes fresh experiences into account"

For QBism

"....assigns probabilities on the basis of what the observer already knows to be the case"

But...

"This doesn't mean there can be nothing "real" beyond personal belief, only that quantum mechanics doesn't speak directly to that issue."

The knowledge-built-in is like simple measurements without any assumption of a cause - as with any primitive Heat Experiment, a law is possible without knowing "Why?" it is so!

"Nor indeed does (the) wave function collapse, which is then just a way of talking about how measurement updates our knowledge"

Now, surprisingly, this old-fashioned pragmatic approach is not preferred by almost all subscribers to

the Copenhagen Interpretation. They believe that their interpretation really does reflect "Reality-as-it-is" at the Sub Atomic Level. They are wrong in their theorising, of course, but can predict reliably using their constructed model.

NOTE: I feel I am bound to compare this with James Clerk Maxwell's Model of The Ether, from which he successfully derived his still-used Electromagnetic Equations. His complicated mix of static-yet-rotating vortices, along with free running "electrical particles" was certainly wrong, but it still allowed him to arrive at those Equations, which are still used today!

As a holist I know that what we seek is never Absolute Truth (as that is an impossibility), but to alternatively seek ever more Objective Content in our conceptions: as well as accepting that all our gains will be temporary, but still, currently, the best and most efficacious yet.

Yet our Copenhagenists are adamant in the face of the Young Pretenders referred to in the reviewed article! They reject the knowledge-without-a-cause Pragmatism, for a purely idealistic set of "supposed causes". But, of course, neither of these should be Modern Physics!

The pragmatic QBism is closer to Reality, but does not explain it! While the Copenhagen gives fixed and useable predictions, but neither reflects Reality, nor explains it. Funnily enough the QBists are the same as the Copenhagenists in how their models came-to-be.

Let us explain why!

There are many myths about the basic Philosophy of Science. Initially Mankind was limited to Pragmatism - "If it works it is right!", and it stood them in good stead for many millennia, and is still present today, though as part of an amalgam of contradictory stances, underpinned and excused by the above pragmatist tenet! The Greeks contributed both Idealism via the contributions termed Euclidian Geometry, and Materialism from Aristotle's studies of Reality. But, they also took from those the Principle of Plurality, which assumes fixed Natural Laws and also underpinned Formal Logic too.

Indeed, the Philosophy, upon which Science stands, is not a single and sufficient stance, but an amalgam of Materialism, Idealism and Pragmatism with all grounded upon a wholly pluralist basis!

Now, such, as it developed, was NOT a disadvantage as you might assume, because, one way or another, an appropriate stance could be available for each and every area of study - a sort of unaware Postmodernism, if you like!

But, the elements are, indeed, contradictory, so Pragmatism was and still is, essential to excise all theosophical flips - "If it works, it is right!" patches-over all inconsistencies for resolution "later".

So, both Copenhagen and QBism resort to Pragmatism in their different ways.

Of course, if you merely want to *use* aspects of Reality, such an amalgamated stance can be made to work. But, if you want to increasingly understand your World, that stance will stymie you regularly, and in the end terminate your endeavours.

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