



SHAPE JOURNAL

SUSSKIND'S UNIVERSE

IDEALIST AND PLURALIST REALITY / SUSSKIND'S COSMOLOGY / TIME AND DEVELOPMENT IN SUSSKIND'S UNIVERSE
PLURALITY AS TYPIFIED BY LEONARD SUSSKIND / THE DEBILITATING EFFECTS OF MATHEMATICS UPON SCIENCE
EXTENDED VERSUS LOCAL / REALITY AND MATHEMATICS

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The idealism of today's leading physicists is beginning to crumble...

Susskind's Universe

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Why Susskind?

Preface

by

Jim Schofield



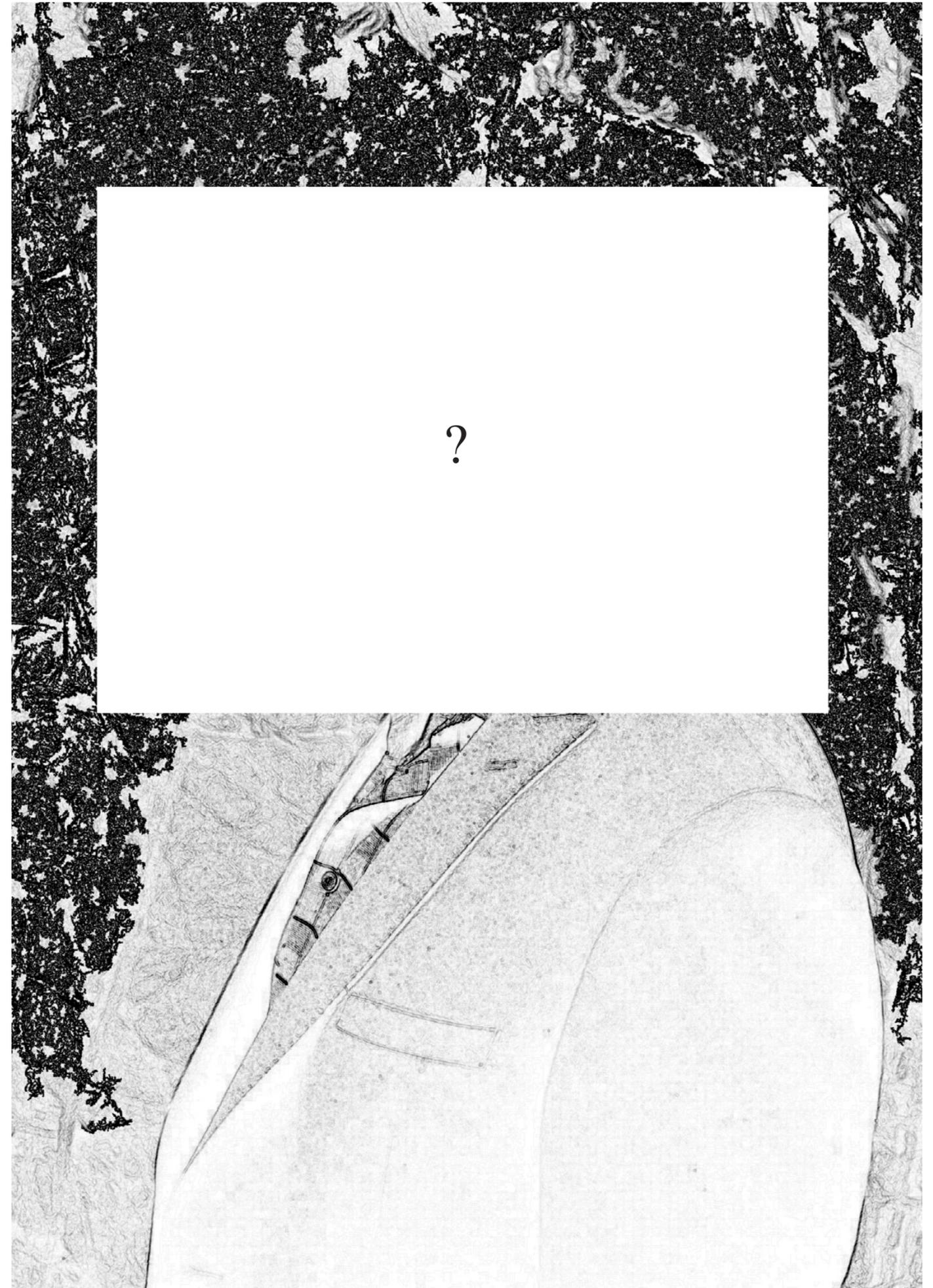
Welcome to Issue 68 of SHAPE Journal, an edition which tackles Cosmology, the philosophy of Mathematics and its deleterious effects on modern Physics. It does so through a critical response by this author to several lectures by leading physicist Leonard Susskind - but why single him out in particular?

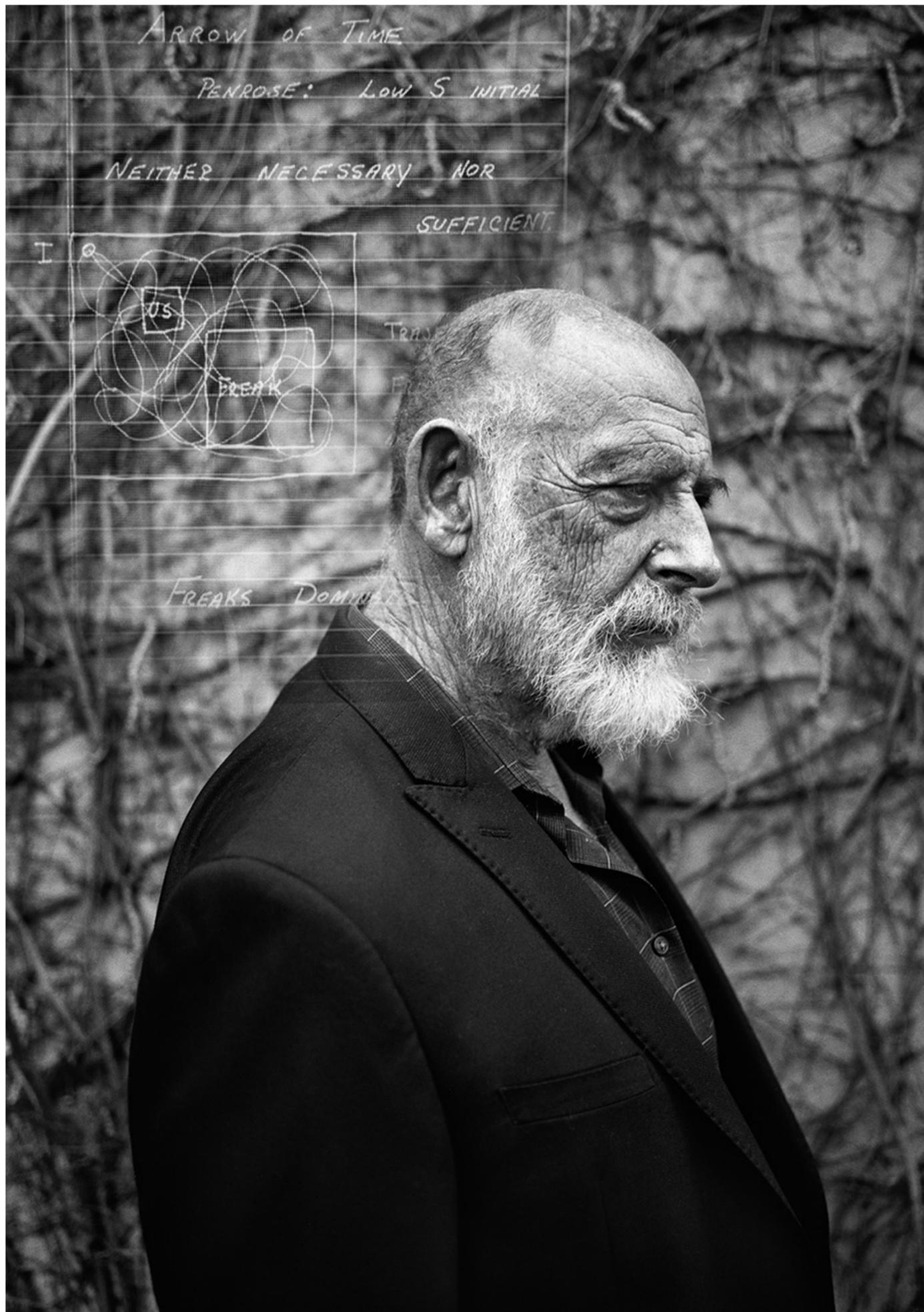
Susskind is professor of theoretical physics at Stanford University in California. Stanford is a private University and is regularly ranked one of the top three universities on earth, employing the very top academics in their fields. For this reason alone Susskind is a key physicist to tackle - he is also considered one of the fathers of String Theory.

As well as this key contribution to Sub Atomic Physics he brings in many other areas of interest such as Cosmology - and presents himself as something of an all round science expert. His vast series of lectures on YouTube are a vital outlet for the latest ideas in contemporary physics based on the flawed assumption of the Copenhagen Interpretation of Quantum Theory. As part of my continuing attack on the latter I felt the need to take down one of the leaders of this field, and Susskind fit the bill perfectly.

In the infamous Smolin–Susskind debate, Susskind’s argument and support for the “anthropic principal” tells you everything you need to know about his quasi-religious idealism - encapsulated in the words of Brandon Carter: “The universe must be such as to admit the creation of *observers* within it at some stage. To paraphrase Descartes, I think, therefore the world is such.”

Susskind, for me, epitomises all that is wrong with science today. Susskind and his like are responsible for the ruination of the subject via their Pluralism and rampant Idealism. In his unapologetic support for Mathematics as the language of the Universe, Susskind entered my sights as a key target in the war against Pluralist science.





Idealist and Pluralist Reality

Susskind's Reality is wholly defined by Mathematics...

In a couple of series of Lectures by Leonard Susskind of Stanford University, he defines both Sub Atomic Physics and Cosmology solely via his beloved Lingua Franca - the wholly Pluralist Discipline of Mathematics, exactly as it was initially defined in the Greek Intellectual Revolution of the 5th century BC, and, as such, could only be possibly applicable to *Pure Forms* alone.

These idealised Forms must not only be pure, they must be qualitatively fixed forever - once defined they can never vary.

Pretty limited, I think you'll agree.

This perfected scenario could only be truly valid within Mathematics itself, but could perfectly-legitimately be used to construct the first ever Consistent-and-Comprehensive Intellectual Discipline, exclusively as the study of only the Pure or Perfect forms that were involved there.

But, the very premise that actually allowed its development, also, in fact, alone enabled its significant properties. It was the necessary FIXITY of ALL the relations involved - which then made them possible, for the very first time ever, by the totally new devising of Simplified Relating Abstractions. For, it was these, and these alone, that made possible its intrinsic properties. But, they are only true about such Forms and literally nothing else!

So, in promoting Mathematics to being The Lingua Franca, wholly illegitimately, of both General Reasoning and all of the Sciences, the Greeks were using that language where it should NEVER have been used, unless, of course, all the features in those disciplines were somehow completely qualitatively unchanging; and that is clearly impossible in reality!

So, in their both arriving at the defining of all Natural Laws as eternal, and, and thereafter, using ONLY a Pluralist Rationality, in both Science and Reasoning, to then wholly illegitimately manipulate those significantly-distorted-assumptions to deliver all the rational consequences generateable from those wrongly assumed bases. And the Forms of Mathematics are not only pluralistic, they are also totally idealistic too: for they represent only the simplest, purest Forms, which only very rarely apply in the Real World situations that are addressed, in both of those Disciplines.

And, they also take this incorrect stance even further, as the Pure Forms of Mathematics only are what are subsequently fitted-up to a carefully adjusted-and-maintained version of Reality, by using only pluralistically-arranged-for experimental data, to complete the felony!

Now, our Stanford Lecturer covers his Physics and Cosmology exclusively by means of Mathematical Rationality, which is, of course, wholly illegitimate in both areas. And, when his auditors ask him questions that actually require *Physical* answers, he subsequently allows absolutely NO deviation to his own steadfast idealist purpose: he admits of no possible deviations from his own super confident rational techniques.

At best, he arrives only at mere echoes of conclusions aquired elsewhere, but absolutely NONE outside of the premise that Formal Equations alone encapsulate the whole undiminished Truth, and all deviations from such Core Truths are the really misleading aberrations. The Essences are embodied only in his maths-based manipulations. He is a competent mathematician, but a very poor Physicist and Cosmologist!

And, in Cosmology he can easily loosen all the reins, for it is not a Discipline where experiments can be used to confirm or deny suggested conclusions, for, no real

control is ever possible in such a Purely Observational Area of Study. So, speculation is not only possible, but almost obligatory. And to compound the possible felonies still further Susskind also further abstracts the equations he uses with what he terms Dimensional Analysis, which largely replaces the usual formal relations with the possible dimensions only - and wherever possible replacing detailed terms by purely "dimensional simplifications", and, even more way out, the actual extending of current relations to their absolute limits, and there defining different phases in situations, always occurring at various "times" in the purely quantitative changes supposedly delivering quite different qualitative changes at the transitional limits of those dimensionally revealed Phases.

It is an old trick, in a new garb, as his Dimensional "variables" just seem to flip (without evident or

demonstrable reason), so he never has explain why-*qualitatively*.

So, in sticking like glue to this Pluralist stance, the clearly obvious Real Qualitative Changes that have definitely occurred in the development of the material Universe, and have NOT been thorough-goingly explained, as they should be, via Dialectical treatment of the factors involved: but are instead rigged up to always be due to "Quantity into Quality", usually approaching some Dimensional transition point - without, of course, any direct physical evidence whatsoever!

And, the formal means used, in all these manipulations and predictions, can never be countered by "actually-measured-evidence", as such are, in his chosen mode, totally unavailable.

By this point, in Susskind's descriptions, without any rational means of delivering Real Cosmological Relations, what he delivers is merely a new branch of Mathematics, with a certain unreliable Cosmological colour.

Equation quickly follows equation, but what objectively you can do with them is very little.

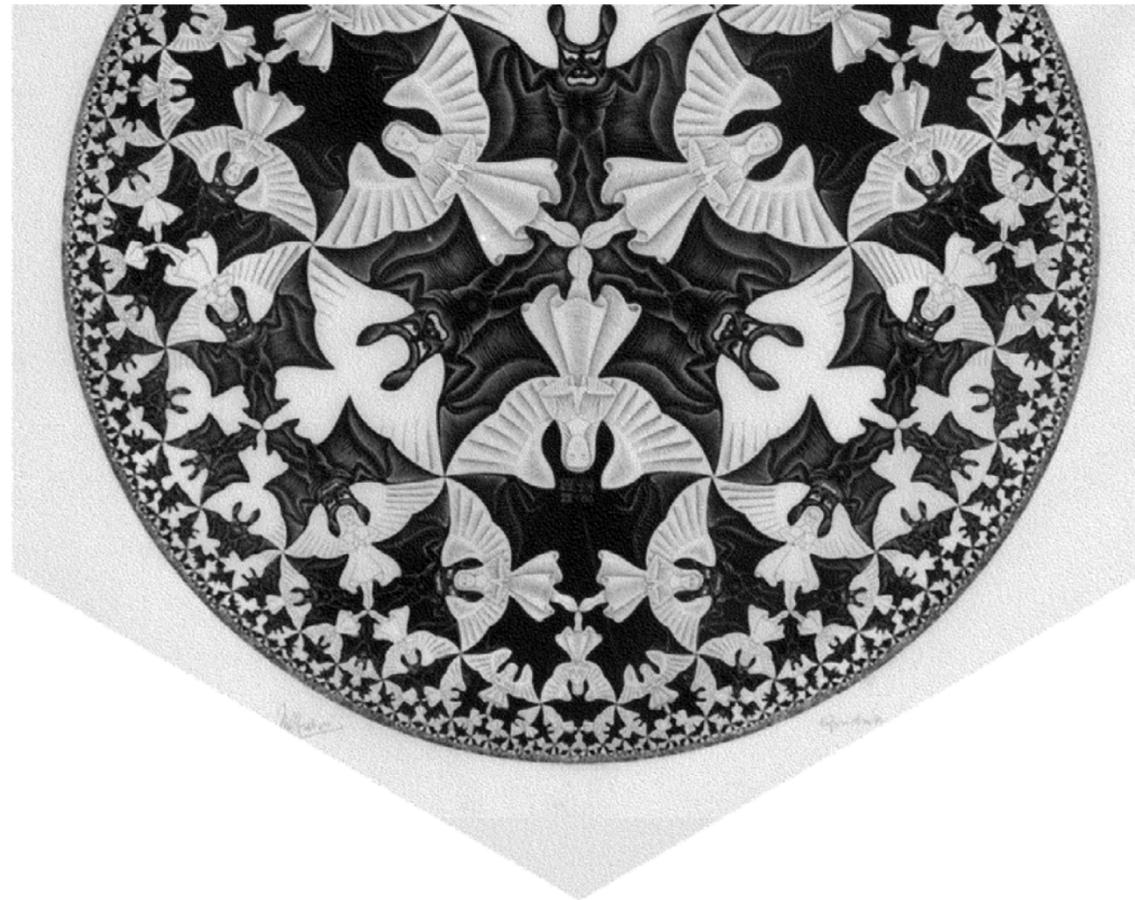
Along with other extensions, this increasing area, is NOT about Reality AT ALL, but on the contrary, about even more extensions into the far reaches of cosmological Ideality - a Universe of Pure Forms alone extended deeply into its infinite Non-Real Hinterlands.

It amounts to the always-present Dichotomy, since the Greeks, of Reality and Ideality. For, the means in both is unavoidably Abstraction, but very differently considered and used in each!

For, if the Abstractions are considered to accurately reflect what determines everything, you are an Idealist, and what you investigate are the infinite reaches of those abstract forms - and your Discipline is called Mathematics!

Whereas, if you are a Materialist, and Abstraction is always a simplifying Means-to-a-Real-End then you investigate the hidden wonders of Reality, and your Disciplines are The Sciences! In this latter case you must always be acutely aware of the limitations of abstraction and quantification - they are certainly not the language of the universe, merely a short-hand developed by ourselves.

It is a perennial problem for Mankind, and irresolvable without subscription to a Dialectical Concept of Development!



Leonard Susskind
Stanford University Institute for
Theoretical Physics



Susskind's Time and Cosmology

The Exclusion of Development

On listening to Leonard Susskind delivering a lecture at Stanford, ostensibly about Time and Cosmology: his by now standard objectives and consequent premises - which had long ago been decided upon - were seen as *immutable* Laws of Nature. Susskind's stance is attractive for it promises a straightforward, all-embracing and "developable" overall system - for it has a solid and dependable foundation. But this approach is only possible by subscribing to a fundamental assumption which *is not true* - determined by the Principle of Plurality - and achieved by limiting all the involved elements to having permanently-fixed properties or qualities.

Now, Plurality certainly isn't the only such assumption that can be made, while it certainly dominates the sciences. Almost simultaneously with the Greeks developing Philosophy and Mathematics, the Buddha in India was assuming the exact opposite premise about reality - namely that "Everything is in constant Change", which ultimately became embodied in the Principle of Holism - and which turned out to be absolutely vital in explaining Real Development, that is in the emergence of the Wholly New. Plurality was severely limited to static, unchanging situations - whether in science experiments or naturally occurring Stabilities, while Holism was the only way of dealing effectively with Qualitative Change.

Yet, these two were clearly completely-contradictory-ontologies, and as the Greeks had also endowed Reasoning with the very same limitation of Plurality, they could not both simultaneously exist, according to the rules of Formal Logic. Plurality came to rule almost universally.

And Susskind's lecture clearly subscribed to, along with the consensus in Science and Mathematics, this universal Plurality - perhaps even a extreme version of it - whereas my own stance cannot so easily dismiss Holism, involving the Exactly Opposite Premises. Consequently Susskind

doesn't delve ever deeper into Physics, which seemed to be the purpose of the journey, but on the contrary, leads instead very deeply into Mathematics - an entirely Abstract Realm containing only Perfect Forms, which I term Ideality.

Mathematics is constructed entirely from simplifying relatable Abstractions, which, being-common to all its elements, made possible the first truly Intellectual Discipline, in which Theorems and Proofs could establish a rationally consistent System.

But, Susskind was not using his abstractions to develop *Mathematics*, but instead to develop an account of all Reality - a Cosmology - and this must be based in Physics, which is NOT, in fact, a pluralist area: it is actually a holist area. Its inadequacies are clearly evident in that Plurality does not deal with Qualitative Change at all, but only Quantitative Change - so the Laws addressed can only ever be eternal Natural Laws - the Laws themselves are not allowed to change. They are like the word of God! And Real Developments are totally excluded from this Cosmology, which sees Physics only as a set of fixed rules playing out for the rest of time.

But how did these rules come to be?

Now, of course, any useful encapsulation of Reality, which omits Qualitative Changes, has to somehow address them in artificial and incorrect ways, and the classical method has always been to also subscribe to basic Pragmatism, keeping alive, as *sometimes* applicable, a whole range of limited and even contradictory specialisms, which can be switched-to, pragmatically, whenever a plurality-generated impasse occurs - which they do - all the time!

In other words, in spite of the so-called Copenhagen Revolution, the underlying basis is still closely similar to the *Positivism* of Poincaré and Mach! How can it be



other when subscribing simultaneously to Plurality and consequently contradictory concepts?

Now I didn't say the same, because the whole Copenhagen detour, introduced by Bohr and Heisenberg, also opened up the infinite reaches of Idealist Mathematics, which when illegitimately coupled with Probability Theory and Wave Theory, could be shoe-horned into a passable, if tedious, pragmatic Description WITHOUT any Explanation!

It is the contention of this non-Copenhagen physicist and philosopher, that the means smuggled in was both possible and necessary because of a now always vitally omitted premise - that of the existence of an undetectable Universal Substrate - originally assumed by all physicists but after the Michelson/Morley Experiments was permanently discarded because it could not be found.

Yet, every single anomaly of the Full Set of Double Slit Experiments were totally removed by the mere insertion of a very simple-and-possible undetectable Substrate made of electron-positron paris.

Of course the "Copenhagen Revolution" was in fact a step backwards, not only into pragmatic Positivism, but even more damagingly, into the total abandonment of Physical *Explanation*, and its replacement by Pure Mathematics. For, these changes terminated our only hope of tackling Qualitative Changes completely, while opening the door to illegitimately applied Pluralist Mathematics upon an enormous scale.

And the necessary Holist Revolution, made possible by Hegel's Dialectics, and Karl Marx's transfer of Dialectics wholesale into Materialism, was taken off the agenda for a Crisis-Ridden Modern Physics! The absolutely essential extension of the Basic Sciences to addressing Qualitative Changes was stopped dead in its tracks by Copenhagen Physics.

In Susskind's lecture he questions *the Arrow of Time*, but starts by restating the obvious, as the usual "Common Sense" mistake, but never mentions his opposing premises - and he certainly should - because he, along with literally all other physicists, assume Plurality as his initial premise, and hence sees his subject as composed only of fixed elements and Laws.

How can you possibly deal with Time and Cosmology without a holistic view of qualitative change and hence development?

Instead of Reality being determined solely by a set of fixed Laws, all of it, including these properties, are subject to change-and-development, and hence Reality is always potentially "on the change", and hence thereby ultimately producing a changing future! If certain 'Laws' appear to last forever, it is vital we attempt to understand how such stable situations can appear to persist for so many billions of years, rather than just assume things last forever!

"But", he insists "as physics became more mature", such ideas were set aside. They would have to be if all Laws were fixed as the wholly new could never happen, and that prejudice would be strengthened by all changes being only produced by incremental qualitative changes by fixed laws. Long-established Stabilities, threatened by series of temporary Crises, and then even total collapses, and creative re-builds into the Wholly New - in other words Emergences and Revolutions would never happen!

Now, these points alone should have scuppered his alternative, but they don't. For Susskind "steps outside" his stance to another "at a higher level" to alternatively see things from several alternative "higher" stances, successively calling upon more and more abstract mathematical (Pluralist) ideas to weave imaginative stories with alternative interpretations.

Interestingly, but I'm afraid NOT rationally or profoundly, he manages to include some echoes of the conclusions of holism, so he must be aware of the weakness of his basic stance. But like Catastrophe Theory, Fractals, Chaotic Mathematics and the rest, they are all merely suggestive fragments only - just more grist to the Pragmatic Mill, without any Coherent, Consistent and Comprehensive overall discipline to back it all!

Believe it or not, every single, stand-alone addition he revealed, are all rationally delivered directly by a single Holist stance and a consistent methodology. Indeed, some of his interpretations from Quantum Theory, which he presents, along with others, are all unsubstantiated, and mutually inconsistent with each other, but often manage to echo actual consistent derivations from the Holist Stance.

The most surprising are his alternatives for the development of our (and possibly other) Universes, yet in none of them does he proffer a caused origin - only a series of alternate possible *Forms!* He is no physicist: he is a mere mathematician.

Finally, his reliance upon probabilities and chaos remind me of the infinite number of monkeys on an infinite number of typewriters ultimately, given an infinite amount of time, producing the Complete Works of Shakespeare!

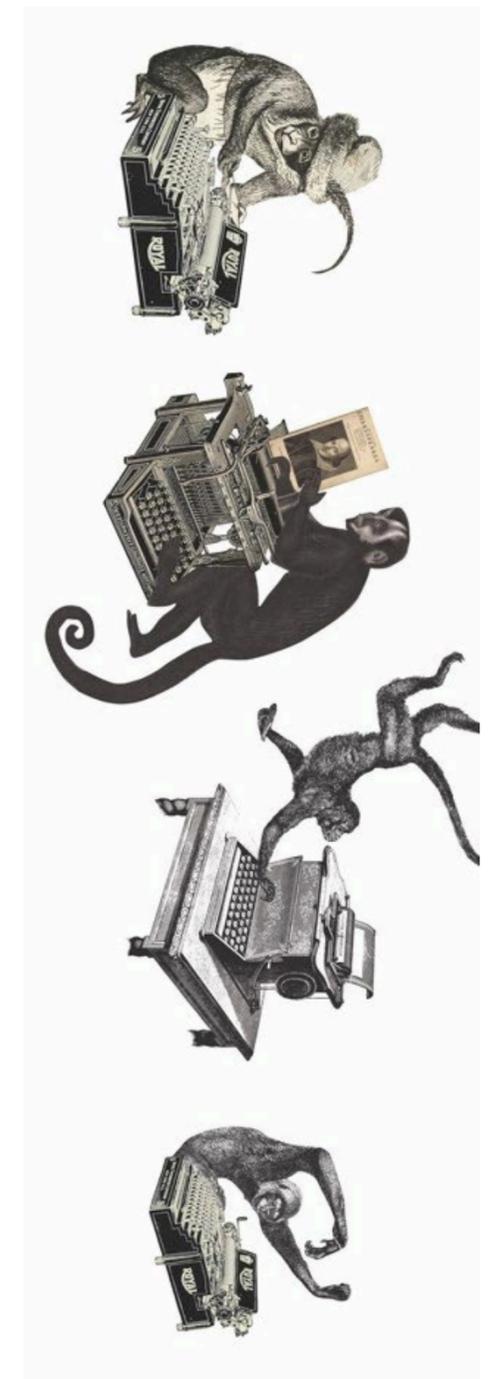
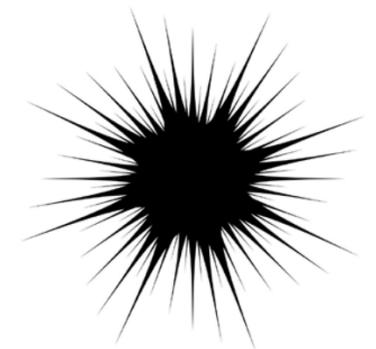
Utter nonsense, of course. For it delivers the required result only within the impossible and the ideal - namely, within an unobtainable infinitely lasting situation! For the infinite-as-such does NOT exist: it only *fictionally* exists as a mathematical concept, going on forever until every single situation must at some point occur. That is NOT an Explanation: it is an Excuse for not having one! And it demonstrates exactly why these thinkers will never come up with any answers, they have absolutely no clue about how real entities and systems develop and emerge.

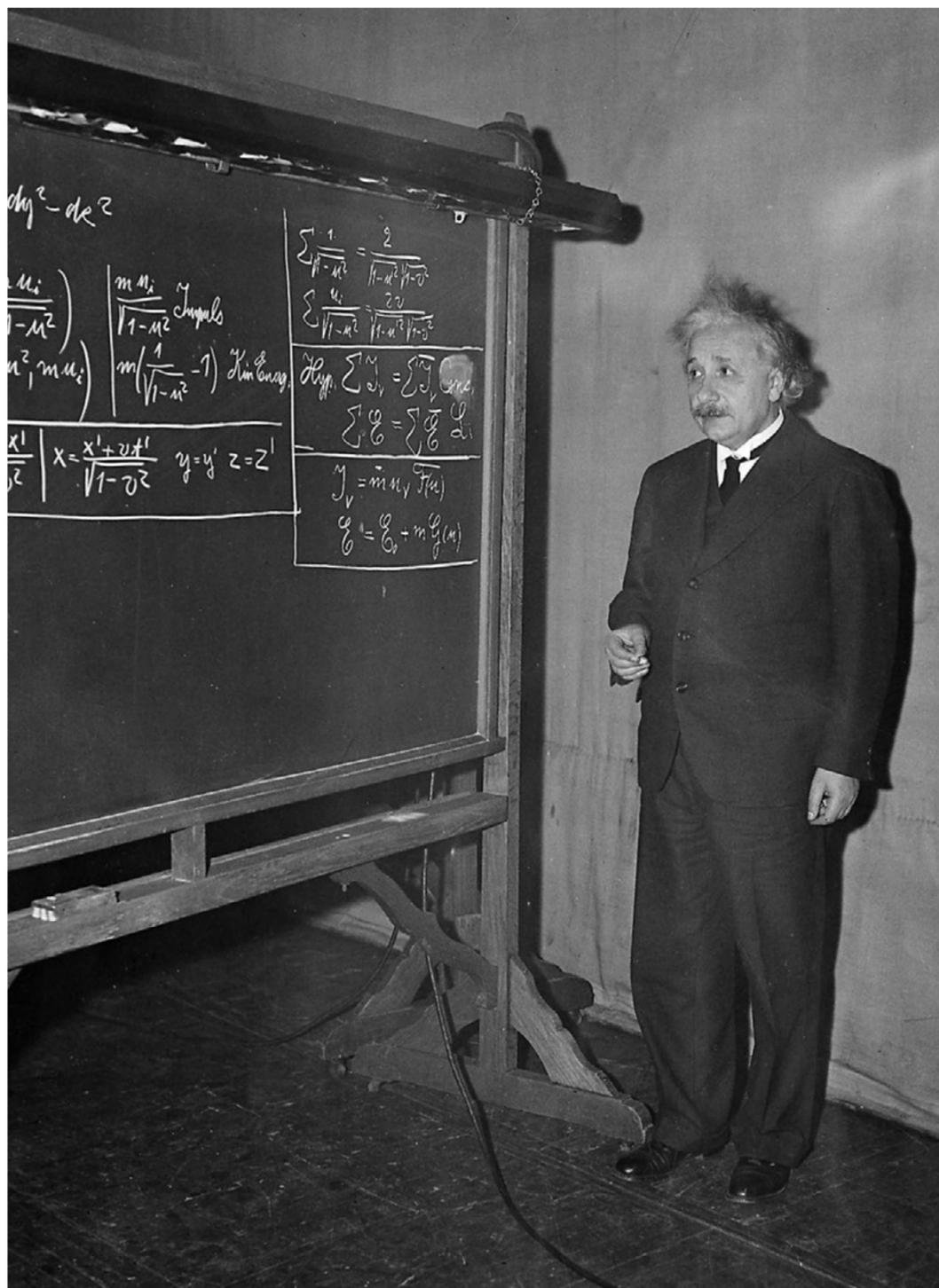
POSTSCRIPT:

It is not easy effectively demolishing an incoherent, inconsistent and pragmatic stance, such as that of Susskind, without a reasonably complete definition of the comprehensive alternative, and a piece-by-piece demolition of the illegitimacies of the criticised pragmatist, amalgam position.

Something akin to that does exist, but it resides in the many published works of this writer, produced, in the main, over the last decade, and residing in this journal.

One last emphasis perhaps should be highlighted here: the role that Chaos and Infinity are made to play is illegitimate because it cannot be proved or disproved: as it is not falsifiable, it is pure speculation only.





The Debilitating Effects of Mathematics upon Physical Science

This is a topic of paramount importance, so I will have to labour at great length to demonstrate exactly how such a fundamental Science as Physics has been corrupted by Mathematics, so much so as to effectively bring it to its knees. Without a significant revolution in its underlying premises, they will inevitably relegate it to become, more and more, a mere branch of entirely Abstract Mathematics, and, less and less, an effective tool for Real Understanding of the Universe.

The most revealing tenet of this severely damaged Science is encapsulated in its stated primary purpose - "to reveal the fundamental Laws of Nature!" You might think this seems innocent enough, a noble aim, even. But hidden within this purpose is an assumption of fixed properties and eternal laws that we can extract and analyse independently of one another.

For, in a World of relatively long-lasting, and easily studiable Stabilities, along with seemingly-unintelligible Qualitative Changes, we naturally look for Essence solely within those maintained Stabilities.

Stability, Plurality and Pragmatism were a winning formula for human development, more than sufficient to establish both Farming and Animal Husbandry - not to mention Metallurgy and War, and had even built Empires based upon those principals alone! Indeed, that same limited stance, in the Sciences, prevails largely in the same way, up to the present day, but in spite of its evident gains on all sides, it has also directed Mankind into many mistaken impasses, and into various investigational cul-de-sacs too.

And even Reasoning, still entirely governed by Plurality, is increasingly slipping ever deeper into the mire, despite the gains of Technology. And, my own specialism, Physics, is undergoing a major Century-Long-existential-Crisis, and an increasing disability, especially in its attempts to

causally explain things at the Sub Atomic Level!

Clearly, the major problem arises with Mathematics inability to Explain Real Qualitative Change, as is absolutely essential. Everything at some point involves periods of development and evolution, crucial to their becoming as they are.

In choosing Mathematics as The Lingua Franca of both the Sciences and all Reasoning, they unavoidably re-directed Thinking and Debate away from Reality, and into the Realm occupied solely by Form, with its pluralistically-fixed concepts, which only exist in the infinite idealist World I term Ideality!

Now, very soon after the Greek Intellectual Revolution, one of their number, Zeno of Elea demonstrated very clearly, in his Paradoxes, that the application of the new Reasoning to Movement always led to impasses and contradictions, which could never be resolved purely rationally. Yet, his legitimate criticisms were misinterpreted or cast aside entirely, and it took a further 2,300 years before the German Idealist philosopher, Hegel decided to directly address Zeno's problems, which he then extended into a whole much wider set of what he termed Dichotomous Pairs of Contradictory Concepts, which always, and unavoidably led to such impasses, due to them being failed efforts at dealing with essential Qualities that clearly really did vary - even into their direct opposites - a switch that seemed logically impossible, but was actually one of the most likely Qualitative Changes that could naturally and regularly occur!

But, loath to introduce such revolutionary and destabilising concepts into what they believed was The Primary and Determining Discipline embodied in their Science, the physicists turned ever more strongly to the discipline that not only conformed to their

defining pluralistic prejudice, but could also be applied successfully in specially arranged for Pluralist Stabilities. So, consequently, not only Physics, but almost all the Sciences were indissolubly linked to the Pluralist stance and could therefore never explain Qualitative Change.

But Physics had long ago conquered Waves, which could be ascribed to physical Media, but were also later found to be extant across all environments, rather than localised into single material objects. For instead, they involved the *Connectedness* of the units involved, which alone enabled those extra Wave properties!

Indeed, mathematicians had produced Formulae that could deliver Field Values across whole areas of a permitting Medium. While others (such as James Clerk Maxwell) had already linked these to distributed Field Effects across the medium's suggested material components.

The key was the supposed Universal Substrate - or Aether - which, though seemingly undetectable, had been expressly-devised to deliver an Analogistic Model by Maxwell, in terms of its known effects upon detectable bodies occurring within it.

But though, the produced properties were known, exactly what the material Units of that Substrate were, which could actually deliver what was known to both exist, and be propagated, throughout that Medium, was still a mystery, if they existed at all!

Now, the application of known properties and Laws to Media, with known-and-studiable units, was already by this time largely complete: but certainly NOT considered as yet for the undetectable Aether! In attempting to settle various still undetermined questions, Michelson and Morley set up an experiment assuming that all heavenly bodies (including relatively inert Planets) were moving through a vast material medium, and their results did not tally with that assumption, so they drew the conclusion that there could not be a Universal Substrate, and hence NO Aether.

Now, as physicists, you might think that such a conclusion was insupportable, as it created a situation in which Waves occurred in situations where they couldn't be propagated! But, the avalanche of impasses had grown to such an extent, that the whole expectation of coherent Explanation had been undermined, that the physicists, as

a whole, were abandoning Physical Explanation, as self-kidding rationalisation, and were increasingly turning to pure Mathematical Formulae as the Real Essences of Reality. They were, at least at the Sub Atomic Level, abandoning Materialism for Idealism!

Now, there was still a problem: Wave Theories when applied to known and detectable physical media were always deterministic, but, at the level of a Universal Substrate, they simply weren't! Absolutely NO unique positions were determinable there: and their conclusion was that Determinism-itself no longer held at that Level.

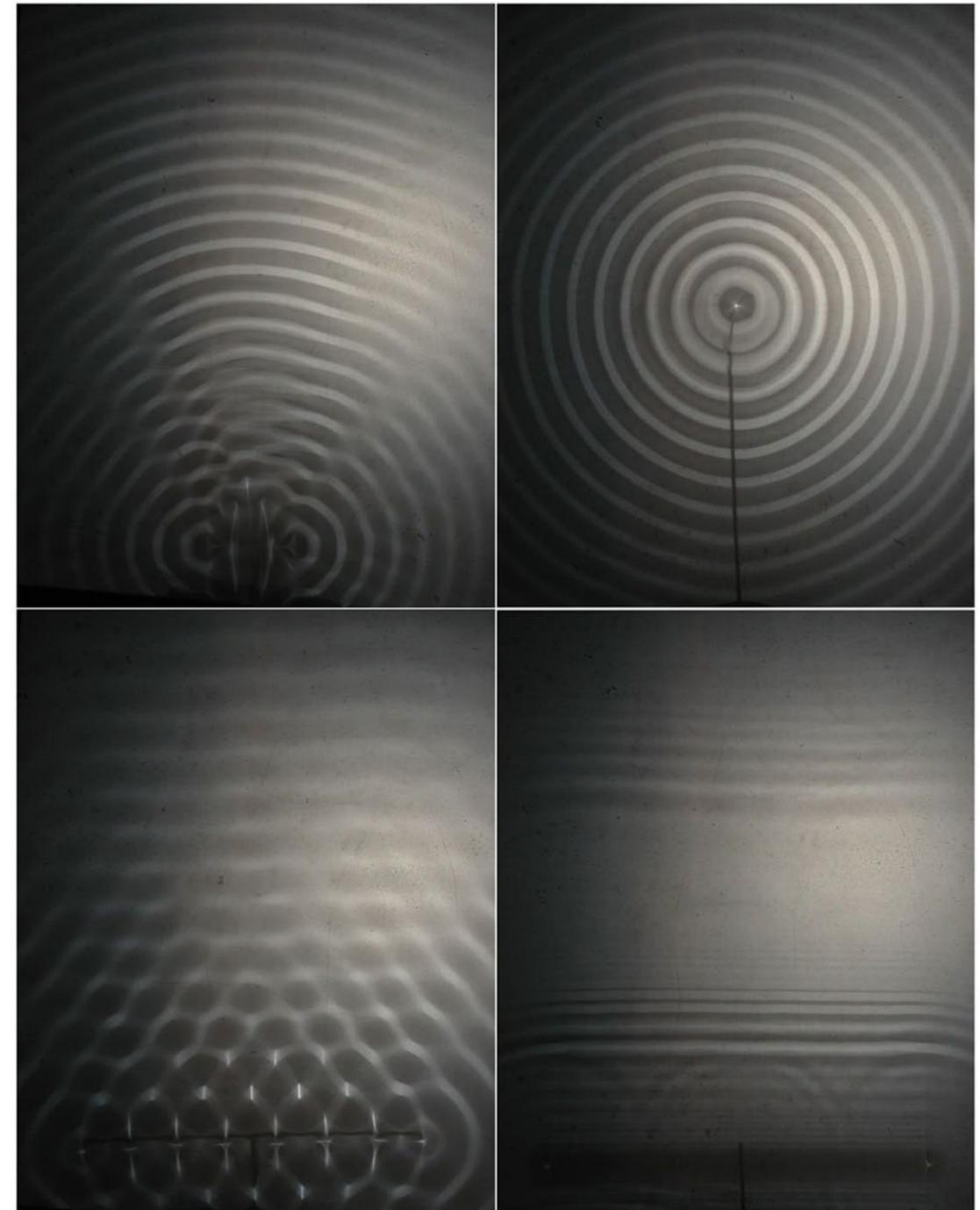
Things were indeterminable at that level, so Determinate Laws would be replaced by Laws delivering only *probabilities* for any affected particle, for example, to be in a particular point somewhere within the whole range of the field involved.

Now, such distributed possibilities had long been possible within certain situations in Fields within Media - but after Michelson/Morley, any possibility of such a Substrate, and consequently its properties, had been jettisoned as untenable!

So, for this Explanatory physicist, as distinct from the Mathematical physicists, who now ruled the roost, the possibility of Explanations was far more important, than a conformity to wholly Pluralistic and Idealist Mathematics! So two distinct theoretical routes were cast in stone by the two diametrically opposing schools of thought within Sub Atomic Physics.

The consensus group would depend only upon Mathematical Forms, derived from data acquired solely from the well established pluralist way of doing experiments (in accelerators, for example), coupled with the necessary fitting-up of those results to entirely Formal idealistic forms from Pure Mathematics. And to compound the felony, they would take equations from Wave Theory that normally give the field effects across the whole range of its supposed influence, BUT then wholly re-interpret them as *probabilities* that the resulting particle is actually situated at each possible position.

In addition to their pluralistic and idealistic errors, they also substantially modified the philosophy involved, which they needed to do, just to allow this to happen!



WAVES IN NOTHING?

And, all this led ultimately to Wave/Particle Duality and Heisenberg's Uncertainty Principle, not to mention Quantum Entanglement and many other constructs and mathematical tricks including those employed by Leonard Susskind.

But, what could the Explanatory physicists do to deliver an alternative?

Initially, they could attempt to re-instate the notion of a Universal Substrate, but as currently undetectable, which, in a Holist rather than a Pluralist way could both affect and be-affected-by particulate intruders! So, that is what I tried to do, initially within a theoretical investigation applied to the whole set of Double Slit Experiments, every single anomaly was finally overcome, purely physically, without any references whatsoever to Copenhagen. And that wasn't by chance: these were Physical Explanations for the very wave-like phenomena physicists had completely failed to account for in their own Maths.

Now, ever since the Greek Intellectual Revolution, the pluralist rationality of Mathematics had been wrongly transferred over to both Logic and the Sciences, and that was wholly illegitimate because the main consequence of Plurality was to limit valid entities and concepts to Fixed Forms alone: and such can never be true in either General Reasoning, and also in both describing and explaining Reality-as-is! Indeed both Zeno and Hegel's corrections to these mistakes were essentially a Holistic stance where everything affects everything else to some, and absolutely essential, degree.

Now, Hegel's corrections to logic, which he termed Dialectics, were necessarily limited to the Human Thinking, which was his area of study as an idealist. But, what was still desperately required was its conversion to a steadfast Materialist philosophic stance, in order to apply Qualitative Changes to All of Reality. And this was eventually achieved by Hegel's student Karl Marx, who spent the rest of his life applying it first to History, his own specialist area, and thereafter comprehensively to Capitalist Economics, that took him until his death.

Now though Marx's Das Kapital was absolutely crucial, it was by no means sufficient in supplying a methodology. What was required was a comprehensive application of Dialectics to the Sciences-in-general, and, as subsequent History has clearly shown, to Physics, and especially to

the heart of that Science's current major Crisis, in Sub Atomic Physics.

Before allowing any attempt to confuse the issues involved here, I feel I must clarify what Qualitative Changes actually are!

They are Changes in the Qualities that define something specific. They are never merely Quantitative Changes - changes in the magnitudes of contributing components, suffered entirely without any change in the Qualities involved. Temperature, Density, Length and Weight are all Quantities, and can be very easily changed. But a Concept can never be simply changed into a different one Quantitatively, and the same is true for a non-living system to a living one.

Quantitative changes can be encapsulated in Descriptive Laws, but changes in Quality cannot be so described. There is NO set of laws enabling changes in Quality: there may be experientially-established descriptions of such techniques, as in metallurgy and other Technologies, but with absolutely NO explanations whatsoever.

Descriptions of "How?" and their execution, with no Explanations as to "Why?" we can group with Technology; and there the age-old tenet has always been "If it works, it is right!"

The whole of Science has been, from its inception, a series of steps, each with the minimal required contents, which have been observed carefully enough, so that the knowledgeable expert can end up with what he wants, but never actually knowing "Why?"

Now the initial Theoretical Experiment, by this researcher, had been to introduce an undetectable Universal Substrate to all the Double Slit experiments, for it was that, which had become the cornerstone of modern physics, without any doubt that such a Substrate would remove all the anomalies of those experiments!

So, the next step was clearly to devise one or more undetectable Universal Substrate Units, that also delivered exactly what happened there, and in so called Empty Space, including The propagation of Electromagnetic Radiation, the production of Electric, Magnetic and even Gravitational Fields, as well as explaining everything about the Double Slit Experiments and oddities like Quantum Entanglement!

The best clue as to where to start was presented by Pair Production and Pair Annihilation, and inferred a mutually-orbiting Pair consisting of One negatively-charged Electron, and one positively-charged Positron.

For these rather small Leptons would produce an uncharged and un-magnetised Joint Particle, which would be both totally undetectable, yet could carry a single quantum of electromagnetic Energy invisibly, via the promotion of its internal, mutual Orbit, as well as producing that Quantum via the orbit's demotion - it would constitute a single material Photon.

Now the next tasks had to be due to Electromagnetism! So the search was once again directed to the Leptons, but this time the Muons and the Taus! But, the mutually orbiting pairs would have to be different as they would involve two different sizes, and opposite properties. There would be both ordinary and antimatter versions of each, delivering two pairs of mirror image, mutually orbiting joint Units, both of which would have Opposite Magnetic Dipole Moments, (they would effectively become a System of Magnetons) so when normally randomly moving about like a Gas, they too would cancel their properties over the population. And in differing spatial arrangements could deliver both Electric Fields surrounding any charged intruder, or alternatively a System of Magnetic Lines of Force, linking the opposite poles of an intruding and initiating Magnet.

And, by extension of the Substrate to also include the various Neutrinos, in a similar way, an analogous system of Gravitons, with Gravitational Dipole Moments seem possible too, although this part of Substrate Theory is still at an early stage of development.

It is clearly an area worthy of further detailed study, for even in the limited work completed so far, ALL the known to be wrong tenets of Copenhagen can be demolished wholly physically! And the distortions of a Mathematical and hence both Pluralist and Idealist approach, can be demoted by comprehensive and completely physical Theories.

Indeed even at this fairly early stage, Genuine Wave Theory within a concretely existing Universal Substrate is beginning to solve areas that have currently been effectively demolished by the detours due to both Copenhagen and Plurality.

Indeed a study of Leonard Susskind's Standard Lectures encompassing both Quantum Theory and current Cosmology reveal exactly how he sees ALL the crucial causalities in these areas as due to Mathematical Forms alone: and without a murmur given to addressing the grave flaws in both Mathematic and Formal Logic we have discussed here.

Dialectics

Plurality has totally dominated Mathematics, Formal Reasoning and the Sciences for well over two millennia. And Idealism, while inherent in Mathematics from its inception, has influenced the discipline involved in a truly prodigious growth - we see the increasing influence of Mathematical Forms in all the Sciences, and particularly within Physics. Our modern technological society would not be possible without it.

Now the significant effect of increasing Pluralism and Idealism has been science's dependence upon describing reality in terms of formulae and fundamental Laws. Real Qualitative Changes could no longer be accurately dealt with, and were incorrectly replaced by a "Quantity into Quality fiction", wherein mere high amounts of such increases were considered entirely sufficient, purely in themselves, to actually cause such Changes!

But that is only a description-of-an-association, rather than an explained Cause! And, it has been the total absence of such changes that have made real explanatory Causality impossible.

Zeno and Hegel had been right, and the latter's effort to import Qualitative Change into Formal Logic - via Dialectics - would, if exhaustively implemented, enable Real Explanatory Causes to be included here for the first time ever! But, for this to work, science would have to deal with *Contradictions*, always banned as being contrary to Logic and hence totally FALSE!

As both Zeno and Hegel realised, while unearthing interludes of Qualitative Change, Contradictions were NOT terminations in Logic, but on the contrary, they constituted the opening of Doors to the wholly New!

Hegel even defined such Change as the Interpenetration of Opposites, and initially was able to remove all such seeming impasses by redefinitions of the concepts involved, in which one actually legitimately became the



MATHEMATICS CANNOT EXPLAIN THIS.

WHY DO WE THINK IT SHOULD BE ABLE TO EXPLAIN THE COSMOS?

other! But Hegel was an idealist and unavoidably bound his innovative techniques solely to Human Thinking. It was only via Karl Marx's transferring of Dialectics to Materialism, that a much more general range of such changes were finally legitimised.

As an example, let us follow the many Qualitative transitions occurring in the passage of the fertilised Egg of a Mammal, such as a Human Being, down into the Womb, where it develops into an Embryo, entirely sustained via the Umbilical Cord from the Mother's Placenta. and further develops until it is ready to be born, and proceeds down the Birth Canal to enter into the World, where it takes its first breath, and has its very first feed through its mouth, at its mother's breast!

That is real Qualitative Change, and NO mathematical formula could ever explain it.

Other sciences are already well ahead of Physics and Cosmology in realising what Maths is good for and what it can't do. But none of the sciences currently embrace Dialectics in understanding those changes. A great deal has still to be done, dealing directly with Holistic Situations, as distinct from the now universally applied Pluralist situation in investigating Reality, for Reality-as-is is always entirely holistic in nature, but natural situations involving many simultaneous factors acting together are still impossible to deal with as such.

And scientists have long radically altered such situations, in order to make them much easier to address.

The main approach has always been to maximally simplify a situation, usually down to only a couple of contributing factors being allowed to vary: the rest being either totally removed, or alternatively held constant.

For it to work, it had to be in an artificially-made pluralist situation, so that a repeatable set of results would be possible. BUT, only usually relating (say) two variables, and delivering a single "supposedly contributory" Law, But it could never be a universally applicable Law: it would only be reliable in exactly the same conditions as had been achieved for its earlier extraction.

So, when trying to replicate what could happen in Reality-as-is, it was always necessary to perform a separate experiment for every law involved, and then perform a whole set of productions each ideally organised for its target law - to, overall, produce something akin to the natural situation, though unavoidably also very different in order to make every single one work as required.

Extended versus Local

How local entities have non-local Influence

I am soldiering on through all of Leonard Susskind's Sub Atomic and Cosmology Lectures, at Stamford University, with the express purpose of relating the unavoidably separate study areas of his account, in order to reveal their inevitable contradictions! This is not just a criticism of Susskind's thinking, but a general critique of the consensus stance within the Science that he pursues.

My basis is that the ever-increasing Crisis in Modern Physics is entirely due to the diverse consequences of their wholly pluralist rationality, which though valid in Mathematics, it is most certainly never the case in literally all other Intellectual Disciplines. Just as both Zeno of Elea, and a couple of millennia later Hegel himself, were able to demonstrate, such a limitation to a pluralist stance would inevitably lead to many totally inevitable contradictions. And these could never be resolved rationally, and were only ever circumvented pragmatically.

Science is still full of such contradictions, but the pragmatic methods used to bind the disciplines together are rarely admitted to or even noticed.

Now, in Susskind's case, the situation is somewhat different, as in his world "Mathematics is The Whole and Only Truth", and he carries over the consistency of Pluralist Mathematics to also totally dominate any seemingly physical explanations: they too are made to conform pluralistically, and whenever it isn't evident he leaves it to his auditors to complete the job [which they do as best as they can]!

But, nevertheless, his lectures are full of his own characteristic "simplifications" even of the mathematics, to make them conform seemingly physically too!

But, let us address the key area. as mentioned in this paper's title.

How does Susskind handle the absolutely essential extension in space of Electromagnetic Radiation, along with his also necessary treatment of Photons as particle-like bodies? Especially when he is talking about Redshift Effects caused by the spreading of extended Waves by the expansion of the Universe?

How does that happen when they are supposedly *localised* as Particles?

Contradiction number 1!

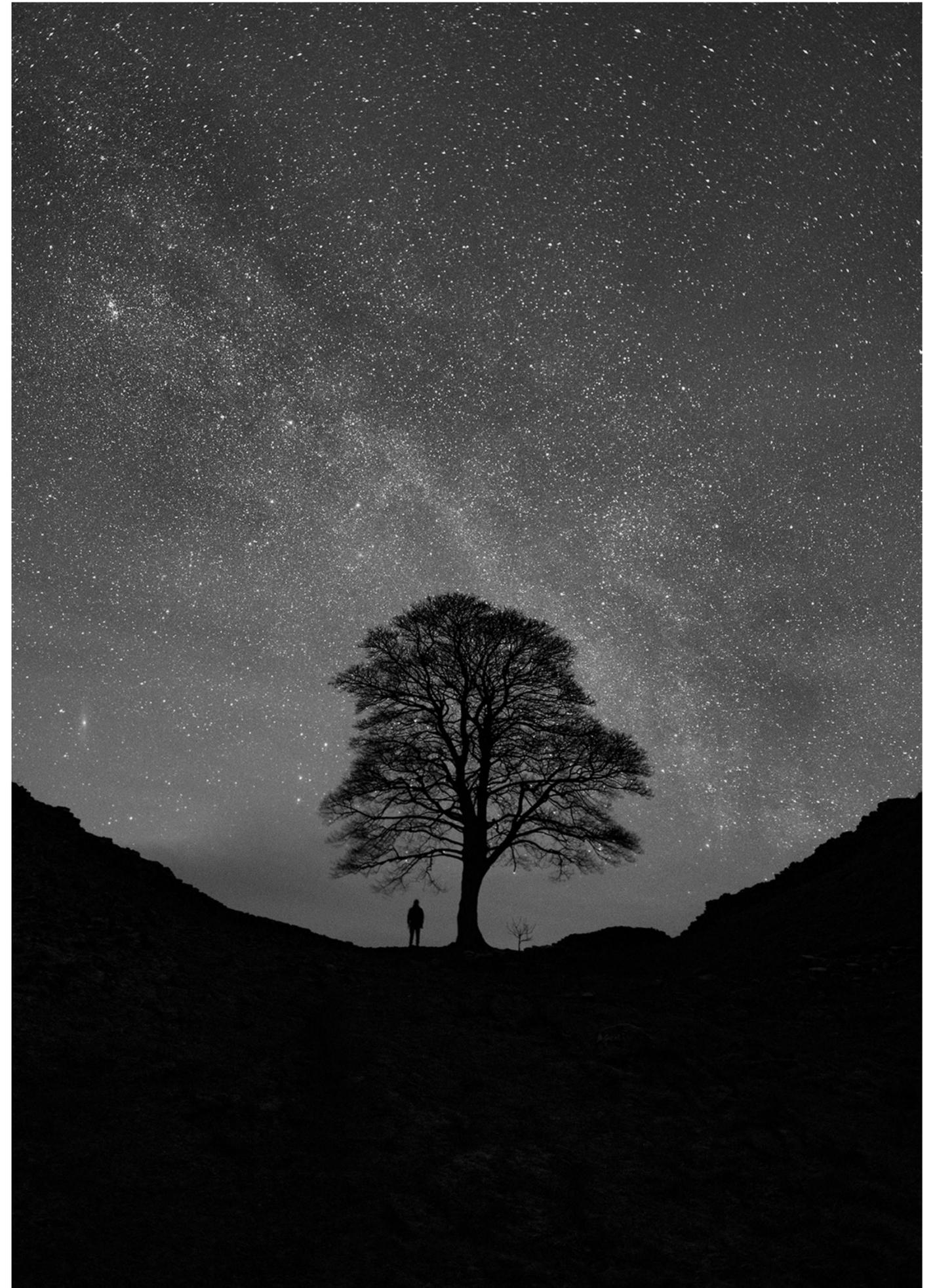
And also in particular the conversion of those same supposedly-massless Photons, presumably concentrated into particles(?), yet changing into Pairs of both charged and mass-containing Pairs consisting of an Electron and a Positron? My theory can explain this, but Susskind and the majority of physicists can't.

He even gives an increasing role to the energy density of Empty Space, by positively excluding both Matter and Radiation from being involved there, yet explaining absolutely nothing as to how it contributes to such energy.

Now, more generally, several other descriptions and predictions can be said to be not only contradictory, but also embodying the Universe as undergoing a slow, but uninterrupted slide to oblivion: a one way street to thermodynamic oblivion!

And he does all this while simultaneously insisting that the energy sum of the whole Universe is, has always been, and will forever in the future be at zero overall!

So as well as offering absolutely NO explanation for the Universe's Origin or why such complexity has evolved within it, he still confidently describes its inevitable decline...





Susskind's Cosmology

The Consequences of his Assumptions of Reality

Having persevered with Leonard Susskind's Stanford University's Lecture Series on Cosmology, I have finally been able to extract an extended series of truly damning criticisms of his philosophic stance and subsequent theoretical methods.

I considered this particular extension to my notes upon his ideas to be absolutely essential, because unlike considering the Science of Physics overall - where theoretical positions can be challenged in various well-established, and universally agreed ways, such as through experiment - that is most certainly NOT the case for Cosmology, as human beings are forever excluded from ever being able to apply the necessary confirmatory methods to any kind of a satisfactory conclusion. We simply cannot literally visit any of the sites of his limiting conclusions, nor legitimately make the assumptions that he relies upon to arrive at those conclusions.

This leaves his Cosmology open to all sorts of unverifiable conceptions and indeed total fictions - stories that seem to go unchallenged.

Also, he is a very clever theorist, who can, and indeed does, as these lectures amply prove, purposely lead you into areas which you would not, upon sound principles, allow yourself to be misled into.

But, it is primarily in his attitude to the use of Mathematics within Science, that Susskind exposes his major weaknesses: for he never even mentions his total dependence upon ever-more esoteric Mathematics, despite the mistakes he makes, which have been clearly evident ever since Mathematics' original conception in

Ancient Greece, based entirely and unavoidingly upon the Principle of Plurality, which though entirely legitimate when applied to the relations involved between Purely Abstract Forms, which do not ever change qualitatively, are absolutely never legitimate in all reasoning used in either Formal Logic, or certainly in revealing Laws in any of the Sciences.

In addition, the Laws involved were always those found only in Artificially restricted Pluralist experiments, yet were also, nevertheless, further assumed to also remain totally unchanged if acting simultaneously with several others in a joint common context, as such is assumed to be totally unaffected of the independently, and very specially arranged-for, pluralistic Laws. For that too is entirely untrue!

For Plurality only deals with permanently-fixed relations, which are never the case in Reality-as-is, and can only be extracted-from, and thereafter effectively used-within, those very same artificially arranged-for situations, that never actually exist as such, unless drastically altered and then strongly maintained as such, in never-naturally-existing situations.

And that methodology is then distorted even further by the then involved method of turning such artificially achieved data into supposedly completely illegitimate Equations, by substituting that incorrectly-obtained data into Pure Form Equations taken direct from Mathematics, in order to evaluate the general constants that needed to be changed, in order to "deliver" a rigged-up particular version of the general Equation.

So by such means, pluralistically-performed experiments are used in tandem with purely idealistic equations, which are then said to be eternal Natural Laws of Reality-as-is!

For example, Susskind is a mathematician, and completely trusts the current Philosophy of Modern Physics as being wholly addressable via the essentially Pluralist Conceptions of Mathematics.

But, he and maybe others of that same stance, also felt they could afford to make the multiples such equations to be left as physicists, mathematicians and technologists would use them, for they would be "asking" to be tested out for validity, so Susskind always gave them an immediate make-over, as well as many corrections and adjustments to give everyone another level of abstraction, which he termed "Dimensional Analysis", and which carried sufficient information for his consequent reasoning, without ever making their usual damning criticisms in the usual way at all easy to apply.

This is duplicitous - and Susskind's Cosmology, such as it is, exists only in the dark corners of a blackboard.



You have to say now that space is something. Space can vibrate, space can fluctuate, space can be quantum mechanical, but what the devil is it?

Leonard Susskind

SUSSKIND ADMITTING THAT SPACE ISN'T EMPTY...

BUT WHEN THESE INVESTIGATIONS ARE CENTRED ON MATHEMATICS ALONE

ONLY 'EMPTY' SPACE CAN EVER BE INVESTIGATED

Reality and Mathematics

How Plurality deals only with Ideality as delivered in maintained Stabilities.

In spite of innumerable papers by this theorist establishing the major and damaging weaknesses in taking Mathematics as the lingua Franca of the Sciences, it must be admitted that the old ways have been, and still are now, highly fruitful in majorly constrained-and-maintained situations (termed Stabilities), wherein its descriptive power can be brilliant and pragmatically useful!

Whether we are gathering data from our experiments or calculating the trajectories for a spacecraft across the solar system, Mathematics is *the* tool which allows the Science to take place. These situations are all fundamentally stable, and this is where such formal approaches can work.

And generally, the old ways also allow empowering *approximations* to Reality to be achieved by a purely formal study of its partial reflection in Ideality (the wholly pluralistic realm constructed by Mathematics).

Of course, the technological advantages can frequently be brought to fruition by doing everything *ONLY* within the required enforced Stabilities, though such approaches necessarily make the real causal relationships involved totally unobtainable - so the needs of a truly explanatory Science, are never served at all.

The more important, and truly natural relationships of Reality-as-is, AND also, crucially, just how they inevitably change *qualitatively*, cannot be addressed mathematically.

Quite apart from the clear technological gains that are eminently possible with Pluralist Science: there is in addition, the wholly pluralist Language of Mathematics, which also helps with a kind of inferred "localised-understanding" to a limited extent, and "seems-to-promise", at some point, when it could transcend those

limitations, so that it could cope with Reality-as-is in full, along with delivering an increasingly correct Theory too! But that is still totally impossible, and the assumed power, and the evident inadequacies of Mathematics, as the Language for Science, are all we currently have.

Surprisingly, we do already know the way to go, but it certainly greatly multiplies the difficulties to a very significant degree, because it has to be Holistic - situations where everything has the potential of affecting everything else, and the simplifications of Plurality are no longer possible, without doing more harm than good!

In watching Leonard Susskind, in his series of Stanford University Lectures (available on YouTube), he does, wholly via Mathematical Formalisms, enable an approximate version of relations to be made available, to go part of the way to delivering Explanations in the Forms, that are based upon a modified Reflection of Reality, but which crucially omits ALL qualitative change.

So, while things remain, or are maintained as, stable - it is all OK! But, at the first sign of such changes it rapidly becomes not only useless, but actually misleading!

Susskind's venture into Cosmology was therefore doomed from the start, Just in the same way as non-Evolutionary Biology could never explain life: and it is not surprising that the necessary alternative should first be demonstrated within that Science, before all others!

Yet, 50 years before Darwin, it had also been recognised in Philosophy too by Hegel. And between these two crucial developments, there also occurred its implanting directly into the very heart of the Materialist Stance by Karl Marx! Yet the major difficulties involved, caused it to take the rest of Marx's life, to apply this new stance effectively to a Critique of Capitalist Economics,

within his major work, Das Kapital, and was still as yet unapplied to the hard Sciences, such as Physics until the publications of this journal in 2019!

Now clearly, exposing the differences between Reality-as-is and the formal idealist version of it, as delivered by Plurality, both via Mathematics and as presented by a Science such as Physics, is not easy to express simply, but it is perhaps most easily described by contrasting Living Developing Entities, with a Game like Chess!

Wherein Reality as a whole is represented by all the complexities dynamism and contradictions of Life, and a pluralist description is only capable of dealing with a Game of purely formal Rules, which though almost infinite in its potential moves, is totally constrained by a stable system of fixed laws.

In effect Real Life is said to be a Game, where the Rules are qualitatively changed by the playing of it!

NOTE:

I have spent an inordinate amount of time studying YouTube recordings of Lectures by Susskind at Stanford, because he actually starts with Equations (mathematical formulae) that are fitted up to pluralistically-devised-and-carried-out experiments.

And I traced it through, because being a physicist myself, I knew that he would inevitably encounter the unavoidable contradictions and impasses, where such a stance was unavoidably bound to take him!

And in Lecture 2 of his series on Quantum Field Theory, he finally arrived at such a thicket of these problems, that he actually had to insist that his auditors must treat it all as a Game with hard-and-fast Rules, and as long as they do so, they will survive, and know how to negotiate this invention and believe that they understand it!

Now, in totally refusing to address the Evolution of Reality and in dealing only in quantitative changes, Pluralists like Susskind could not pretend that such changes did not exist, so somehow, they had to embed qualitative change, without explanation, into situations where quantitative changes at differing quantitative rates caused a *flip* between dominances at particular threshold circumstances: crudely changes in Quantity were seen as causing changes in Quality!

I'm afraid not!

Both situations were considered to have always been present, but with one dominating the other, until quantitative contributions varied sufficiently until a flip in dominance finally happened.

But notice how useless this conception was, in explaining the appearance Wholly NEW, like Life for example!

It simply couldn't happen unless all future possibilities were always present as such throughout History, but suppressed by dominances, and only revealed by a sequence of different dominances, that were entirely determined by purely quantitative changes.

It doesn't sound too bad until you consider Life, Evolution, and Consciousness. And even ignores Recursion, wherein changes made in circumstances nevertheless mean that the same process has different results. Indeed Plurality allows NO change in Qualities, and prohibits simultaneous processes affecting one another qualitatively.

And the physics pluralists also found that they just had to significantly *extend* Mathematics - their supposed Lingua Franca - to cope with these fast proliferating difficulties.

They had long included i (as the square root of -1), in non-real solutions to Quadratic Equations, but what they were really doing is "integrating" Geometric Operators, as a major extension to Mathematics, where most elements were mere multipliers similar to ordinary numbers, but i was the Operator "turn anticlockwise through 90 degrees" in an Algebra of Geometric Operators, where juxtaposition was interpreted as "followed by". Subsequently e as something whose rate of change was exactly the same as itself. And $ei\theta$ was also included along with it as alternative $\sin i\theta + \cos i\theta$ as these also arose in Circular movements too.

In addition all sorts of other extensions were allowed including more than three graphical dimensions, and in Quantum Field Theory many of these pushed the Game further towards Reality but always only as a trick, and never by including Qualitative Changes as was actually required!

Susskind emphasized all the new rules and how they were to be re-interpreted, which were NEVER explained

or even intrinsically true, but had been pragmatically justified where possible via measurements upon "the situations" - though as these were generally achieved within the Large Hadron Collider, you could never really call it Reality-as-is!

The real test and replacement of all of this, will require the re-establishment of Sub Atomic Physics upon a Dialectical Materialist basis, and the construction of a wholly New Theory . experimental Methodology, and an appropriate rational system to cope with it all.

The process begins here.

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