

Truth in Paradigm



Examination of paradigmatic validity and
recommendations within the physical, psychological and
medical sciences

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Standing Dead—

*Let us cast aside the husk, walk away from that which was
our name, and leave it as a dead thing. Standing Dead are
we—as a tree rent by lightening: now bright and sudden,
we who refuse to fall.*

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Truth in Paradigm

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Dedication:

This book is dedicated to the future. Hope is an unknown, a new question asked by one uncertain of the obvious, unaware of the impossible. The future is Hope's imagining.

Introduction:

Science is our modern mythos, a functional pantheon of models and mathematics designed to gain results we can use, and so, it is tempting to believe that in our sciences we see “truth.” Is this science the eternal light of Prometheus, the spark of mankind’s salvation stolen complete from the Gods? **Truth.** All such judgments are of course a matter of semantics, for “truth” in so much as mankind may kindle any such auspicious ideal, could be nothing more than a series of guesses, each holding a few more matchsticks in hand than the last...if not the entire forest ripe and splintered dry for kindling as the hubris of Prometheus might imagine. Scientific models are useful scraps of logical fiction embedded with splinters of truth, an amalgam of instrumental and empirical artistry and factual essence...functional myth. Paradigm is not truth, but there is truth in it.

This book was written in order to dig out the actual facts and truth within our current scientific paradigms. Also, as with our previous book, *Beyond the Veil*, this is also a collection of self-contained articles and so each may be read independently of the others. While not exhaustive by any means, it may serve to pierce the sacrosanct and comfortable barrier of human preconception, and bring needed change. Although at times a bit too honest and plain, in the end, we may discover the truth in paradigm is a direction, a *way of looking*, with open eyes and a mind free of the pride which imagines the rude and impossible to be true: that we already know enough. Clearly, in this world of pollution, shortage, cruelty, mental imbalance, greed and war...but one thing is needful: *Something New*. The basis of human advancement and change is created as the bedrock of knowledge shifts. Truth is a direction of evolution, an ascending course which never rests, and from the most basic points of our long trusted theory upward, nothing is sacred. Hope is change. Evolution, truth is not certainty, but process—growth.

As to every unshakable axiom and assumption — let us imagine, anew. So are limits cast and broken.

It is this which is: *Truth in Paradigm*.

"When we see probability we do not see causality, we see the limits placed upon our ability to observe overcome by way of an ingenious guess at the result. In this clever approach where cause is neglected *for the prediction of outcome*, we must not forget it is we who can not see. *Physical systems are not guessing at themselves.*"

—R.N.

Our Belief in Our Belief

Richard Lawrence Norman,

Jeremy Dunning-Davies,

There is a fundamental error hiding beneath the floor, the foundation of truth and error lies hidden, or perhaps the lie was just a mistake. The human community practices the noble disciplines which have sustained the progress of our race and hence, there is a second factor beneath our truth, beneath the mathematics and analysis is the fact of the human equation; for it is the community of man which determines the essence of fact. Fact is that which is agreed is fact. However, consensus is a limit past which truth is oft' excluded. In many cases, *consensus* is the axiom upon which paradigm is based.

What is 'known'? This is a question first sought, then forgotten. But the wise, foolish and daring have often questioned this, those such as Nietzsche...always questioning the foundations, un-answering the certain thing upon which we stand, cracking up and breaking apart the ice of belief, until it is shifting and unsure...look down, now we can see into the bottom and beneath, a dangerous tonic not suitable for most— Depth...is an uncomfortable and hazardous proposition. The rumor is that philosophy is the mother of our noble disciplines and sciences, and in the rare case of one such as Nietzsche perhaps it is so.

The better scientists admit their doubt, and do not stand in certainty upon the opinion of others as a boast. The limits of science are but the limits of its models, and any good scientist knows this. It is the *rare* model which is an exact match for reality, its mechanisms and causes. We are quite sure none has yet been found! The finest of all scientists understand and admit this. The utility of a model and its correspondence to reality are deeply intertwined, and of course are always ripe for doubt, change and improvement. Just what sort of scientist understands this, and to whom does it apply?

Think of the role of Newton. His theories were brilliant and timeless, and contained within them much truth about reality in the way models do. We quite rightly do not speak of the accomplishments of Newton as being foolish or wrong headed simply because a more detailed model such as relativity or quantum theory comes to the fore. No, we understand that the picture has been sharpened and the model made anew, so we might gain further insight into the nature of reality. Experiments sharpen the limits of our models and in this, we have scientific progress. Scientific progress is found in the refinement of its models, nothing more than that. Einstein himself understood the limits of scientific model making, and often related his doubts to those with whom he had correspondence. It is to be remembered that Einstein was a good scientist, and did himself doubt the validity of his own models, models of things which involved the concept of curved space-time. He also strongly doubted the validity of quantum models.

Einstein wrote about his misgivings concerning his own theories in a letter to his friend Michel Angelo Besso: "I consider it quite possible that physics cannot be based on the field concept, i.e., on continuous structures. In that case nothing remains of my entire castle in the air, gravitation theory included, [and the] rest of physics."

Einstein understood the situation. One must always be on the lookout for the new idea, the new model, which will claim even more of the elusive prize. Dogma has no place in science; none. Einstein knew this best.

Indeed, the models of quantum theory and relativity have brought us a new world of hope and wonder. We have nuclear fission and fusion, we have the most accurate model ever conceived by man: Quantum Electro Dynamics (QED). Of course, Feynman who helped perfect QED was no less the scientist than

Einstein, and admitted without hesitation that QED was causally, a mystery of confusion to him and all others. A re-normalized theory of stunning accuracy, but based upon unknown grounds...Feynman is famous for saying this illustrious theory of unprecedented accuracy was based on a mystery, and much was 'swept under the rug' as to the causes. Recall that Feynman shared a Nobel Prize in 1965 for his work with QED and also note how clear he is about the fact that QED, stunningly accurate as it is, is a model with limits, and *not* a pure representation of truth. Just as Einstein, we see good scientific thinking, and lots of doubt. From his famous book *QED, the strange theory of light and matter* in typically direct language we read (p. 128): "The shell game that we play to find n and j is technically called "renormalization." But no matter how clever the word, it is what I would call a dippy process! Having to resort to such hocus-pocus has prevented us from proving that the theory of quantum electrodynamics is mathematically self-consistent. . . . I suspect that renormalization is not mathematically legitimate. What *is* certain is that we do not have a good mathematical way to describe the theory of quantum electrodynamics: such a bunch of words to describe the connection between n and j and m and e is not good mathematics." Here, Feynman describes the single most accurate model ever devised by man! Of course Feynman is correct and we see in QED only an accurate model and not certain truth, as science itself is based on models and mathematics, no more than that. Progress is to be found in sharpening those models. Those who profess certain truth in any current scientific dogma, are not strictly honest. We speak now as always only of science, only of models. Just ask Einstein or Feynman. Dogmatism is anathema to good science.

Unfortunately, those men are rare. History paints a different picture for us of the more usual situation. Think in a basic way of the life and work of Nietzsche and how his writing was never checked, the original source manuscripts never inspected and the word of the Nazis was simply accepted as the right meaning. Later, the truth emerged and a complete reversal of the lies was discovered. Often the interpretation of an experiment or data is like that. Once all agree as to the meaning, the case is closed and be it error or truth...the very question is then removed from view. Once a result is agreed upon the foundation is sealed over, and the bedrock upon which our scientific foundations are based is imagined solid. So has it been agreed.

However, the issue may well be one which has been settled by way of a sort of "vote." All agree the meaning is what it is. The mass of opinion gives weight to the process of factual determination, and so, that process is really a matter of conflict resolution, more so than certainty. This may well be the case, not in all, but surely in some instances and perhaps, in regards to some very key pieces of foundational scientific 'fact.' We believe in science, and science is based upon those earlier beliefs and interpretations upon which its later "truths" are founded. What lies hidden, beneath our belief in our belief?

To look upon the familiar history of science under doctrine, we see an effect much the same as modern consensus and its resulting doctrine in determining what is or is not 'acceptable' truth. This is not a matter of experiment, nor is it open to debate. The fact of 'truth,' precedes those things.

Even as far back as the late 1800's the view into history was millennial, and the sight clear to interpret. From Bechamp's seminal work, [*The Blood*](#), we read:

"An historian of the founders of modern astronomy recently related that the philosopher Cleanthus three millennia before our era, wished to prosecute Aristarchus for blasphemy, for having believed that the earth moved, and having dared to say that the sun was the immovable centre of the universe. Two thousand years later, human reason having remained stationary, the wish of Cleanthus was realized. Galileo was accused of blasphemy and impiety for having like Copernicus and following Aristarchus, maintained the same truth; a tribunal condemned his writings and forced him to a recantation which his conscience denied."

". . . I, Galileo, in the seventieth year of my age, on my knees before your Eminences, having before my

eyes the holy gospels, which I touch with my own hands, I abjure, I curse, I detest, the error and heresy of the movement of the earth."

Clearly, the thing which lies hidden beneath doctrine is truth itself, and so—hope. We might ask: What has been accepted, agreed upon and made firm as modern doctrine; what has been crafted as truth within the community of man, now held as firm fact, but, is in truth of fact but a forbidden sight, a blinder which forms the flawed hidden foundation of science and hence, the limit of man, his hope and his knowledge? Here are but a few pieces of consensus masquerading as fact, for history might find truth and as a pick axe shatters black ice, we may then see beneath the foundation and so, into a better future.

To honor and to improve:

Science will never admit final theories. In this fact is contained the full measure of human hope. Science is never static, it is a series of evolving models, each hopefully more closely approaching the truth. Today, there is great pride in our scientific paradigms, and for good reason. However, this pride, deserved as it is, exerts a paralyzing inertia, as a kind of dogma which prevents the next tier of solutions from emerging. Money and reputation are invested in the current interpretations, which are set up as a sort of irrefutable truth. The best way to honor the lauded lineage of scientific progress is to improve it. Let us examine this current state of progress and the history upon which it is founded and ascertain if the next step toward a better future may be derived.

Today, we have achieved incomplete combustion burning fossil and other available fuels, such as wood and oil, coal, gasoline and natural gas with their associated pollution and high cost. We have achieved fission and used this science to create nuclear power along with much risk and the familiar poisonous radioactive waste products that persist for many centuries. We are attempting to harness the processes of fusion such as those within the sun and achieve at enormous cost and substantial risk a *hot* fusion, with no useful success. Cold fusion is laughed at by orthodox science. Today we have medical practice with many great successes and also many limitations, such as high priced toxic drugs and chemotherapies associated with a host of familiar deadly hazards and of course, deeply prohibitive costs. These advances and limits may be clearly traced to the limitations of current science and those, may be traced back to specific episodes with clear historical import. First we will review our current limitations and then present a new pathway toward our better future. Science is the bride of human progress, and as such we must vow to honor and improve that to which we are wed. In science and human affairs alike: It is stasis which is our limit and hence, the limit of future hope.

We do not suggest that the current paradigms should be discarded; certainly not. We suggest that they may be reevaluated, and those areas which do not yield needed new results may be reformulated and, in some specific cases, replaced or augmented with a new perspective. These new ways of understanding the systems we examine within biology and physical science are surprising and vary from what is already believed, and so are often subject to reflex rejection and quick condemnation by the scientific community at large. However, in due course experiment after experiment will prove sound science to be valid. If medical science and the fundamentals of quantum physics, chemistry and relativistic physics were treated thus, what would the result be? In a word: *Hope*. First, we will articulate a few unspoken facts which if addressed will permit needed advancement and a new future. The basis of modern scientific theory must be plainly understood if we are to locate the targets for scientific reformulation, and offer up the new solutions we need. We must refine the theory, to change the fact. Three general points will suffice to allow us to see beneath our beliefs, and so find needed new solutions.

1. Quantum theory and its offspring quantum chemistry have limits. Although quantum chemistry is touted as a complete solution to the problems it attempts to address, this is clearly not the case, nor should we expect it to be. The facts although but quietly acknowledged, are well known. Remember, science does not admit final theories! In the words of Ruggero Santilli: "Recall that quantum chemistry was

unable to achieve an exact and invariant representation of the main characteristics of the water molecule from unadulterated first principles despite efforts over the past century. In fact, a historical 2% has been missing in the representation of the water binding energy, while the representation of its electric and magnetic moments was embarrassingly wrong even in the signs.” [Quote from: Santilli R. M. (2005) *The New Fuels with Magnecular Structure*, International Academic Press. <http://www.i-b-r.org/docs/Fuels-Magnecular-Structure.pdf>]

2. Although very successful and useful, Einstein’s special and general theories of relativity were designed around specific limits within which they are solely meant to apply. Those limits have been exceeded and also, particular aspects of the formalism are based in the supposed Schwarzschild solution to Einstein’s field equations which however, is not actually Schwarzschild’s and this leads to several troubling consequences. This article is too brief to take a full accounting of the details, but suffice it to say for the sake of brevity that the original conditions of Einstein’s special theory upon which his general theory is based are very specific in relating only to the propagation of light *through a vacuum*, and also, do not rightly apply to hadronic scale interactions and resultant charge deformation as demonstrated in recent experiments with neutron synthesis from an arc of current and hydrogen gas.

3. Medical science is on the cusp of a revolution, and those at the forefront of such revolutionary change, quite naturally, meet with stiff resistance. Nobel Laureate Luc Montagnier, discoverer of the AIDS virus is in just this position. Before him, was a man named Benveniste. These men articulated the role of electromagnetic and quantum phenomena within the body as they affect tissues in ways similar to chemicals and drugs, and also showing how these new aspects take on a clear role in sustaining disease processes and health. A sort of scientific tribunal headed by a man named Maddox and relying on the views of a professional magician destroyed the good reputation of Benveniste. However, some scientists with whom we are associated have repeated experiments many times over, which are directly akin to Benveniste’s and indeed, those [experiments are repeatable](#). Benveniste’s ideas have been proven right. Montagnier has demonstrated in scientific papers and also before a film crew that DNA itself may be formed from raw PCR ingredients with no trace of a physical DNA template! The possibility of contamination has been eliminated by sending the signal over a thousand kilometres to an independent lab for aqueous instantiation, PCR processing and verification. The result is unambiguous; only encoded electromagnetic radiation is needed to affect the aqueous system and structure DNA from raw ingredients and so, we understand the processes which sustain disease themselves and those of health as well are deeply connected to electromagnetic information and quantum processes, once understood in this new medical context.

What would happen if we questioned our belief in our belief? What might the result be if we were to admit these foundational questions and then, answer them? Could our future be different if science were to advance in these areas? If so, how?

Our future:

To include information theory and electromagnetic processes within our medical models and also, to “cover” (ie. keep the good and then improve) quantum and relativistic science so as to gain results which are new will, in our estimation, create a better future for the race of man. Some aspects may be seen clearly as a matter of testable hypothesis and others are currently available for immediate use.

Medical possibilities:

Experiments clearly suggest that the dynamics of the bodily system involve electromagnetic information and quantum processes in sustaining disease and health, determining cell morphology and also, that drugs and chemical agents do indeed gain some substantial part of their efficacy through electromagnetic

informational and quantum processes. What could this mean for the future?

- a. A disease may be diagnosed in moments with a non-invasive scan.
- b. A field may be applied to alter faulty encoding with correct patterning.

This is the *eventual potential*. Any disease which demonstrates resonance should be treatable and diagnosed in this way. A resonant approach to disease and health is indicated. Here, perhaps, is found the common process basis of many diseases. There may be a simple process nexus which could allow the informational alteration of fundamental disease dynamics without recourse to drugs, high priced treatments, or invasive techniques. In [Electromagnetic Signals Are Produced by Aqueous Nanostructures Derived from Bacterial DNA Sequences](#), Montagnier notes: "we have detected the same EMS in the plasma and in the DNA extracted from the plasma of patients suffering of Alzheimer, Parkinson disease, multiple Sclerosis and Rheumatoid Arthritis. . . . Moreover, EMS can be detected also from RNA viruses, such as HIV, influenza virus A, Hepatitis C Virus." A great many diseases may possibly share the same mechanism of reproduction, and so may all be treatable and diagnosable in one simple way. Field effects may well hold the future of medical practice. Imagine a hand-held device which scans, finds resonant aspects of specific disease and after diagnosis, initiates new healthy patterning within the bodily system via an informationally encoded field, without the use of drugs. One must think also in this context of the lost science of Rife and the hope for a cheap, safe painless cure for cancer. This is our future.

Can electromagnetic information do the work of drugs? Can a computer network be established which will permit distribution of inexpensive and safe drug effects to all those in need, for little cost? Can information theory and the physics of electromagnetic encoding foster a new medical model under which the poor and rich alike may benefit from inexpensive nontoxic drug effects? Information is all but free to replicate and distribute, and no toxic chemical constituent enters the body in [this mode of treatment](#).

Energy and pollution:

The covering of quantum and relativistic science is a daunting and detailed task which has been accomplished by a highly adept and unorthodox scientist named Ruggero Santilli. Although employed for many years at Harvard and MIT amongst other institutions of note and stature, his efforts have met with stiff resistance just as one might expect. What he has found may change the human situation in a profound and hopeful way:

The notorious inefficiency of combustion leading to pollution from the utilization of fossil and other fuels may be a thing of the past, allowing those fuels to be burned free of pollution, and also, permitting clean burning, nonpolluting cheap fuel to be synthesized from waste chemicals and sewage! Vehicles using said fuel need no catalytic converter, and emit oxygen in the exhaust. [This technology](#), which extends directly from a mathematical covering of quantum and relativistic science, may provide our race with energy independence from oil and solve the issue of pollution so clearly caused by burning oil based and coal based fuels, which may be replaced or augmented, to create highly efficient clean combustion for little cost.

"Hot" fusion which uses mechanisms such as those assumed to operate within the interior of the sun to create power is difficult to contain; the reactors are unreliable as of present and very costly to build, and also, the process, should it ever be practically obtained, emits hazardous radiation. Through a new understanding of the internal nuclear/hadronic structure, a sort of intermediate "warm" fusion has been achieved [in experimental prototypes of substantial size](#). Silicon has been created by fusion of oxygen and carbon using air as fuel, and other new approaches as well. No radiation whatsoever is emitted in these energy releasing reactions.

The above mentioned new understanding of internal nuclear structure has also allowed a new model of the neutron and other hadrons. Calculations extending from the model permit a possible new approach to the clean up of nuclear waste produced in our modern fission power plants. The theory implies

stimulated nuclear decay may be possible, and instead of taking thousands of years to decay, the radioactive waste may be disposed of on-site in minutes or hours. This potential application of the new model in pointing the way to gamma stimulated nuclear decay must be tested.

From the theoretical calculations, it is hypothesized that this decay can be stimulated by bombarding the nucleus with so-called 'resonant' photons with an energy of 1.294 Mev. Under normal circumstances the probability of this interaction is extremely low. However, Santilli claims that there is a large resonance peak in the reaction cross-section (that is, the probability of the said interaction occurring) for incident photons with an energy of 1.294 Mev.

Conclusion:

Science is itself human hope for one reason and one reason alone: science will *never* admit final theories. Instead, science is nothing but a series of evolving models which never rest as if content in a false posture as truth or dogma. Problems which one paradigm is unable to solve, may then be addressed with new thinking. In this there is hope for our race. From energy and pollution to medical science no paradigm or problem is written in stone, for truth may always be approached more closely within scientific pursuit which never rests, but remains ever searching and finding. Nothing is sure, for science must always look twice and reimagine its foundations. Science understands one thing most of all: we must always question the basis and build again. History, and so our future, may then be recast. Nothing is sacred and in this, there is all of hope:

—*We may question our belief, in our belief.*

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The Electric Universe.

Jeremy Dunning-Davies

Some years ago, in an entirely different context, Sir Winston Churchill advised people to learn from the lessons of history. This advice might well be seen as applying to all fields of human activity and now, towards the beginning of the 21st century, it seems highly appropriate to follow this advice in several areas of physics which, at least in the eyes of some, seem to be almost stagnating. In this spirit, it is of interest to note that, following the introduction of Newton's mechanical ideas, work still proceeded apace investigating electromagnetic phenomena and this continued at least into the earlier years of the 20th century, as is evidenced by the contents of J. J. Thomson's book *Electricity and Matter*¹, which is essentially the text of a series of lectures he gave at Yale University in May, 1903. However, this book provides but one example to illustrate the very real emphasis on work involving the effects of the electric and magnetic fields, work which constantly sought an explanation in terms of those forces for the concept of mass, as an aside, it is possibly worth noting that, in this book, Thomson talks quite routinely of the equivalence of mass and energy. However, after those early years of the century, the emphasis seems to have shifted to explanations of phenomena purely in terms of gravitational effects as far as most mainline research was concerned. This might seem a retrograde step given that much of the matter in the universe is known to be in the form of plasma and support for this view is surely supplied by the work of such as Kristian Birkeland and Nobel Prize Winner Hannes Alfvén. Thanks to the work of these two and, more recently, Anthony Peratt and others, work has continued in the general areas of electromagnetism and plasma physics. Importantly, much of the work on plasmas has been via laboratory experiments, so hard experimental evidence is available to support any claims made.

The work on plasmas and other electromagnetic phenomena has inspired people to examine astronomical phenomena in these terms and this has resulted in the so-called Electric Universe ideas expounded in such books as *The Electric Universe* by Wallace Thornhill and David Talbott² and *The Electric Sky* by Donald Scott³. Reading through this material makes one aware immediately that, while like orthodox commonly accepted theory, the electric universe ideas are supported by much computer modelling, it draws also on parallels in astronomy with plasma phenomena observed in the laboratory. Admittedly, drawing such parallels involves scaling up tremendously but assuming this possible is little different from assuming that laws seemingly applicable here on Earth are also applicable throughout the Solar System and, indeed, throughout the Universe. However, at least visually, some of the phenomena observed in the laboratory are very like what is observed by some of the most powerful telescopes. For example, electric currents in plasma naturally form filaments due to the so-called 'pinch effect' of the induced magnetic field. Electromagnetic interactions cause these filaments to rotate about one another to form a helical 'Birkeland Current' filament pair and this is mirrored in the structure seen in the Double Helix nebula near the galactic centre. Again, the Hubble image of the planetary nebula NGC6751 looks remarkably like the view down the barrel of a plasma focus device. Examples such as these prove nothing but might serve to awaken people to the possibility of alternative explanations for astronomical phenomena.

Much of the initial laboratory work seems to have originated with the work of Kristian Birkeland more than one hundred years ago. It was during his Arctic expeditions at the end of the 19th century that the first magnetic field measurements were made of the Earth's polar regions. His findings also indicated the likelihood that the auroras were produced by charged particles originating in the Sun and guided by the Earth's magnetic field. Birkeland was an experimentalist and is still known for his Terrella experiments carried out in a near vacuum and in which he used a magnetised metallic sphere to represent the Sun or a planet and subjected it to electric discharges. In this way he was able to produce scaled down auroral-type displays as well as analogues of other astronomical phenomena. These claims were finally vindicated by satellite measurements in the 1960's and 70's. Birkeland also showed experimentally that electric currents tend to flow along filaments shaped by current induced magnetic fields. This confirmed observations made by Ampère that indicated that two parallel currents flowing in wires experience a long range

attractive magnetic force that draws them closer together. However, as plasma currents come closer together, they are free to rotate about each other. Such action generates a short range repulsive magnetic force which keeps the filaments separated so that they are, in effect, insulated from each other and able to maintain their separate identities. The end effect is for them to appear like a twisted rope and it is this configuration which is termed a 'Birkeland Current', as was mentioned above when the Double Helix nebula was mentioned as a possible example. Satellites orbiting above the auroras in the 60's and 70's were able to detect a movement of ions, indicating that electric current were present. Later missions found quasi-steady electric fields above the auroras following the magnetic field lines, thus lending some credence to Birkeland's claim of the existence of an electric circuit between the Earth and the Sun. Some may be sceptical of this latter interpretation but it is undoubtedly true that much of the material in the Universe is in the form of plasma and there is certainly electric and magnetic activity occurring in abundance. This means that there are many excellent reasons for considering the effects of the electromagnetic force in the Universe, only one of which could be the resolution of the problem of the so-called missing mass.

However, precisely what is the Electric Universe? In truth, it is really just a hypothesis, a new way of interpreting known data by utilising both new and well established knowledge relating to electricity and plasma. It should be emphasised immediately that, in this new interpretation, gravity still has an important role to play but it is a secondary one since the electric force is so much more powerful. A major point to be stressed from the outset is that, in this interpretation of astronomical phenomena, scientists are able to call on evidence from laboratory based experiments to help form and support suggested explanations for a wide variety of phenomena. As is explained in more detail in the above mentioned books^{2,3}, it has been found that an electrified plasma in a laboratory is a good model for providing possible explanations for many recently observed astronomical phenomena which, in several cases, have caused real puzzlement for astronomers seeking explanations using more orthodox gravitationally based theories. This is not to even hint that gravity should be ignored or regarded as irrelevant; rather, within this suggested new approach, the possible effects of the electromagnetic force in astronomical phenomena are investigated while continuing to recognise the importance of gravitational effects. In the electric universe, the gravitational systems of galaxies, stars, moons, planets are felt to have their origins in the proven ability of electricity to generate both structure and rotation in plasma. Further it is felt that the force of gravity only assumes importance as the electromagnetic forces approach equilibrium.

As has been noted already, great consternation has been caused in astronomical circles by the realisation that gravity, as presently understood, cannot explain much that is observed if the amount of mass available is as now felt to be present. In the new postulated approach, instead of positing the existence of 'dark matter' or seeking to modify Newton's well tried law of gravitation, it is suggested that the possible effects of the electromagnetic force be examined to see if, in conjunction with orthodox ideas on gravity, these puzzling observations can be explained. When the solution of problems through the introduction of 'dark matter' is discussed, it is often forgotten that the missing mass – if there really is any missing mass – is not absent homogeneously throughout the Universe. It is missing only in specific places such as the outer regions of galaxies. It follows that possible solutions, such as the idea that neutrinos possess mass, which are essentially homogeneous in nature cannot be acceptable. It might be noted here that, in the Electric Universe model, neutrinos do in fact possess mass and are extremely important. They respond to massive objects such as stars and galaxies only weakly but form an extended atmosphere which, for example, refracts light from distant stars around the Sun and this offers an alternative explanation for the so-called gravitational bending of light. On the other hand, in this model, neutrinos are not required to explain galactic rotation although they must contribute to the masses of both stars and galaxies. Again, having some mass, neutrinos will not be distributed homogeneously throughout the Universe.

Returning to the realisation that most of the matter in the Universe is in the form of plasma, it should be remembered that these clouds of plasma behave according to the well-known laws of Maxwell and, as pointed out by Scott in his book³ cited above, another law, due to Lorentz, helps explain the galactic

speeds alluded to earlier. This law states that a moving charged particle's momentum may be changed by the application of either an electric field, or a magnetic field or both. This would seem to a highly likely contributory factor in causing galaxies to rotate as they are seen to do but, contrary to the presently accepted view, would appear to indicate that gravity has less of a part to play than is thought. It should be noted though that nowhere is it being suggested that Newton's law of gravitation is wrong or in need of modification; it is simply being suggested that, in deep space where everything swims in a sea of plasma, the Maxwell-Lorentz electromagnetic forces dominate over gravity.

It might be remembered that the Lorentz force alluded to here changes a charged particle's momentum and that change is directly proportional to the strength of the magnetic field through which the particle is moving. Also, the strength of a magnetic field produced by an electric current is inversely proportional to the distance from the current but the gravitational force between stars is inversely proportional to the square of the distance. This well-known difference between the two forces could lie at the heart of the problem of the galactic rotation curves. Certainly this seems an avenue worth exploring especially since more and more space missions are indicating that electromagnetic forces are distributed more widely throughout space and are, as mentioned already, many orders of magnitude stronger than gravitational forces.

Much time, effort and money is spent worldwide on producing elaborate computer programs which purport to support the prevailing belief in the Big Bang as being the correct theory explaining how the Universe originated. However, as well as a great many laboratory experiments being performed to help establish plasma properties⁴, it has been shown, using the Maxwell and Lorentz equations, that streams of charged particles, such as are found in the intergalactic plasma, will evolve under the influence of electromagnetic forces into the familiar galactic shapes. The results fit with the observed velocity profiles extremely well and all without recourse to missing mass. Much of this simulation work has been carried out by Anthony Peratt and is reported in various issues of the IEEE Transactions on Plasma Science, as well as being covered in his book⁴.

The above is merely a brief outline of this increasingly important topic of the Electric Universe. Far more detail and discussion may be found on the Thunderbolt's site⁵ on the internet as well as on Wallace Thornhill's own internet site⁶. For the interested layman who wishes to learn more of this, there can be no better starting point than Tom Findlay's book *A Beginner's View of our Electric Universe*⁷.

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The Enigma that is Light.

Jeremy Dunning-Davies,

&

Richard Lawrence Norman

Introduction.

What is the true physical nature of light? This is a seemingly simple question which has been around in science for centuries. Newton favoured a particle theory but found difficulty when trying to explain the so-called Newton's rings with this theory; then, Young's experiments appeared to indicate a wave nature. The problem of attempting to reconcile the apparent wave and particle properties of light seemed for years to be an intractable one. However, reconciliation came in the wake of the quantum mechanical notion of wave/particle duality; in other words, light could display both wave and particle properties depending on the physical situation under consideration. Mathematically this might seem an acceptable resolution of this considerable problem but, physically, it seems it has always left people with at least a feeling on unease. In view of material, both experimental and theoretical, which has accrued over recent years, it is perhaps time to look again at this question with (hopefully) a completely open mind. The latter point is vitally important because some material might be considered to cause a 'rocking of the boat' in areas of science deemed sacrosanct by some.

Wave or particle?

Much of the more modern work carried out in addressing the meaning of wave/particle duality has been by Lazar Mayants and this is worth considering in some detail. It probably goes back at least to the appearance of his first book, *The Enigma of Probability and Physics*¹, continues through a number of publications, with one of 1989² being of particular relevance here, and culminates in the lucid overall discussion in his second book *Beyond the Quantum Paradox*³. To start, it seems worth considering in some detail some of the material contained in Mayants 1989 article cited under reference 2. Here he examines, for example, the phenomenon of particle diffraction but first examines straightforward diffraction which is known to occur when a series of waves of the same frequency encounters obstacles. The resulting diffraction pattern is determined by the geometry associated with the total system involved, together with the wave-length of the wave involved. For a real physical wave process, the detail will be determined eventually by the wave equation and the relevant boundary conditions. The relevant wave equation has the form:

$$\nabla^2 \varphi = (1/v_p^2) \partial^2 \varphi / \partial t^2, \quad (a)$$

where v_p is the phase velocity of the waves and φ is a quantity whose magnitude squared determines the diffraction pattern.

However, what is the actual position concerning particle diffraction? If the conventional belief that individual particles possess inherent wave properties is true then any such particle should have some property, akin to φ , obeying the above wave equation. If such a property does exist then the diffraction pattern should remain unaltered, regardless of the intensity of the beam, but gradually weakening as the beam does. However, experimentation does not support this. If only a few particles are used, no continuous diffraction pattern appears; a few points on the display are all that do appear. In the case where a large number of particles is used, the picture seems to be a normal diffraction pattern but, in reality, it isn't; it simply consists of a very large number of points which appear to merge together to

produce a familiar diffraction pattern seemingly. One might say that the perceived result is essentially a statistical one in the sense that a very large number of particles is involved and such numbers may only be treated effectively by statistical considerations. These remarks have been phrased to refer to particles – any particles – and, therefore, would refer to photons if photons are considered as particles.

In an actual particle diffraction experiment, a beam of *concrete* particles (to use Mayants terminology) is concerned and the experimenter considers the experimental statistical distribution of the coordinates of these diffracted *concrete* particles. However, in the theoretical situation, attention turns to the relevant probability distribution of the coordinates of what are, in effect, corresponding *abstract* diffracted particles. It is this rather subtle distinction between the *concrete* particles of the experimenter and the corresponding *abstract* particles of the theoretician which lies at the very heart of Mayants argument. This seemingly obvious distinction between abstract and concrete objects is an error hiding in plain sight. To see the distinction with clarity, allows the removal of many apparent paradoxical contradictions. As Mayants says³, “It is these two principle features of abstract objects—the nonexistence in reality and the lack of definite values of many properties—which differentiate them from the corresponding concrete objects.” “Which comes first, the chicken or the egg” refers to an abstract chicken and an abstract egg. The question being based on an abstract object can not be answered, but that is not important, as the abstract object “the chicken” does not have particular properties or exist, rendering the question improper and trivial. Each real particular such bird exists in no temporal paradox but comes after the egg in which it was gestated, and before any egg it may itself produce. In like fashion, the subject of “a cat” in Schrodinger’s paradoxical experiment, which it must be remembered was outlined in the original case to point up quantum theoretic inconsistencies at macro scale is again, an abstract cat, in this case symbolizing an indeterminate probability distribution, which is itself again, an abstraction with undefined qualities. The resultant paradox, simply does not exist. Probability theory works, and an abstract set adequate to a concrete set gives good results in calculations, but in no case are abstract and concrete objects alike. Paradox itself is not paradox, but misunderstanding. *The world is made of concrete objects.* It is this which the theory in its end *result* must describe, and does.

As has been described in detail elsewhere², it follows that the probability distributions of physical quantities for an abstract physical system, which conform to real motion of the corresponding concrete physical system, are determined by the solutions to the Schrödinger equation

$$E\psi = H\psi.$$

For a free real particle, the Hamiltonian is given by

$$H = c(p^2 + m_0^2 c^2)^{1/2},$$

where, as usual, m_0 is rest mass and p is momentum. c is the speed of light in a vacuum. However, the operators for particle momenta are $p_\alpha = -i\hbar \partial/\partial\alpha$ and $E = i\hbar \partial/\partial t$ Then the Schrödinger equation takes the form

$$c(-\hbar^2 \nabla^2 + m_0^2 c^2)^{1/2} \psi = i\hbar \partial \psi / \partial t$$

which leads to

$$\hbar^2 c^2 \nabla^2 \psi = m_0^2 c^4 \psi + \hbar^2 \partial^2 \psi / \partial t^2. \quad (b)$$

However, diffraction refers to a stationary state of the particle, determined by a specific value E of the energy which corresponds to a definite value of the momentum p and these are linked via

$$p^2 = (E^2 - m_0^2 c^4)/c^2.$$

It follows that

$$\hbar^2 \partial^2 \psi / \partial t^2 = -E^2 \psi \text{ and } \psi = -E^{-2} \hbar^2 \partial^2 \psi / \partial t^2.$$

Substituting in the first term of the right-hand side of (b) above gives

$$\nabla^2 \psi = c^{-2} (1 - m_0^2 c^4 / E^2) \partial^2 \psi / \partial t^2.$$

By putting $(E^2 - m_0^2 c^4)/c^2 E^2 \equiv 1/v_p^2$ in this equation leads to

$$\nabla^2 \psi = (1/v_p^2) \partial^2 \psi / \partial t^2,$$

that is, the well-known wave equation (a) with $v_p = E/p$.

At the very least, this would seem to indicate that particle diffraction is not a wave process but is, rather, linked with to the probability distribution of particles in a stationary state with corresponding with well-defined values of both energy and momentum for the particles. Again, it does suggest that the whole notion of wave particle duality should be re-examined with truly open minds. The above outlined theory is due, as stated previously, to Mayants – particularly in his cited article of 1989 - but is work which seems to have been forgotten by much of the scientific community and is certainly deserving of more public acknowledgement.

The Speed of Light.

What is really meant when people speak of the speed of light? What is meant when reference is made to the constancy of the speed of light? Popular talking about issues linked to the speed of light have probably increased since the popularisation of Einstein's theories of relativity. It is a popular misconception that Einstein's theory claims the speed of light to be a constant and that the theory leads to an ultimate speed for everything which is this constant speed of light. This, however, is only an incorrect public misconception.

It is important to remember that Einstein assumed the speed of light *in a vacuum* to be constant. Also, in several subsequent mathematical manipulations, the factor

$$(1 - v^2/c^2)^{-1/2}$$

appears, with v being the speed of the object under consideration and c the speed of light but, as emphasised above, the speed of light in a vacuum. It must always be remembered, though, that Einstein's theory was and is just that – a theory. Like any theory it will only hold when the assumptions made in constructing it hold; if any one of those assumptions ceases to be valid, it cannot be assumed the theory continues to be valid. This is, of course, true of any theory.

These points are important to remember since it is known, and has been known for a long time, that the speed of light is *not* constant; it certainly varies for light passing through different media. The speed of light passing through a medium of refractive index n , is c/n , where c is the speed of light in a vacuum. Hence, for light passing through a medium, such as water, which possesses a refractive index greater than unity, the speed of light will be substantially less than the value in a vacuum. Therefore, the ratio v^2/c^2 in the factor mentioned above will be less than unity and so, no mathematical problems are encountered with this factor. However, there are media which appear to possess refractive indices less than unity and, in such cases, light will propagate at speeds in excess of the speed in a vacuum. This, in turn, raises questions about the above relativistic factor since if v is greater than c in this expression, mathematical problems do arise due to the appearance of a negative quantity whose square root is required.

What must be remembered here is that, as Santilli has explained it⁴, special relativity was constructed to describe the propagation of light in a vacuum but not within physical media. Many of the results of special relativity have been validated on numerous occasions for point particles or electromagnetic waves moving in a vacuum but the theory is inapplicable for the movement of such in physical media because the speed of light is really a local variable dependent on the properties of the medium through which it is passing.

As with all physical theories, it is important to realise that they are just theories and, as such, are based on certain very definite assumptions. If any theory is applied in a situation where one or more of those basic assumptions is invalid, that theory cannot reasonably be expected to produce a satisfactory explanation of that situation. Note that this does not mean the theory is incorrect, it merely points out that it is invalid.

Axiomatic implications: Uncertainty, EPR, Popper, Bell and gravitation.

Uncertainty as an inherent systemic property and the quantum uncertainty principle we attribute to Heisenberg, as well as the closely related wave/particle duality have been the target of much enquiry and by no means stand on certain and irrefutable ground, nor should they. The Einstein-Podolsky-Rosen (EPR) paradox, is in no way paradoxical. In fact, it reveals the uncertainty relation itself to be “paradoxical.” Indeed, this simple thought experiment involving two particles moving along the same linear path in the same direction at the same speed, maintaining therefore fixed relative distance, does allow the precise simultaneous determination of both position and momentum of either particle. The thought experiment refers to concrete particles, and has a non-paradoxical outcome, where the uncertainty principle refers to quantum probabilistic calculations upon abstract objects, yielding a “paradox” when mistakenly applied directly to the particular, ‘concrete’ world.

Mayants is not the first to advance some of these ideas, which can be seen in the work of Popper in slightly different language⁵. The factual order of historical development points to an initial particle view of EM, with the field then later added as a secondary mathematical abstraction, which subsequently had the particle, the photon, emerge secondary to the field as an excitation³. Indeed, it appears we see the same confusion yet again, and perhaps it may be fruitful to restore the proper genesis of theory and realities, place the photon at the base of its collective wave propagation, and understand it is the source of any emergent field effects.

In reference 5 it is stated that:

“Max Born himself says about his statistical interpretation of wave mechanics: “The solution . . . was suggested by a remark of Einstein's about the connection between the wave theory of light and the photon hypothesis. The intensity [of course, what is meant is the square of the amplitude] of the light waves was to be a measure of the density of the photons or, more precisely, of the probability of photons being present.”

“Thus, through Born's statistical interpretation of matter waves even the one problem of quantum theory which appeared not to be statistical - the problem of atomic stability - was reduced to, or replaced by, a statistical problem: Bohr's quantized “preferred orbits” turned out to be those for which the *probability* of an electron's being found on them differed from zero.”

“All this is to support my thesis that the *problems of the new quantum theory were essentially of a statistical or probabilistic character.*”

However, Popper also draws this unusual, apparently contrary conclusion which will fit into place later:

“Thus the relativity to specification of which we have spoken is characteristic neither of quantum experiments nor even of statistical experiments: it is a permanent feature of all experimentation. (And a propensity relation might be regarded, and intuitively understood, as a generalization of a “causal” relation, however we may interpret “causality”.) For this reason it seems to me mistaken to regard statistical laws, statistical distributions, and other statistical entities, as non-physical or unreal. Probability fields are physical, even though they depend on, or are relative to, specified experimental conditions.”

In order to make sense of the above statement, it may be beneficial to take an elliptical pathway and consider the consequences of these insights as applied to one of the basic tenets supporting the current predominant quantum viewpoint: the Bell inequalities. Mayants’ commonsense analysis will have come as an unwelcome surprise to some. However, any facts unearthed in a cogent analysis such as his must be accepted and it must be seen where they lead. It may be noted that Bell’s inequalities suffer from the same

logical error as the other ‘paradoxical’ constructs considered above: an erroneous substitution of abstract for concrete elements. Bell’s inequalities are based on Bell’s theorem, which is itself a derivative of Bohm’s paradox, and Bohm’s paradox confuses abstract quantum elements and concrete objects. It is argued³, that the basic experiments upon which Bell’s inequalities are based can apply only to large numbers of particle pairs and must represent a statistical expression, and so, it is therefore entirely *expected* that Bell’s inequalities do not conform to experiments involving the real concrete system in question, as Bell’s inequalities confuse abstract and concrete elements to assume simultaneous rotation amongst various axes in the case of *one individual particle*, which is physically impossible. Quantum physics in this light may be rightly seen as representing real non-paradoxical outcomes and Bell’s inequalities are thereby revealed as flawed at their axiomatic basis, hence the apparent but nonexistent paradox.

From this new vantage Mayants³ informs us of the *ordinary view* of the consequences implied which place Bell’s ideas and nonlocal faster than light effects on one side of the scales, and on the opposing side of the balance we find realism and the common if incorrect assumption that *nothing moves faster than c*. Recall that Einstein’s limit of *c* refers to propagation through a vacuum. Does Einstein’s *c* hold good as a matter of consequence to defeat nonlocal theory, if Bell’s ideas are not correct? What of nonlocality? What of light? Do physical processes move faster than light in a nonlocal way and, if so, which ones?

In Tom Van Flandern’s essay⁶, *The Speed of Gravity what the experiments say*, a solid and specific empirical answer is provided (see original article for embedded parenthetical citations):

“The most amazing thing I was taught as a graduate student of celestial mechanics at Yale in the 1960s was that all gravitational interactions between bodies in all dynamical systems had to be taken as instantaneous.

. . . Yet, anyone with a computer and orbit computation or numerical integration software can verify the consequences of introducing a delay into gravitational interactions. The effect on computed orbits is usually disastrous because conservation of angular momentum is destroyed.

. . . While relativists have always been partial to the curved space-time explanation of gravity, it is not an essential feature of GR. Eddington (1920, p. 109) was already aware of the mostly equivalent “refracting medium” explanation for GR features, which retains Euclidean space and time in the same mathematical formalism. In essence, the bending of light, gravitational redshift, Mercury perihelion advance, and radar time delay can all be consequences of electromagnetic wave motion through an underlying refracting medium that is made denser in proportion to the nearness of a source of gravity. (Van Flandern, 1993, pp. 62-67 and Van Flandern, 1994) . . . The principal objection to this conceptually simpler refraction interpretation of GR is that a faster-than-light propagation speed for gravity itself is required. In the context of this paper, that cannot be considered as a fatal objection.

. . . We conclude that the speed of gravity may provide the new insight physics has been awaiting to lead the way to unification of the fundamental forces. . . . Moreover, the modest switch from SR to LR [\[Lorentzian Relativity\]](#) may correct the “wrong turn” physics must have made to get into the dilemma presented by quantum mechanics, that there appears to be no “deep reality” to the world around us. Quantum phenomena that violate the locality criterion may now be welcomed into conventional physics.”

Gravity appears to propagate at extreme super-luminal velocities⁶. It may safely be concluded that the

logical inconsistencies of Bell's theorem and inequalities do not in fact preclude non-locality in its super-luminal aspects. Mayants also comes to the conclusion that photons can vary from c , and names fundamental sub c non-zero rest mass expressions of EM: emons.

Next recall the famous wave function collapse of the double-slit experiment. A photonic interference pattern 'collapses' if measured to become something more closely akin to a single particle. This is traditionally ascribed to the effect of "measurement/observation." What can be made of this paradoxical anomaly where the observer affects the observed to induce wave function collapse and perhaps even 'create reality' ?

Measurement or observation are not the bottom of the process; they are but second order descriptions. Wheeler was highly insightful to posit information at the very deepest level of physical reality. Observation and measurement in terms of a primary informational dynamism then represent: *Informational Exchange*. Information affects physical form. Indeed this is true also in biology, not surprisingly, as biology and its relation to chemistry are founded on a primary physical basis with information at the deepest level⁷. The paradox appears as such, only because the primary role of information and its exchange, which clearly affect form/outcome, has not been understood. Now, it may be seen that there is no wave function collapse in the usual sense; the interference pattern is a complete outcome formed of photons, and the 'collapsed' expression is again a different complete outcome formed of photons, both being not in any way uncertain or indeterminate, the differentiation between them being a product of informational exchange which is the dynamic at the bottom of both observation and measurement.

To place this in a human perspective, and suggest a few alterations to the Copenhagen interpretation and some of the more radical theoretic anomalies which have gained predominant sway, such as the deeply troubling many worlds hypothesis, or the equally vexing solipsistic implications of observation, ideas so strange as to have one wonder if an electron is there or perhaps the moon if we are not looking, and place all this into proper relation to probability, attention might turn to some of the more puzzling experiments which are now mounting up and deserve to be addressed.

In these experiments, double-slit interference patterns are seen to change due to thought, and random number and event generators which are properly shielded become more organized in their output. These effects are created at close range, and at *very great distances*⁸⁻¹³. Is this inexplicable paranormal activity, or perhaps the cognitive result of resolved uncertainty affecting photonic wave expression? Theory allows an answer: No! This is simply the physics of informational exchange.

In the case of gravitation and also of thought as it affects reality it appears that some nonlocal aspect is needed to explain the effects we observe. Recall the unlikely assertion by Popper, that appears quite clearly to confuse abstract and concrete elements, which states that probability fields must be attributed reality. He had observed experimental effects which required explanation, a real physical explanation was demanded to account for observed phenomenon, hence his supposition. It might reasonably be posited that probability is not at the root of physical form but that information is. Hence it might be hypothesized that the field in question is not a probability field, but a non-probabilistic informational field: *the 'bit field.'*

Imagine a simple example of probability: one reaches one's hand into a concealed container to extract a ball or game chip with some particular marking common to a sub-set of the total objects in the container. Probability is used to guess at result prediction, but in fact the hand does not extract the chip or ball by way of probability, each concrete case is that of selecting one particular concrete object, probability is invoked only to allow prediction under uncertain conditions of human observational constraint, and hence reflects a limit in our available knowledge, not the basic dynamic of the system which is not probabilistic but specific. It has been clearly understood and articulated in previous articles¹⁴ that the nature of human

perception is by phenomenological necessity and anatomical analysis understood to be entirely probabilistic. Probability is a valuable and necessary consequence of our human limits. It is a second order method and not a descriptor of underlying processes, but instead an admission of our human limits in defining those processes. Wave function is a necessary abstraction.

With this in mind, the many seemingly paradoxical aspects of quantum theory under the current interpretation may now be reassessed:

There are no many worlds, as the wave function is a probability distribution, an abstract thing which does not require its unrealized aspects be accounted for in some imaginary other world, for all outcomes are complete in and of themselves. There is no uncertainty or wave/particle duality endemic to physical dynamism, those are aspects not of the system at its lowest level of operation, but reflect our human limits which are revealed in attempting to ascertain the same. Uncertainty is the product and province of human cognition and phenomenology, not external reality. Human mental effects upon physical reality including observation/informational-exchange entirely within the sphere of mentation are revealed in experiments referenced above to yield a very slight but demonstrable impact on physical systems. It appears that there is an experimentally demonstrable and specific place for human consciousness in quantum theory, but not the solipsistic one supposed. It may rightly be concluded that human observation in no case creates an electron to observe it, any more than human observation itself might create the moon. The appearance of probability alteration in experiments with human mentation indicates specific informational exchange over some actual medium, perhaps one such as the proposed 'bit field.' It may be concluded that

*The wave function itself represents an abstract probability distribution, signifying the **possible effects** of a potential REAL alteration in systemic informational allocation.*

The fact that subatomic particles demonstrate some fuzziness and do not behave as virtual little golf balls but in a way more akin to a wave packet, is then not due to the fact that the particle is somehow wave-like or uncertain, but because it is a process, a *specific* process which is informationally interactive, as are the larger emergent structures which they compose en masse.

Future questions:

1. Is the implied connection between gravitation, informational exchange and refraction testable in quantum experiments? Clearly alteration in refractive index can account for faster than c propagation speeds for light. If informational exchange over a 'bit field' accounts for the super-luminal aspects of gravity, and gravitation can be accounted for in its effects upon light by way of alterations in the refractive index as suggested above⁶, then an experiment could be derived where the hypothesis is tested. Hypothetically: *Micro-gravitational effects created through interactive informational exchange alter refractive conditions yielding specific patterned allocations within the experiment thereby determining the outcome.* Can these theoretical postulations be tested?
2. Is probability at the basis of physical reality or is non-probabilistic information? Does the uncertainty relation signify an endemic systemic aspect, or a human phenomenological limit in epistemology?
3. Is there a realistic interpretation of quantum theory which allows for the unification of gravitation in an informational model based around the empirical necessity of other than " c " electromagnetic propagation speeds and experimentally observed nonlocal aspects? Can a quantum model be derived without uncertainty or duality by way of accepting a central tenant of 'informational gravitation'?
4. Is paradox endemic to reality, or is it simply a misunderstanding based on improper assumptions which confuse abstract and real elements?

5. Is it possible to create sound physics based on a constant vacuum propagation value for c ? Does Lorentzian relativity offer an alternative?
6. Is the 'bit field' real?
7. Can clear and evident effects of informationally encoded photons on morpho-functional outcomes in biological systems⁷ be taken as a correct model for a system-wide common informational basis in physics?
8. Does information theory offer us the elusive prize and connect together gravitational effects with quantum theory by placing informational gravitation as a quantum basis?
9. It appears that the 'bit field' (previously aka the temporal field) *mediates specific entangled relational properties and strength* such as that between a mind and an object or *between gravitationally interactive bodies*, and recent experiments and theories have concluded entangled evolution to be the source of time. Then, could the 'bit field' provide a specific mechanism for temporal/gravitational effects such as gravitational time dilation and others?

Concluding comments.

Our understanding of what light is and is not depends crucially on two interrelated things – experiments carried out meticulously and the theory used to interpret those experiments. As discussed earlier, in his work, when Mayants wishes to talk of particles, he carefully distinguishes between what he calls the *concrete* particles of experiment and the *abstract* particles of theory. This is a rather clever and useful distinction to consider. Experiments are involved with actual reality; theory is always the product of the human mind and, as such, only ever attempts to picture reality rather than be reality. As a result of incorporating this distinction into his reasoning, he has reignited the debate concerning the nature of light – is it merely waves or is a beam of light composed of a huge number of particles? His theoretical calculations look again at the uncomfortable notion of wave/particle duality and show that a particulate theory is capable of describing all events concerning light previously thought to be purely wave phenomena. This proves to be particularly interesting given the recent resurrection of the atomistic view of matter¹⁵ in which everything is fundamentally composed of indivisible particles and void. Interesting because that theory also reduces a light beam to a stream of particles.

As a general point emerging from this discussion, it is worth realising that Mayants also seems to be indicating that great care must be taken when considering any so-called thought experiment. Any theoretician contemplating a physical problem essentially builds a model in his mind to describe the system involved. He then uses well-established techniques, often involving mathematics, to try to understand and explain the original phenomenon. In any thought experiment, the entire process of conceiving an experiment and carrying it out is confined to the mind of the person concerned. There is not any direct contact with physical reality such as is experienced by the experimenter in his laboratory. It seems that Mayants distinction between concrete and abstract particles as discussed here may have farther reaching consequences for future scientists.

Whatever the public view of many might be, these considerations primarily due to Mayants, together with some factors already well-known but highlighted publicly by Santilli, must reawaken the wave/particle duality debate because, in truth, they cast real doubts on that interpretation having much, if any, present day validity.

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Hadronic paradigm reassessed: neutroid and neutron synthesis from an arc of current in Hydrogen gas

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&
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I. Introduction and History.

Although quantum theory is unquestionably one of mankind's greatest and most useful achievements, it must be remembered that even its most accurate inculcation as demonstrated in Quantum Electro Dynamics (QED) does not proceed from a firm causal basis, as it is renormalized [1] (p. 128). This situation admits new possibilities which might more closely approach the truth in order to create new solutions to the intransigent problems which have beset mankind. Hadronic science offers us just such a new avenue where a simple and easily replicable experiment could allow insight permitting paradigm adjustment and new solutions. Toward that end, we will first review the experimental history of the synthesis of neutrons and an intermediate spin zero state prior to the full neutron synthesis known as *neutroids* (see section so named below) from an arc of current in hydrogen gas proceeding conceptually and experimentally from Rutherford to Ernest Sternglass, Edward Troupson then Don Carlo Borghi and R. M. Santilli, after which we will articulate the overarching implications for theoretical physics.

Rutherford (1920) [2] first proposed the notion that neutrons might actually be synthesized within the furnace of stars as compressed hydrogen atoms:



as Chadwick [3] experimentally confirmed in (1932):



where ν symbolizes a neutrino, meaning "little neutral one." The neutral charge, zero mass neutrino was proposed by Wolfgang Pauli under the name of neutron [4,5,6] so as to account for how beta decay conserves energy, momentum and angular momentum, even though Pauli had such severe reservations [4] as to call his proposed solution a "desperate remedy." Later Pauli's "neutron" was renamed as the "neutrino" by Enrico Fermi [7], a name humorously suggested by Eduardo Amaldi [8,9] to avoid subsequent confusion after Chadwick's discovery [3] of the neutron proper in 1932 [7,8,9,10]. It should be remembered that, although great expense has been incurred attempting to detect neutrinos directly, no direct detection of neutrinos has ever occurred; their "existence" has been *inferred entirely from signature effects* involving gamma ray production from electron positron annihilation and also gamma ray production stemming from cadmium neutron interactivity, allowing signature-specific timing differentiation between two supposedly neutrino induced gamma sources [11].

In assessing the likely plausibility of his own "desperate" solution, we read (translated) from his 1930 communication to the *Physical Institute of the Federal Institute of Technology*, Zurich [4]:

" . . . I have hit upon a desperate remedy to save the "exchange theorem" of statistics and the law of conservation of energy. . . . I admit that my remedy may seem almost improbable because one probably would have seen those neutrons [here meaning neutrinos], if they exist, for a long time. "

Also, on the Berkley Center for Theoretical Physics web site [7a] we find:

"Because neutrinos interact so weakly with matter, Pauli bet a case of champagne that nobody would ever detect one."

II. Experimental Results.

The initial successful synthesis of neutroids from an arc of current in hydrogen gas and subsequent synthesis of neutrons by a process of substance-specific nuclear transmutation was performed by Earnest Sternglass in 1951 while completing his Ph.D. thesis at Cornell. He wrote to Einstein of his inexplicable results, which seemed to occur in conditions lacking sufficient energy to synthesize the neutrons his experiments had indeed somehow apparently created.

From the Rare Manuscript Collection division of Cornell University Library as represented in [12]:

Ithaca, N.Y.
August 26th, 1951
518 Dryden Rd.

Dear Professor Einstein,

You may be interested to learn that in the course of the past two months I have been able to obtain experimental evidence for the formation of neutrons from protons and electrons in a high-voltage hydrogen discharge.

The experiments were carried out with a demountable gas X-ray tube capable of dissipating 1,200 watts filled with hydrogen and surrounded by about 6 inches of paraffin on all sides. Voltages up to 35 kV and currents up to 40 mA were used and silver and indium foils were placed near the tube walls. The neutron induced beta--activities were measured with a thin-walled aluminum Geiger-Muller counter in a lead housing of about 3-4" thickness giving a background count of 15 counts per minute. The initial activities in indium and silver were found to be 6--7 counts above background, decaying with the respective mean lives of 2.4 min for Ag and 54 min. for In. Having a standard neutron source, this arrangement could be calibrated roughly so that the rate of neutron formation can be determined to be on the order of 10--20 neutrons/sec at 38 mA and 25 kV and an estimated pressure of 10^{-2} mm of mercury in the discharge.

The possibilities of cosmic--ray produced neutrons was eliminated by exposing the foils without turning the discharge on. Contamination of anode & cathode with materials that could give rise to neutrons was eliminated by replacing them with freshly machined parts. The possibility of a deuteron--deuteron reaction was eliminated by a calculation using famous values of the cross-section for this process leading to a factor of 10^5 - 10^6 too small a rate of neutron formation by the slight admixture of deuterium in normal hydrogen. So far, no one in the department here has been able to suggest any nuclear reaction that could be made to account for the activity at such a low energy. During the next few weeks we intend to make measurements on the activities in a salt-mine, 2000 ft. below ground as to improve the statistics of our counts. Professor Cocconi and Professor Ieiri will setup the equipment for this experiment after which we shall feel ready to announce it possibly at the Chicago meeting.

The indicated rate of formation is consistent with a cross-section of 2.5×10^{-24} cm² for the case of an isolated proton capturing an electron in the process calculated by C.G. Darwin in 1913. It is not consistent with the cross--section of 10^{-42} cm² predicted by neutrino theory. This seems to lend strongly support to the view that the neutron is a purely electromagnetic entity composed of a proton and a highly "distorted" electron as I have outlined to you in my last letter.

I remain sincerely yours,

Ernest J. Sternglass [12] (pp. 8-9)

Although Einstein firmly advised that the results must be published even though they apparently contradicted standard theory, Sternglass refused due to the stultifying preponderance of contrary opinion and so, his results were preemptively excluded under orthodox pressure within the discipline [12,13] leaving them unpublished. Edward Trounson, a physicist working at the Naval Ordnance Laboratory repeated the experiment and again gained successful results but they too, were not published [12,13].

It will be demonstrated that Sternglass' experiments could only have synthesized *neutroids*, which were then subsequently transformed into neutrons by a process of substance-specific nuclear transmutation. (See the section entitled *Neutroids* below.)

The next to synthesize neutroids and hence neutrons via an intermediate process of substance-specific nuclear transmutation was Don Carlo Borghi. His seminal experiment involved a cylindrical metal chamber named a “klystron,” containing low pressure hydrogen gas irradiated with microwaves at 10^{10} s^{-1} frequency and also using an electric arc of 500 *V* and 10 *mA* [14]. Santilli [14a, 15] later discovered that microwave irradiation of the gas was not necessary to create the experimental effects, although the influence of such radiation was not excluded as to its possible contributory influence. In both the experiments of Don Carlo Borghi and those of Santilli, *delayed neutron synthesis* was sometimes observed. From Santilli [14a,15]:

“A first series of measurements was initiated with Klystron I on July 28, 2006, at 2 p.m. Following flushing of air, the klystron was filled up with commercial grade hydrogen at 25 psi pressure. We first used detector PM1703GN to verify that the background radiations were solely consisting of photon counts of 5 – 7 $\mu\text{R/h}$ without any neutron count; we delivered a DC electric arc at 27 V and 30 A (namely with power much bigger than that of the arc used in Don Borghi's tests . . .), at about 0.125" gap for about 3 s; we waited for one hour until the electrodes had cooled down; and then placed detector PM1703GN against the PVC cylinder. This resulted in the detection of photons at the rate of 10 – 15 $\mu\text{R/h}$ expected from the residual excitation of the tips of the electrodes, but no neutron count at all.

However, about three hours following the test, detector PM1703GN entered into sonic and vibration alarms, specifically, for neutron detections off the instrument maximum of 99 *cps* at about 5' distance from the klystron while no anomalous photon emission was measured. The detector was moved outside the laboratory and the neutron counts returned to zero. The detector was then returned to the laboratory and we were surprised to see it entering again into sonic and vibrational alarms at about 5' away from the arc chamber with the neutron count off scale without appreciable detection of photons, at which point the laboratory was evacuated for safety. After waiting for 30 m (double neutron's lifetime), we were surprised to see detector PM1703GN go off scale again in neutron counts at a distance of 10' from the experimental set up, and the laboratory was closed for the day.” [14a,15] (Santilli, 2006 pp. 4-5, 2007 p. 715)

Neutron counts registering much higher and in these cases arising more rapidly, some necessitating the actual evacuation of the laboratory, were obtained by first increasing the arc energy to 700V and 1.2 amps via a transformer, noting closely that manual impact of the experimental device and also a triggering-implosion from oxygen admixture yielding oxygen/hydrogen combustion both dramatically increased synthesis effects. Once hydrogen pressure was stepped up to 100 psi, dangerous experimental results were assured. It appears from analysis of this first series of Santilli's experiments [14a, 15] that arc energies are associated with the possible delayed creation/detection of neutrons if those energies are low (by a particular mechanism to be specified), or the immediate synthesis of neutrons may be encouraged if the energies achieve some higher energetic constituency.

Alarm, neutron	9/1/2006/5:57:00 AM	99 Cps
Alarm, neutron	9/1/2006/5:58:00 AM	99 Cps
Alarm, neutron	9/1/2006/5:59:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:01:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:01:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:01:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:02:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:02:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:02:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:03:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:03:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:03:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:04:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:04:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:04:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:05:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:05:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:05:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:07:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:08:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:08:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:09:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:09:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:10:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:10:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:10:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:11:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:11:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:14:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:14:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:15:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:15:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:15:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:15:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:15:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:16:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:16:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:16:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:16:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:17:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:17:00 AM	99 Cps
Alarm, neutron	9/1/2006/6:17:00 AM	99 Cps

FIG. 1.
 Print-out reproduction of a typical scan of detector PM1703GN indicating neutron alarms that required evacuation of the laboratory [15] (Santilli 2007). (Used with permission of Ruggero Santilli/Hadronic Journal).

Experimental apparatus used by Santilli in [14a,15] as represented in [16]:



FIG. 2.
 [16] (Santilli, 2014) (Used with permission of Ruggero Santilli/Journal of Computational Methods in Sciences and Engineering)

The next tests discussed [16] (Santilli, 2014) were conducted using several different more advanced pieces of experimental apparatus. (See below).



FIG. 3. Second reactor constructed with schedule 40 steel used in tests with hydrogen gas at 100 psi. [16] (Santilli, 2014). (Used with permission of Ruggero Santilli/Journal of Computational Methods in Sciences and Engineering)



FIG. 4. One experimental setup, equipment from the left: SAM 940 neutron and gamma detector; a Polimaster, a Berkeley Nucleonics PalmRad; and a Ludlum neutron and gamma detector (not shown in this figure); the reactor; the specially built rapid DC pulsing power unit (patent pending) with incorporated capacitors in it; and the hydrogen bottle. [16] (Santilli, 2014). (Used with permission of Ruggero Santilli/Journal of Computational Methods in Sciences and Engineering)

In these new experiments neutrons were synthesized immediately upon the condition that the arc energy was sufficient to exclude the production of neutroids (see section below) which are indeed excluded at energies of a $\sim 500J$ [16]. Santilli states in regard to the striking result concerning synthesis of thermal neutrons: “. . . a reactor comprising an essentially pure hydrogen gas at 30 psi, when exposed to a high voltage DC discharge with about 3 kVA at about 15 kV and a frequency of about 1 Hz through a 3/16" gap between 1/4" tungsten electrodes, produces thermal neutrons with less than 1 MeV.” [16] (p. 412).

This is a decidedly practical result considering the usual bulky, hazardous and costly mechanisms of spallation sources and research reactors currently used in the production of thermal neutrons.

We see in this series of tests [16] the expected positive correlation between arc energy, gas pressure and neutron synthesis rates such that at 100 psi hydrogen gas pressure and arc strength of 50 kVA radiation of such potency is produced so as to necessitate the closure of the lab and preclude even the proper collection of data.

Recent tests reported privately to us by Santilli clearly state that a nonlinear relation exists between arc pressure, gas pressure and neutron production [17]. From one such correspondence:

“. . . neutrons are not synthesized in appreciable numbers of CPS for arc voltage less than 3 kV and energy less than 3 mJ and that, beyond the threshold values, the number of neutron CPS increases non-linearly with the increase of the hydrogen pressure, the arc voltage and the delivered energy.” [17] (p. 3).

It may be concluded that: *Only such energies as those used in the work of Santilli which exceed threshold energy values as specified can directly produce neutrons.* The mechanism of neutroid interactive

substance-specific nuclear transmutation involved in delayed neutron synthesis at low arc energies will be defined shortly. In our consultations Santilli has strictly specified that a low energy continuous arc can only produce neutroids (see below), and threshold minimum energies expressed in a pulsing arc (fig. 4) are required for the most efficient direct neutron production.

Clearly, the arc energy was below threshold values in the experiments of Sternglass and Borghi to have accounted for the direct production of neutrons and so we propose, only *neutroids* would have been synthesized from the $35kV\ 30mA$ and $500V\ 10mA$ currents used, hence those *neutroids were then only subsequently transformed into neutrons*. Next, it will be demonstrated how this proposed delayed transformation occurs.

III. Theoretical Analysis.

History:

In order to address and repair the limitations of quantum theory and relativity so as to allow new solutions to be derived, a mathematical covering of existing theory was required. The new model which has achieved this, that of Santilli's Hadronic Mechanics, is based on new mathematics called "Iso-mathematics" which has been extended to include several new methods of calculation [18,19,20,21,22,23,24].

To condense briefly from references [18,19,20,21,22,23,24]:

Isomathematics is derived through an isotopic lifting of the conventional associative product between generic quantities into an iso-product. In this way, the mathematics and differential calculus of Newton-Leibniz might be reformulated so as to find new answers and solutions to old problems. Lie's theory has been augmented to articulate non-linear, non-local and non-Hamiltonian systems (meaning, variationally nonself-adjoint systems not representable with a Hamiltonian). Fundamental time evolution invariance was accounted for in Santilli's Iso-Differential calculus. A summary of these ideas is available here: [19,23,24]. The Schrodinger-Santilli isoequations underlying hadronic mechanics and the Heisenberg-Santilli isoequations constituting a *completion* of existing quantum theory have been created. [22] (pp. 64-65).

Experimentally demonstrated inconsistencies articulated in this paper regarding orthodox quantum mechanics and relativity have been addressed and new theoretical solutions which fit experimental results have been offered by way of the successful *covering* of existing theory. The resulting model includes relativistic and nonrelativistic treatment of *all characteristics* of the neutron in its synthesis from a proton and an electron using isomathematics and related isomechanics which allow the representation of the proton with its actual extended shape, as can be seen here:[14a,15,16,19,20,25,26,27,28,29].

Further theoretical explanation may be found below.

Applied theory:

Quantum mechanics is unable to account for these experimental results. Further explanation will follow; note initially that:

$$E_p = 938.272\text{ MeV},\ E_e = 0.511\text{ MeV},\ E_n = 939.565\text{ MeV}, \quad (3a)$$

$$E_n - (E_p + E_e) = 0.782\text{ MeV} > 0, \quad (3b)$$

indicating the rest energy of the neutron is 0.782 MeV greater than the combined rest energies of the

proton and electron, demonstrating both “positive binding energy” and “mass excess” which are both *disallowed* by quantum mechanics.

The Neutroid:

Don Borghi and his scientific associates coined the name "neutroid" (symbolized here as \tilde{n}). The neutroid was proposed as an intermediate particle mutation preceding synthesis of actual neutrons. Neutroids have also been experimentally created by Santilli. Santilli defines the proposed neutroid as a (spin zero) particle having the values (in standard nuclear units: A = total number of nucleons; Z = number of protons; (N = number of neutrons); J the total angular momentum; with *amu.* = mass),

$$A = 1, Z = 0, J = 0, m = 1.008 \text{amu.}$$

Santilli then writes:

$$p^+ \uparrow + e^- \downarrow \rightarrow \tilde{n}(1, 0, 0, 1.008) \quad (4)$$

where $J = 0$ avoids a spin anomaly in the synthesis [29].

In order to fully articulate the proposed formalism and mechanics of neutroid to neutron transformation within a process of substance-specific nuclear transmutation yielding experimentally demonstrated delayed neutron synthesis, we must return to the idea of the neutrino and offer a new piece of theory.

The Santilli Aetherino:

The currently accepted theory of weak interactions has been applied in a model of inverse beta decay with proposed collective electron effects in order to explain the creation of neutrons from hydrogen catalyzed through nuclear reactions on metallic hydride surfaces [12, 30]. However, the high probability of inelastic scattering in these low energy experiments has not been addressed to the satisfaction of the discipline within those explanations offered in this model [12].

A causal model and specific explanation of neutron synthesis detailing internal hadronic structure is available in Hadronic Mechanics [19], Hadronic Chemistry [31] and the theory of the Santilli Aetherino [32]. A new mathematical construct (with flexible $-/+$ signs) along with experimental demonstration the existence of neutroids and the synthesis of the neutron with over 340 tests will soon be published as: *Experimental confirmation of the synthesis of neutrons and neutroids from a hydrogen gas*: [33].

In standard theory neutron synthesis as here discussed requires emission of a neutrino, or absorption of an antineutrino:

$$p^+ + e^- \rightarrow n + \nu, \quad (5a)$$

or

$$p^+ + e^- + \bar{\nu} \rightarrow n. \quad (5b)$$

Logically, this is assertion is necessarily revealed as flawed:

1. A positive binding energy of 0.782 MeV is indicated to account for the rest energy difference between the constituent components of the neutron, the electron and the proton, and the neutron itself. However the Schrödinger equation does not admit such positive binding energies and can not account for the bound state of the electron within the hyper-dense medium of the proton.

2. Experiments plainly demonstrate a positive binding energy. However in classical anti-matter theory the antineutrino is ascribed negative energy, contrary to experimentally derived data.
3. Antineutrinos have a *null cross section* for electron and proton interactions, contrary to experimental results.
4. Paradoxical results seem to indicate neutrino scattering effects implying some “particle” mass, yet no particle is detected. Such “particle scattering” sans particle implies another solution: a longitudinal impulse moving through a substantial surrounding energy density interacting with targets: *the Aetherino* (symbolized as: “*a*”) [32].

The Aetherino carries mass and charge zero, spin 1/2 and 0.78 energy according to the synthesis

$$p^+ + a + e^- \rightarrow n.$$

A. Neutron from substance-specific neutroid absorption and aetherino:

We may now directly approach the delayed synthesis of neutrons demonstrated in low energy experiments by way of articulating the formalism used to define Aetherino/Neutroid interactivity within the context of detector and experimental substance-specific nuclear transmutation and then applying that formalism to the specific compounds actually used in the experiments and detectors [15, 29]. The basic equation is written as:

$$\tilde{n}(1,0,0,1.008) + a \rightarrow n(1,0,1/2,1.008) \quad (6)$$

The basic component interaction is given by:

$$N(Z, A, J) + \tilde{n}(0, 1, 0) + a(0, 0, 1/2) \rightarrow \quad (7)$$

where N is a nuclide. The probable transformation of the neutroid is that of a neutron given by,

$$\tilde{n} + a \rightarrow n, \quad (8)$$

that of the predicted form,

$$N(Z, A, J) + \tilde{n}(0, 1, 0) + a(0, 0, 1/2) \rightarrow N'(Z, A + 1, J + 1/2) . \quad (9)$$

In Don Borghi's tests, gold appears to act as a neutron source through the absorption and subsequent transformation of neutroids via the calculation:

$$Au(79, 197, 3/2) + \tilde{n}(0, 1, 0) + a(0, 0, 1/2) \quad (10)$$

$$\rightarrow Au(79, 198, 2) + a(0, 0, 1/2)$$

$$\rightarrow Hg(80, 198, 0) + \beta^-(-1, 0, 1/2) + \gamma(0, 0, 1)$$

The silver in Sternglass' experiments absorbed neutroids to produce neutrons as given by:

$$Ag(47, 107, 1/2) + \tilde{n}(0, 1, 0) + a(0, 0, 1/2) \quad (11a)$$

$$\rightarrow Ag(47, 108, 1) + a(0, 0, 1/2) \rightarrow$$

$$\rightarrow Cd(48, 108, 0)[stable\ isotope] + e^{-}(-1, 0, 1/2)$$

$$Ag(47, 109, 1/2) + \tilde{n}(0, 1, 0) + a(0, 0, 1/2) \quad (11b)$$

$$\rightarrow Ag(47, 110, 1) + a(0, 0, 1/2) \rightarrow$$

$$\rightarrow Cd(48, 110, 0)[stable\ isotope] + e^{-}(-1, 0, 1/2)$$

The *Li*-activated detectors in Santilli's experiment function as mediators of aetherino and neutroid interactivity yielding neutrons by:

$$Li(3, 7, 3/2) + \tilde{n}(0, 1, 0) + a(0, 0, 1/2) \quad (12)$$

$$\rightarrow Li(3, 8, 2)$$

$$\rightarrow 2\ He(2, 4, 0) + 2\ \gamma(0, 0, 1)$$

We may deduce: *the substances used for neutron detection are themselves the neutron source by way of neutroid absorption and subsequent nuclear transmutation. Li based detectors that can register thermal neutrons are best for this experimental work.* New mathematics and theory will soon be available here: [33].

IV. The Role of Physical Theory

Physical theory explains experimental and observational results.

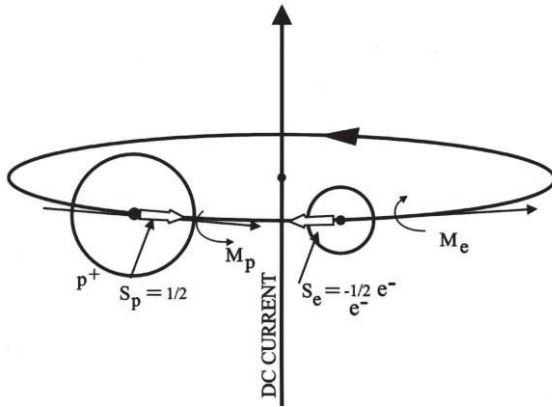


FIG. 5a.

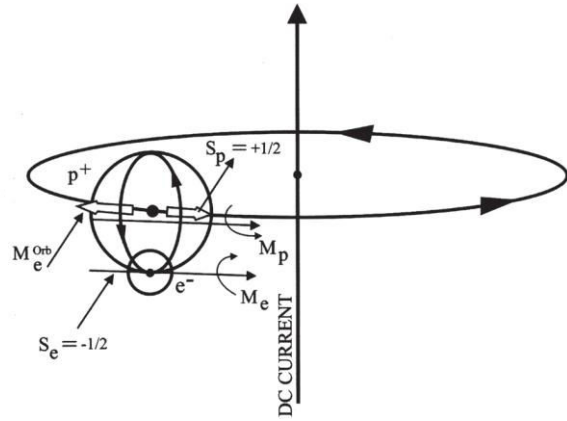


FIG. 5b.

A schematic view of the tangential alignment of protons and electrons along the tangent to a magnetic force line (Fig. 5a), and a view of the compression of the electron against the proton caused by opposing electric and magnetic polarities (Fig. 5b) [16] (Santilli, 2014) (Used with permission of Ruggero Santilli/Journal of Computational Methods in Sciences and Engineering).

Hadronic mechanics offers a clear causal mechanism to explain these results. The electrons and protons constituting the hydrogen gas become ionized in the arc, and by way of its tangential relation to the magnetic force lines the electron breaches the proton's hadronic horizon via opposing magnetic and electric polarities, leading to singlet coupling. The mass difference of the order of 2000 times between the heavy proton and the light electron ensure that the proton is not mutated, while the electron

demonstrates constrained angular momentum orbiting then within the proton's hadronic sphere. In this way, a stable singlet coupled particle with the proper spin is created: the neutron.

Hadronic structure is defined within Hadronic Mechanics and Chemistry as a contact type interaction characterized by full emergence of one wave-packet within the other. The dynamic tangential relations between the proton and electron ionized gas constituents mediated by DC magnetic force lines so as to breach the hadronic proton horizon and compress the electron within the proton and bind them together in singlet coupling as a neutron, offer us a specific physical mechanism to explain observed inelastic scattering probabilities:

The electron collapses into the proton from attractive Coulomb forces due to opposing charges and magnetic moments [14a].

Further detailed theory and mathematical explanation may be found here: [19,29,31,32].

See

[14a,15,16] for further examples of neutron and neutroid syntheses under various experimental conditions and constraints.

Possible implications for quantum theory

The parsimonious interpretation of the empirically derived internal neutron structure is that of an electron bound within a proton. If this is so, axiomatic adjustments to the current Hadronic and Quantum paradigms are logically indicated:

1. The Schrödinger equation fails to produce correct physical solutions in the case of the experimentally indicated 0.782 MeV *positive binding energy* over the rest energies of the proton and electron which is required to synthesize neutrons.
2. Quantum mechanics forbids the synthesis of the spin 1/2 neutron from the bound state of the spin 1/2 proton and spin 1/2 electron.
3. The electron being bound into the proton for the 15 *m* life of an isolated neutron is not permitted in quantum mechanics.
4. The magnetic moments of the proton and electron are insufficient to account for the magnetic moment of the neutron according to quantum theory.
5. The uncertainty principle does not allow the electron to be bound permanently within the proton in stable nuclei such as the deuteron.
6. The interpretation of internal neutron structure which is most parsimonious, is that of an electron bound within a proton, not that of quarks. A simpler neutron structure has been articulated. The undetectable free quark is no longer required.
7. The model of Hadronic Mechanics and Chemistry implies new hadronic fuels, possible stimulated nuclear decay and rapid safe elimination of radioactive nuclear waste (see below) [31].
8. The neutron can be re-conceptualized as the hadronic bound state of the hydrogen atom with the electron orbiting within a proton (see figure 6 below). Ergo: the ordinary energy levels of the hydrogen atom may be rightly conceptualized as the excited states of the neutron.

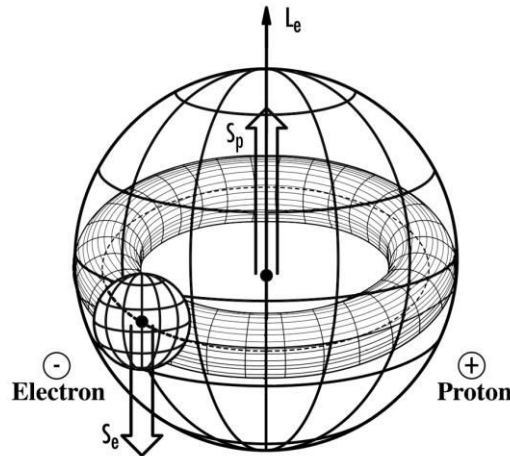


FIG. 6. Image of the hydrogen atom's electron orbiting within the proton forming a neutron in singlet coupling. The neutron is the hadronic bound state of the hydrogen atom. Used with Permission of Ruggero Santilli.

V. Practical Benefits of Paradigm Shift

Should physics choose to adjust the paradigm to fit the experimental results afforded by this simple experiment rather than suppress those results, the potential benefits to mankind and the sciences are extensive in their scope.

An alternative method for disposal of high-level radioactive waste.

An alternative method for disposing of high-level radioactive waste has been proposed by Santilli. It is a form of neutralisation but does not use the conventional methods currently being researched. Indeed, classical formulations of quantum chemistry and nuclear models do not even permit the practical method proposed. This new method arises from a number of discrepancies between the theoretical and measured values using the current formulation of quantum mechanics. Conventionally, the probability for beta-decay of a neutron into a proton, electron and neutrino is very low for radioactive elements on a nuclear timescale; for stable isotopes, the lifetime of neutrons is effectively infinite. Hadronic mechanics predicts that such a reaction may be stimulated within the nuclei of radioactive materials.

In essence, a radioactive nucleus is in an excited energy state and is attempting to return to its ground state energy. Under normal circumstances, this is achieved by spontaneous fission or radioactive emission; the time taken to decay being dependent on how much excess energy the nucleus has. This can vary between

⁻³¹
 10^{-31} seconds and millions of years. An excited nucleus can return to its ground state through emission of a photon (gamma emission), an electron (beta emission), or by spontaneous fission, where alpha emission is assumed to be a form of fission. The latter two processes cause a change in the nature of the parent nucleus, altering its nuclear properties. The energy value of the excited state determines the method by which the nucleus returns to its ground state. If the decay process involves the emission of a beta particle, it may be extrapolated that a neutron will have to decay to achieve this.

From the theoretical calculations, it is hypothesised that this decay can be stimulated by bombarding the nucleus with so-called 'resonant' photons with an energy of 1.294 Mev [31]. Under normal circumstances

the probability of this interaction is extremely low. However, Santilli claims that there is a large resonance peak in the reaction cross-section (that is, the probability of the said interaction occurring) for incident photons with an energy of 1.294 Mev.¹

If this interaction is found to be true, its application for the disposal of radioactive waste is profound. Photons with the correct resonance energy can be produced easily within a piece of equipment of small volume, such that the neutraliser could be built on the same site as the parent reactor itself. Effectively, it would allow all radioactive waste to be fissioned until all the isotopes form stable nuclei. However, a point to note is that, taking a typical sample of waste, the resultant treated material would not be radioactively dangerous but chemically could be a totally unknown concoction of elements and compounds, which may well contain high levels of toxins. Another point to note is that stimulated fission would release a considerable amount of heat energy from the fuel, and so some sort of effective coolant would be required. However, since this heat energy could be used to produce even more power, there seems no reason in principle to suppose that what might be termed a secondary 'waste reactor' could not be built.

To continue quantitative scientific studies of the proposed new method for the disposal of nuclear waste essentially requires a few basic experiments to be performed. All should be of reasonable cost and are certainly realisable with present-day technology. It seems sensible to perform these experiments to decide whether or not the claims are valid. If they are, the rewards would be tremendous; if not, little would have been lost.

A. Hadronic fuels:

From the very beginning, one of the main driving forces behind Ruggero Santilli's hadronic science has been an urgent desire to help find new clean forms of energy for the benefit of all. To this end, hadronic mechanics has been developed and it is found that all energies predicted are suitable for the clean production of electricity and so may be used in the production of fuels acceptable in a so-called green economy. These new energies are found to be of three types; one at each of the particle, nuclear and molecular levels. These are all discussed in detail in the book on hadronic chemistry [31], although that volume does really concentrate on molecular aspects. However, the vitally important point to remember at all times is that the new proposed hadronic mechanics agrees with conventional theories everywhere except at short distances of the order of 10^{-13} cm. It is also important to remember that, at these short distances, many effects are non-potential ones and so may not be examined via the use of a Hamiltonian. These new effects are extremely short range and exhibit a number of unusual features:

- (i) the non-hamiltonian interactions due to the deep mutual overlapping of the particle wavepackets in singlet coupling are attractive and are so attractive as to overcome repulsive Coulomb interactions,
- (ii) they occur without any binding energy,
- (iii) these new interactions imply a mutation of the intrinsic characteristics of particles, characterised by irreducible representations of the Poincaré-Santilli isosymmetry. e.g. a deformation of the charge distribution of protons and neutrons is representable by hadronic mechanics and allows an exact representation of nuclear magnetic moments.

1. It is also feasible, though not stated, that the simple existence of an excited nucleus makes it open to interaction with resonant photons, regardless of the means of decay ultimately used to return to its ground state energy. Once a neutron is converted into a proton plus reaction products, a number of possibilities could occur. Firstly, the new nucleus could be a stable isotope, in which case further interactions with the resonant photons would be unlikely and the waste would have been effectively neutralized. Secondly, the new isotope could form a new neutron deficient nucleus and one of the following could then occur: the nucleus undergoes spontaneous fission, forming two new nuclei and possibly a number of neutrons, which could interact with other fissile elements in the fuel and generate excess heat; the neutron deficient nucleus could form a new excited energy state which can simply be categorized as another target radioactive nucleus for the resonant photons.

The attractive nature of these new interactions combined with their lack of energy exchange and the possible alteration of the intrinsic character of particles allow for truly new clean energies. It remains to consider briefly these three types of new energy as alluded to earlier;

(1) Firstly consider that occurring at the elementary particle level.

It seems that the neutron harbours a huge reservoir of clean energy which could be made available to mankind. It is a naturally unstable particle with spontaneous decay

$$n \rightarrow p^+ + e^- + \bar{\nu}, \quad (13)$$

which releases electrons with huge kinetic energies up to 0.8MeV. Here, and later, the traditional notation incorporating the symbols for anti-neutrino and neutrino are used.

The capture of these electrons via a conducting screen provides a dual source of energy called hadronic energy. The first source is due to the creation of an electric potential difference, while the second is due to the creation of a large quantity of heat. This source is clean because no dangerous radiation is emitted and there is no harmful waste.

As is explained in detail in the book on Hadronic Chemistry [31], this so-called hadronic energy is based on three predictions:

- (a) A peripheral neutron belonging to a group of light, natural, stable elements $N(A, Z)$, called hadronic fuels, may be stimulated to decay via a flux of photons γ with a resonating frequency of 1.294MeV,

$$\gamma + n \rightarrow p^+ + e^- + \bar{\nu}; \quad (14)$$

- (b) The resulting nuclei $N(A, Z+1)$ are naturally unstable with spontaneous beta decay

$$\gamma + N(A, Z) \rightarrow N(A, Z+1) + e_1^- + \bar{\nu}_1 \rightarrow N(A, Z+2) + e_2^- + \bar{\nu}_1 + \bar{\nu}_2; \quad (15)$$

- (c) The final nuclei $N(A, Z+2)$ of the class of hadronic fuels are light, natural, stable elements and so, there is no deposit of harmful waste material.

Examples of these so-called hadronic fuels are $Z_n(70, 30)$ and $M_0(100, 42)$. It should be noted also that the energy of the original resonating photon is not lost but remains available in the final usable energy. Also, for each resonating photon there are two electrons and related kinetic energy produced. Again, in essence, the suggested process transforms the original nuclei into nuclei having smaller mass while producing large amounts of energy - large enough in fact to ensure a positive energy output after allowing for that needed to produce the original resonating photons. Obviously, hadronic energy is highly acceptable environmentally and it would seem that the suggested process readily delivers large amounts of usable energy. However, the entire theoretical discussion lies outside the realms of traditional theoretical physics, indicating a process which is impossible for traditional quantum mechanics. As will be noted again later, it does appear that this is what provides the most vociferous denunciation of this mentioned theory and the implied benefits for mankind if, in fact, the idea works. It does seem, though, to be a process worth evaluating independently both theoretically and experimentally since it could prove extremely beneficial for mankind if it works as expected.

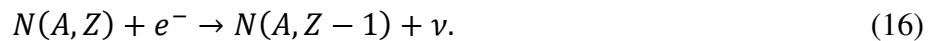
(2) New Clean Energies occurring at the Nuclear Level.

As mentioned already, one of the biggest obstacles facing these new proposals is the firmly established position of quantum mechanics within scientific circles. Orthodox quantum mechanics simply doesn't allow for some of these developments; for example, it doesn't even allow the possibility of low energy stimulated nuclear transmutations but, even if such processes are admitted, it is claimed such are accompanied by the emission of harmful neutrons. Experimental verification of stimulated nuclear

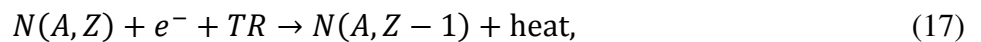
transmutations at low energy without the emission of neutrons would indicate direct support for this new theory which, in a very real sense, simply extends, or covers, existing quantum mechanical theory to include physical situations not addressed by that existing theory. However, in the present context, the crucial point is that the new theory predicts a totally new model for the structure of nuclei. In this new model, hadronic mechanics, they are reduced to being composed of electrons and protons but recovering the conventional structure in terms of protons and neutrons in first approximation. These new models are, as mentioned previously, a consequence of neutron model as a hadronic bound state of a proton and an electron as originally conceived by Rutherford. It follows that the new clean energies of classes 1 and 2 are very deeply interconnected, to the extent that experimental evidence of one is experimental evidence of the other.

Three types of new clean energies emerge in this class but possibly the first is the most obvious:

- (a) This first source reignites thoughts about electron capture; that is, the spontaneous capture of electrons by certain nuclei under normal conditions on Earth. In truth, such electron capture implies the synthesis of neutrons from protons and electrons, leading to low energy transmutations of the form

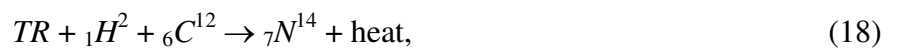


This reaction is spontaneous but hadronic mechanics has indicated how such transmutations may be stimulated with a release of energy:



- (b) A second group of energies of this second type may be identified by noting that the Earth's core is still so hot, after billions of years, that it must possess an internal source of heat which could well be due to nuclear transmutations such as envisaged above. It appears that observations, conformed by hadronic mechanics, indicate that such nuclear transmutations may well be reproducible here on Earth.
- (c) A third group utilises the fact that, millions of years ago, the earth's atmosphere might have been composed of only 40% nitrogen. It is thought that the ensuing doubling of nitrogen content might well be due to nitrogen being synthesized in the atmosphere from other natural elements via a low energy nuclear process without the emission of harmful radiation. This is a process permitted by hadronic mechanics but not by conventional quantum mechanics.

It seems quite possible that the trigger required to provoke this process is simply lightning. Also, the most plausible candidates as the natural elements to be in these processes are carbon and deuterium which occurs in small amounts in ordinary water. The stimulated synthesis of nitrogen predicted by hadronic mechanics would then follow



where the trigger in this case is lightning together with related events such as extreme magnetic fields. The low rate of such synthesis may be attributed to the low concentration of heavy water in our atmosphere. It should be noted that the energy output associated is impressive, [31]

As an interesting aside, it might be noted that the instantaneous availability of these large quantities of energy in this process provides an obvious explanation for thunder.

(3) New Clean Energies occurring at the Molecular Level.

In this class, the idea is to tap the energy within molecules; for example, via the transition from given molecules to structures at lower energy with practical use being made of the energy difference. These transitions would be utilised in hadronic reactors of molecular type, also called PlasmaArcFlow reactors, which are, incidentally, already in industrial production. More details of this category are

readily available. [31]

It should be realised that the hadronic reactors of each of the three types considered are based on the same principle – that of stimulating the decay of considered bound states via resonating effects acting on the nonpotential component of binding forces. This constitutes a totally different approach as compared with conventional approaches utilising traditional quantum mechanics. The main physical principles behind each of the three classes discussed are identical. Hence, the experimental verification of one class gives immediate support for the existence of the other two classes. It is to be hoped that independent attempts at verification will be forthcoming soon because, if these classes do exist – and the present existence of operating PlasmaArcFlow reactors would appear to suggest that such attempted verification would be successful – the World's energy problems could be a thing of the past.

VI. Conclusion

The purpose of physical scientific theory is to explain physical systems as revealed in observation and experimental results. Theory must not refute facts but instead be able to account for them. Many experiments using various designs have now synthesized neutroids and neutrons from an arc of current in hydrogen gas, [12,14,14a,15,16,17] revealing the neutron in its internal hadronic structure as being that far more parsimonious interpretation of an electron within a proton as first proposed by Rutherford, not that of quarks [32]. We propose that contact type interactions of full wave-packet penetration at distances of 10^{-13} cm or less characterize hadronic structure as is the case with the neutron, which is defined and properly described in the model of Hadronic Mechanics and Chemistry [20, 31]. Direct neutron production from an arc of current in hydrogen gas requires a minimum arc voltage of 3 kV and energy of 3 mJ, or only neutroids will be produced which may potentially by way of substance-specific absorption and subsequent nuclear transmutation within particular materials then become neutrons. These specifics of hadronic and neutron structure as well as neutroid to neutron transformations are fully defined within the theoretical context of Hadronic Mechanics and Chemistry [20,31] permitting new approaches to the production of energy, and the clean up of nuclear waste. *Within the province of this one simple experiment and its variants, the hadronic paradigm itself may be reassessed.*

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Some New Ideas in Physical Science.

Jeremy Dunning-Davies.

Introduction

In a previous book, *Beyond the Veil*, we discussed the work and eventual demise of Royal Rife and his ground-breaking work on cancer – work which has seemingly disappeared into the abyss containing most effort that challenges perceived conventional wisdom. Royal Rife had been deeply interested in microscopy and it was this that led him to his studies on cancer. Other scientists have not remained exclusively in one field of study but have spread their net much wider and attempted to contribute to a variety of major problems. One such is Ruggero Santilli, but even his energies have been influenced by one huge issue facing mankind and, in his case, that has been the search for new, cleaner fuels to help in the solution of the World's energy requirements.

For just over a century now, science has almost complacently drifted along in a assumed belief that Einstein's relativity theories, together with quantum mechanics, offered the true means of solving all the remaining theoretical problems of science. Put this way, many would throw up their hands in horror. However, that is the situation the world of science has been facing for some time. For years, undergraduates have been told of the complacent attitude existing at the end of the nineteenth century when, the story goes, many eminent scientists believed all the theoretical tools necessary to solve all the world's scientific problems were known; it was simply a matter of time before all the answers were found. This sort of sentiment was, and is, often used as a prelude to introducing the theories of relativity and quantum mechanics in university undergraduate courses. The story also served to ridicule the scientific establishment in place at the end of that century. It might be thought that a lesson would have been learnt from this story, but no. At the end of the twentieth century, eminent scientists once again vociferously proclaimed the same position as that so falsely claimed at the end of the previous century. It seems that eminent scientists, like so many other people, can be tempted very easily into making rather foolish claims in order to gain a little short-term, high profile publicity, or might it be more properly called notoriety? This is possibly a lesson the non-scientific public should learn. However eminent a scientist may be and in whatever field of science, he is still human and, as such, is prone to human frailties and mistakes like everyone else. It is often claimed the public, through the media, places individuals – be they sportsmen, politicians, philanthropists or scientists – on pedestals, only to destroy them if they err. There may be some truth in this assertion but surely, therefore, it is sensible not to allow oneself to be placed on such a pedestal in the first place? The rewards may be great, but the fall is so much greater!

In the present case, however, what of these claims concerning the theories of relativity and quantum mechanics? As has been claimed on many occasions over the years, there are grave qualms over the theories of relativity harboured by many people, but what of quantum mechanics? There have been worries expressed almost from the very beginning of the subject. Frequently, these have revolved around the role of the observer and over whether or not quantum mechanics is an objective theory. One man who has considered these points at length is Karl Popper, probably one of the best known philosophers of science. Although he has written on the topics at length, his book *Quantum Theory and the Schism in Physics*² proves an excellent source of his views. He expresses the view that the observer, or, as he prefers to call him, the experimentalist, plays exactly the same role in quantum mechanics as he does in classical physics; that is, he is there to test the theory. This, of course, is totally contrary to the so-called Copenhagen Interpretation, which provides the normally accepted position. This alternative view basically claims that "objective reality has evaporated" and "quantum mechanics does not represent particles, but rather our knowledge, our observations, or our consciousness, of particles".³ As Popper

² K. R. Popper, 1982, *Quantum Theory and the Schism in Physics* (Hutchinson, London)

³ W. Heisenberg, 1958, *Daedalus*, 87, 95

points out, there have been a great many very eminent physicists who, over the years, have switched allegiance from the pro-Copenhagen camp. He cites among these Louis de Broglie and his former pupil Jean-Pierre Vigier, Alfred Landé and, in some ways most importantly, David Bohm. Bohm, himself an acknowledged and deeply respected thinker, wrote a book on quantum theory, which was published in 1951⁴, in which he presented the Copenhagen point of view in minute detail. Later, apparently under Einstein's influence, he arrived at a theory⁵ "whose logical consistency proved the falsity of the constantly repeated dogma that the quantum theory is 'complete' in the sense that it must prove incompatible with any more detailed theory"⁶. It was this very question of whether or not quantum mechanics is 'complete' which formed the basis of the intellectual struggle between Einstein and Bohr. Einstein said 'No'; Bohr claimed 'Yes'. The whole problem is discussed in great detail by Popper and, for those interested, there can be no better reference than the book by Popper mentioned already.

However, where does Popper fit into anything to do with Hadronic Mechanics? Quite simply, the answer lies in the fact that it was in his 1982 book⁷ that he drew attention to the thoughts and ideas of Ruggero Santilli. In the 'Introductory Comments' to his book, Popper reflects on, amongst other things, Chadwick's neutron. He notes that it could be viewed and indeed was interpreted originally as being composed of a proton and an electron. However, again as he notes, orthodox quantum mechanics offered no viable explanation for such a composition. Hence, in time, it became accepted as a new particle. Popper then notes that, around his (Popper's) time of writing, Santilli had produced an article in which the "first structure model of the neutron" was being revived by "resolving the technical difficulties which had led, historically, to the abandonment of the model"⁸. It is noted that Santilli felt the difficulties were all associated with the assumption that quantum mechanics applied within the neutron and disappeared when a generalised mechanics is used. Later, at the end of section IV of his 'Introductory Comments', Popper makes the following assertion:

"I should like to say that he (Santilli) – one who belongs to a new generation - seems to me to move on a different path. Far be it from me to belittle the giants who founded quantum mechanics under the leadership of Planck, Einstein, Bohr, Born, Heisenberg, de Broglie, Schrödinger, and Dirac. Santilli too makes it very clear how greatly he appreciates the work of these men. But in his approach he distinguishes the region of the arena of incontrovertible applicability of quantum mechanics (he calls it atomic mechanics) from *nuclear mechanics* and *hadronics*, and his most fascinating arguments in support of the view that quantum mechanics should not, without new tests, be regarded as valid in nuclear and hadronic mechanics, seem to me to augur a return to sanity: to that realism and objectivism for which Einstein stood, and which had been abandoned by those two very great physicists, Heisenberg and Bohr". Obviously, these comments of Popper will not be too well-received by some but, at the very least, they provide much food for thought and, considering his own well-deserved reputation, should convince people to assess Santilli's contributions with open minds.

As stated above, in more recent times, one man who has worried about the extent of the claims for these theories, both relativity and quantum mechanics, is Ruggero Santilli. He has devoted his life to studying them and attempting to extend the theories to cover situations to which they were not, in their usually accepted forms, truly applicable. The fact that they are, at the very least, not applicable in certain cases is something which is hidden from the public and from most students and Santilli's investigations have placed him squarely in opposition to the 'godfathers' of 'conventional wisdom'. All this has put him at a grave disadvantage in the scientific world.

However, as already noted, he has dedicated his life to examining the bases of relativity and quantum mechanics, feeling both theories to be incomplete. His investigations have led, in recent years, to possibilities for new clean energies and it is this which is now so important to consider, especially at this time when the world is so troubled by the depletion of energy stocks and worried about possible environmental effects of the energy sources presently being utilised so widely. This whole problem of

⁴ D. Bohm, 1951, Quantum Theory, (Prentice-Hall Inc., New Jersey)

⁵ D. Bohm, 1966, Reviews of Modern Physics, 38, 453

⁶ K. R. Popper, 1982, Quantum Theory and the Schism in Physics (Hutchinson, London)

⁷ Ibid

⁸ R. M. Santilli, 1981, Foundations of Physics, 11, 383

future energy supplies is probably far more serious than usually imagined. Present demand is increasing but, when countries such as China, the Indian sub-continent and those of Africa come on line fully and require as much energy as the countries of the present west, that demand will escalate enormously. Given the present state of orthodox fundamental knowledge, the only realistic solution to this problem is presented by nuclear power. For a number of reasons, to many, this is not an acceptable option. Alternatives such as solar power, wind power, geothermal energy, wave energy, and others are all put forward but, in truth, these in total would come nowhere near satisfying the probable future demands for energy. No; as has been pointed out on several occasions⁹, the only realistic answer at the world's disposal at present is nuclear power. However, nuclear power is felt to pose two major problems and both are concerned with safety. The safety of the actual power stations is, not unreasonably, a tremendous worry for many. This is accentuated by incidents such as the Three Mile Island problem in the U.S.A. and, more recently, the disaster at Chernobyl. However, it is only the latter case that proved a true disaster; the first was fundamentally contained by the safety systems in place. There is little doubt that, provided adequate funds are made available, nuclear power plants can be made extremely safe, although, as with all man-made structures, no-one can guarantee complete safety of anything and, whether those in authority like to admit it or not, genuine accidents will, and do, occur. Therefore, there can be no room for complacency but, if a sensible number of safety measures is incorporated into the plant, nuclear power stations should be safe. The disposal of nuclear waste, however, is another matter, as has been highlighted by all the problems being faced in the U.S.A. over its proposed storage facility in Nevada. This brings the story back to Santilli for another outcome of his work has been the emergence of a possibility for the safe disposal of nuclear waste in-house; by which is meant, the safe disposal of the waste without any need for transportation. Even now the idea is still only at the theoretical stage, partially due to opposition from outside but, as Santilli has been requesting for some time now, the biggest requirement is the performance of about three experiments to see if the theory actually works in practice. Such experiments would not be cheap to perform but, considering the enormous sums spent on some elementary particle work, the cost would certainly not be too great and, if successful, the ensuing benefit for mankind would truly be out of all proportion to that cost!

Most will ask at this point why these experiments haven't been performed. This is a difficult, if not impossible, question to answer, but it may be noted that, on the one hand, the theory behind all this does not conform to 'conventional wisdom' and does, in fact, raise questions about the range of validity (at least) of the widely accepted theories of relativity and quantum mechanics, while, on the other hand, the theory has led already to the production of the new clean fuel, 'magnegas'! Hence, although the theory may be abstruse, may contain elements which some feel unacceptable, and may conflict with 'conventional wisdom', nevertheless something concrete has been produced which can be, and has been, used. In other words, the theory definitely appears to have had a readily identifiable success already. On the other hand, enormous profits are being made by people in the business of disposing of nuclear waste using the current somewhat crude and unsatisfactory methods. So the question arises as to whether, in some sense, 'conventional wisdom' and 'big business' have combined to prevent the performance of these experiments which, if successful, could have such a dramatic effect on both.

While the details of magnegas and its production are readily available via the internet (at www.magnegas.com or www.i-b-r.org) and may be read about in Santilli's book the *Foundations of Hadronic Chemistry*¹⁰, it is worth noting that it was in 1998 that Santilli first built a so-called hadronic reactor of molecular type – something also known as a PlasmaArcFlow reactor. Such reactors make use of a submerged DC electric arc to achieve the recycling of nonradioactive liquid waste into a clean combustible gas called 'magnegas'. The process involved also produces heat, which may be used via exchangers, and some solid precipitates. These reactors provide an ideal means of disposing of most kinds of liquid waste – sewage, oil waste, other contaminated liquids and so on, - but may be used to process fresh or salt water also if necessary. In the above- mentioned book, Santilli comments that the best liquid

⁹ G. H. A. Cole, 1996, in *Entropy and Entropy Generation*, ed. J.S.Shiner; Kluwer Acad, Pub., Netherlands.
V. Castellano, R. F. Evans and J. Dunning- Davies, *Nuclear Power and the World's Energy Requirements*, arXiv:physics 0406046

¹⁰ R. M. Santilli, 2001, *Foundations of Hadronic Chemistry* (Kluwer Academic Publishers, Dordrecht)

for use in these reactors is crude oil, which may be processed into an extremely clean combustible gas at a fraction of the cost of normal refinery processing. However, the use of crude oil would hardly be beneficial in the present circumstances.

As is described in detail by Santilli¹¹, the said reactors operate by liquids flowing through a submerged DC arc with at least one consumable carbon electrode. The arc decomposes both the liquid molecules and the carbon electrode into a plasma at approximately 3,500°K. This plasma is composed predominantly of hydrogen, oxygen and carbon atoms. The plasma is moved away from the arc as soon as it is formed and the reactor controls the recombination into 'magnegas', which bubbles to the surface where it is collected. Due to the known affinity of carbon and oxygen, oxygen may be removed from the plasma which results in combustible carbon monoxide. The removal, in turn, of this carbon monoxide, as soon as it is formed, then prevents its oxidation into carbon dioxide and so reduces the carbon dioxide content of the gas dramatically. The hydrogen essentially recombines into hydrogen molecules, although there are other products also.

The use of an underwater arc is, of course, nothing new but, in other apparatus, the resulting carbon dioxide content of the emerging product is unacceptable environmentally. This is one of the bigger points in favour of this new technology. Again, the large glow normally created in underwater arcs is due to the recombination, following separation, of hydrogen and oxygen into water. This, of course, helps account for the low efficiency of the said underwater arcs. The new reactors, however, display a dramatic increase in efficiency due, at least in part, to the removal of hydrogen and oxygen from the arc immediately following their creation, thus preventing recombination into water. This hugely increased efficiency is a major plus for these new reactors and results in the production of a combustible gas at a price which is genuinely competitive with the cost of fossil fuels. When this overall cost is considered, it must be remembered that it will be arrived at after any income derived from the recycling of liquid waste and the utilisation of the heat produced has been taken into account.

'Magnegas' is largely unknown in many parts of the world and so, having introduced it as above, it is worth realising that it has been subject to extensive testing. The results are impressive! A Ferrari 308 GTSi and two Honda Civics have been converted to use 'magnegas'. One of these vehicles has been the subject of the above-mentioned testing. It has been found that 'magnegas' exhaust surpasses all the usual safety requirements without the use of a catalytic converter; emits no harmful carbon monoxide, carcinogenic or other toxic substances in the exhaust; reduces carbon dioxide emission due to petrol combustion by roughly 40%; and actually emits some breathable oxygen. This final fact is highly unusual since most fuels act to deplete the oxygen in the atmosphere; this one enhances it! However, not only is this final fact unusual, it is possibly highly important since, if the world continues with its present activities, what effect will oxygen depletion of the atmosphere have eventually? With all the talk of the dangerous environmental effects of present energy policies, oxygen depletion of the atmosphere is one rarely, if ever, mentioned. A further point of possible interest to motorists with a passion for performance cars, is that use of 'magnegas' as fuel doesn't seem to affect performance adversely, - at least not by much. In fact, a 'magnegas' fuelled Ferrari was privately raced successfully against conventionally fuelled Ferraris.

To conclude this introduction, it seems intriguing to ponder on the possible reaction of academics to this work and its resultant partial justification at least via use of one end-product in the above mentioned test. The basis for all the work is an unshakable belief that quantum mechanics as normally practised is not complete and, therefore, it is necessary to introduce hadronic mechanics as a covering theory, or extension, to account for phenomena not describable by that accepted theory. That being the case, it would surprise many if the overall academic judgement was not one of condemnation since it often appears that accepted conventional wisdom must be protected at all costs.

¹¹ Ibid

Hadronic Mechanics.

The book of Santilli's discussed earlier was published in 2001 and was produced to provide a possible explanation for a number of problems which had persisted for many years in the general area of quantum chemistry. After a century of research, despite a great many successes, a number of basic issues remained unresolved by orthodox quantum chemistry. Among these were:

- (i) the lack of an exact representation of molecular data when derived from first principles, with deviations of the theory from experimental data on binding energies of the order of 2%;
- (ii) the inability to permit accurate thermochemical calculations, since 2% is missing in the representation of the binding energies, corresponding to about fifty times the typical energy releases of thermochemical reactions, such as that in the formation of the water molecule;
- (iii) the absence of an attractive valence force sufficiently strong to explain the strength of molecular bonds existing in nature;
- (iv) the inability to restrict valence bonds to electron pairs only, thus essentially implying the prediction of molecules with arbitrary numbers of constituents;
- (v) the incorrect prediction that all molecules are paramagnetic.

Obviously, the origins of Santilli's work go back much further and the applications are already much wider than is implied by the words 'hadronic chemistry'. The list of books, apart from other publications, is impressive and contains mention of virtually all his contributions to various areas of science. However, whether he is considering a problem in astrophysics or biology, as he himself says, he approaches it as a mathematical physicist. Also, he took as his starting point a seemingly unshakeable belief in the idea that science, in general, doesn't admit complete and final theories, and could not progress without the introduction of some new mathematics. One immediate example illustrating this is provided by Newtonian mechanics, which had been so successful for so long, finding itself being regarded as a special limiting case of relativistic mechanics towards the beginning of the last century. Also, Einstein's general theory of relativity brought to the fore in the world of physics new mathematical methods. This new mathematics involved tensors and was reliant on earlier work by such as Riemann, Ricci and Bianchi. Hence, the huge change in physics at the beginning of the twentieth century was accompanied by new mathematics being introduced and used in physics and a well-established theory clearly being seen to be approximate and not final. Accordingly, Santilli turned his attention to producing new mathematics in order to deal with these new problems. To do this, he turned to the work of Marius Sophus Lie for some of his inspiration. After much intellectual effort, Santilli proposed so-called hadronic mechanics which is basically an image of quantum mechanics formulated via several completely new forms of mathematics, termed by him iso-, geno-, and hyper-mathematics, with so-called isoduals for antimatter. The corresponding iso-, geno-, and hyper-mechanics are then found to represent single-valued reversible, single-valued irreversible, and multi-valued irreversible systems respectively. Fundamentally, hadronic mechanics preserves all the usual laws and principles of orthodox quantum mechanics but represents what might be termed a completion of that subject, as seemingly required by the well-known argument of Einstein, Podolsky and Rosen (*The Physical Review*, **47**, 1935, 777). It is strongly suspected by many that Santilli's hadronic mechanics genuinely achieves this objective. However, the whole truth will be known only after the wider scientific community has examined the veritable mountain of material with an open mind. Iso-mechanics is fundamentally a non-unitary theory but is reversible; geno-mechanics preserves this property of non-unitarity but introduces ideas of irreversibility; hyper-mathematics goes even further and, while preserving non-unitarity and irreversibility, introduces multi-valuedness which increases the number of degrees of freedom open to the investigator and thus permits the study of far more complicated structures than was allowed previously.

It is not intended to discuss the precise details of any of these new forms of mathematics or, indeed, mechanics here but, suffice it to say, that a major difference between the forms of mathematics proposed by Santilli and the form with which everyone is so familiar, is that Santilli proposed using something other than the usual 'one' as the unit for his mathematics. For example, in the simplest form used for

investigating anti-matter, the unit is -1, instead of 1. A very simple introduction to the use of this particular case is furnished by the examination of the associated thermodynamics as discussed in *Thermodynamics of Antimatter via Santilli's Isodualities* (*Found. Phys. Lett.*, 1999, **12**, 593-599). In other forms, the structure proves more complicated. This immediately indicates that the new theories should be capable of discussing more complex systems of nature than was possible for classical and quantum mechanics since those theories only had real and complex numbers at their disposal. This limit placed by orthodox mathematics on mechanics, both classical and quantum, might be felt to be responsible, at least in part, for such theories having to make such suppositions as all particles being point-like.

At this point, it might be remembered that mathematics has long been termed the language of physics, but, with the principles of physics extending into so many regions of science these days, it might be termed the language of science more appropriately. That being the case, it is not too surprising if major changes, or even extensions, have to be introduced into our mathematical preconceptions when it comes to dealing with totally new situations.

To say that some of these situations are totally new might be thought something of an understatement, given some of the areas to which the new mathematics has been applied successfully. However, before considering that, it might prove beneficial to consider some reservations of current knowledge expressed by leading scientists of earlier years. Santilli himself admits to a lasting impression being left on him by several of these. In his book *Nuclear Physics* (University of Chicago Press, 1950), Fermi states on page 111 that "there are doubts as to whether the usual concepts of geometry hold for such small regions of space (those of nuclear forces)". This is, by itself, an extremely powerful statement by one of the leading scientific figures of his age but is it well-known, do people pay it due attention? The answer to both those questions is probably 'No'. It is of further interest that the dedication of Santilli's book *Elements of Hadronic Mechanics*, Vol. 1, (Naukova Dumka Pub., Kiev, 1995), is to the memory of Enrico Fermi "because of his inspiring doubts on the exact validity of quantum mechanics for the nuclear structure." Santilli also alludes to a statement included in Blatt and Weisskopf's book *Theoretical Nuclear Physics* (John Wiley, 1963) in which they speculate on page 31 on the possibility "that the intrinsic magnetism of a nucleon is different when it is in close proximity to another nucleon". In fact, this statement acted as a major spur to Santilli who claims to have produced a complete theory of total nuclear magnetic moments via his so-called hadronic generalisation of quantum mechanics. Whether or not he has achieved this is for the scientific community as a whole to decide but, until his work is read with open minds and properly digested, no final verdict can be sensibly announced. This indicates, once again, the urgent need for a totally open-minded examination of Santilli's work. A third, possibly rather obvious, source of inspiration was provided by the very well-known article by Einstein, Podolsky and Rosen which appeared in the journal *The Physical Review* (volume 47, page 777) in 1935. This article voiced concerns about quantum mechanics and it is worth realising that, until the day he died, Einstein continued to harbour real doubts concerning the lack of deterministic character of quantum mechanics. This again raises the question of how the scientific community, in general, regards Einstein. To many in the general public it is probably felt that he is still revered as the greatest scientist of the twentieth century. If that is the case though, it seems surprising that so many of his views and beliefs seem to be misrepresented or even, on some occasions, seemingly conveniently forgotten. By referring back to his writings of the early years of the last century, it soon becomes apparent that here was a man who wrote very precisely and with great clarity. A good example of this is provided by his writings on Brownian Motion, now collected into a small book, *Investigations on the Theory of the Brownian Movement* (Dover, 1956). The writing in this small volume could well serve as an object lesson to all writers of science. Nevertheless, as commented on earlier when discussing black holes (for example), there are several occasions where his views are kept well-hidden and have been kept so for many years. It is not without significance to note that it is some of the truly 'big' names of twentieth century science who were voicing these qualms about the total validity of quantum mechanics over many years of the last century. These were also people who, it is well-known, were highly articulate. There was, and is, no reason to doubt what they were saying or about the grave doubts they were harbouring. In many ways the scenario is a repeat of that facing relativity in the earlier years, at least, of the last century. It is a sobering thought that, by this time, some may be wondering how science has managed to progress as far as it has, and with so much success. The added thought, however,

has to be how much farther mankind might have progressed if unhampered by 'conventional wisdom' and all its attendant trimmings.

Another spur to Santilli's investigations was provided by the realisation that most of contemporary physics is concerned with the examination of systems subject to conservative fields of force; that is, subject to forces which are derivable from potentials. A good everyday example is provided by the gravitational field which so markedly affects our everyday lives. This is the example with which so many are familiar from school and which forms the basis for the introduction to the ideas of kinetic and, more importantly in the present context, potential energies. If the motion of an object held at arm's length before being released to fall to the floor is considered, it is seen to gather speed until it strikes the floor. At the instant before it actually strikes the floor, it is at zero distance above the floor but is moving at its highest speed during the entire motion. At that point, all its energy is said to be kinetic; that is, all its energy is due to its motion. However, at the initial moment of release, the object is not moving and so, has no kinetic energy. All its energy is due to its height, its position, above the floor. This energy is said to be potential energy; it is the energy which the object possesses because of its position and which gives it the potential for movement. This potential energy is purely due to the presence of the gravitational field, whose action pulls the object towards the centre of the earth or, in this case, towards the floor. This gravitational field is one of those force fields said to be conservative because potentials are associated with them. The vast majority of the basic mechanics taught in schools and universities is done so under this restriction. Only rarely are situations for which there is no potential energy discussed. In a way this is not unreasonable since so much that affects us directly is governed by conservative fields of force. Newton's mechanics incorporating conservative fields of force are found to describe accurately both very small systems and very large systems. These days, problems of astronomy are considered at a variety of levels by everyone in his own home via well-established television programmes such as *The Sky at Night* and, since planetary motion is thought to be governed by a conservative field of force, this serves to reinforce the notion of such fields being all important, so that the possibility of non-conservative fields is often forgotten or even ignored. However, when the original writings of such as Lagrange and Hamilton on the analytical approach to mechanics are examined, no such restriction is apparent. This is certainly not clear in the vast majority of undergraduate courses on Analytical Mechanics, as the whole area is commonly called. Restriction to conservative fields of force occurs at a very early stage. Of course, in fairness, to the undergraduate this does not seem at all unreasonable; whether it be the mathematician or the physicist, the majority of actual situations met will be concerned with conservative fields of force. To a large extent, the same excuse for absence of consideration of more general situations from undergraduate lectures is valid but, in reality, attention to this restriction should be drawn. In Pure Mathematics lectures no-one would contemplate drawing back from making *all* restrictions placed by a theorem crystal clear. This must be the correct approach, even though, in most cases, those restrictions will not affect the practising physicist. However, as has been pointed out on numerous occasions, when dealing with problems of the physical world, the alert physicist should find himself warned by the physics of the situation to be careful that mathematical restrictions on the use or applicability of a result may be coming into play. A perfect example to illustrate precisely what is meant by this is provided by the phenomenon of phase transitions. In the case of water, for example, it is obvious that something very unusual is happening when ice changes into liquid water and when that liquid water turns into steam. In both cases, it is observed that, at particular temperatures, as heat is added to the system, the structure of the substance changes but the temperature remains fixed. This is contrary to what is normally believed to happen when heat is added to a system. Hence, at these two temperatures of 0°C and 100°C for water, something very unusual is happening physically. This should alert the physicist to be wary of what is happening physically but, in some ways more importantly, to be wary of whether or not mathematical expressions remain valid. This is another good example of the use of mathematics as the language of physics; here the applicability of mathematics is ruled by the physics of the situation – not the other way around!

To return specifically to Santilli's contributions, it is remarkable to note to how many different outstanding problems he has turned his attention with this new approach and, apparently, with so much success. As mentioned, one of his earliest worries concerned the range of applicability of quantum

mechanics. Having noted the comments and concerns of some truly notable scientists of the early part of the last century, he devised so-called Hadronic Mechanics and succeeded in explaining a wide variety of otherwise unexplainable phenomena. These are catalogued in detail in his book *Foundations of Hadronic Chemistry* but it is worth noting, and speculating on, some of them here; one in particular being particularly relevant to something which has preceded it, but more of that example later. As noted on page 35 of his book, explaining the experimental data on the Bose-Einstein correlation in proton - anti-proton annihilation at both high and low energy provided experimental verification of hadronic mechanics in particle physics. Such experimental data may be represented by traditional quantum mechanics only after the introduction of arbitrary parameters which seem to have no physical origin. However, hadronic mechanics is easily able to explain things because it proves capable of dealing with the off-diagonal terms appearing in expectation values. This latter property is not allowed in orthodox quantum mechanics because, for a quantity to be observable, its expectation value must be diagonal in form. This, of course, introduces mathematical terms into the discussion which, ideally, should be avoided but, suffice it to say, that the phenomenon may not be explained by orthodox quantum mechanics because it is too restricted as a theory. Another experimental verification, in the sense of the previous example, has been provided by the ability of the new theory to explain data concerning the anomalous behaviour of the mean-life of the kaon with energy. This has been examined successfully over various energy ranges and is important because, as with the example of the Bose-Einstein correlation, it establishes the existence of effects in the interior of kaons which are nonlinear, non-local and, most importantly, non-potential (that is, non-conservative).

As Santilli has stated categorically on several occasions but, possibly most clearly at the beginning of section 3 of his article in the *Journal of New Energy* (1999, **4**, page 106), he has always thought of physical particles as being particles which may be defined rigorously in our spacetime. He points out that hadronic mechanics was conceived and developed in order to identify the constituents of all unstable hadrons with genuine physical particles. Has he succeeded? Time will tell, but the positive evidence is there for all to see and is mounting. As has been seen already, any discussion of this topic inevitably seems to introduce mathematical ideas and notation at some point. Again as stated already, this is unfortunate but doesn't detract from an appreciation of the picture emerging and might serve as a spur for professionals to investigate the detail further in order to reach a truly informed opinion of the work.

From the point of view of physics, it seems that Santilli obtained inspiration from early ideas of Rutherford. It was in 1920 (*Proc. Roy. Soc. A*, 1920, **97**, 374) that Rutherford postulated the existence of a new particle, which was, in essence a 'compressed hydrogen atom'; that is, it was composed of an electron compressed entirely within the proton. This he called a neutron. Presumably Rutherford thought that, when a hydrogen atom is compressed, for example, in the core of a star, the high pressures involved could result in it being reduced in size to that of a proton, with an electrically neutral particle emerging finally. Twelve years later, Chadwick (*Proc. Roy. Soc. A*, 1932, **136**, 692) established the existence of the neutron experimentally. However, Rutherford's original conception of this particle was dismissed by many of the founders of quantum mechanics for a variety of seemingly good reasons at the time: - the model would require a positive binding energy; both constituents possess spin $\frac{1}{2}$ and so, the resulting particle would not be permitted to have spin $\frac{1}{2}$ by normal quantum mechanics; orthodox quantum mechanics would also not allow the correct magnetic moment to follow in this model. Hence, the rejection of Rutherford's model of a neutron and this heralded a change in the direction of physics' research. Up to that time, physics had been based on the notion that the constituents of so-called bound states have to be capable of being isolated and identified in laboratories. The rejection of Rutherford's conception appears to have altered this view. This then was a spur for Santilli and, having devised the new mathematics referred to earlier, he first succeeded in producing a consistent model of the meson, π^0 , as a bound state of an electron and a positron. This model is not possible in conventional quantum mechanics for a number of reasons, one of which concerns binding energy. Quantum bound states possess negative binding energies and this implies a total mass less than the sum of the constituent masses. For a π^0 meson, this would imply a rest energy appreciably less than its actual rest energy of 135Mev. This problem, as are all others, is resolved by hadronic mechanics or, at least, that is the claim with all the evidence clearly available for examination by those with a mind to do so. The model Santilli proposes

does, in fact, explain all the characteristics of the said particle – zero spin, electrically neutral, null magnetic moment, a rest energy of 135Mev, a mean-life of approximately 10^{-16} sec., a charge radius of about 1fm (that is, 10^{-15} m), decay according to

$$\pi^0 \rightarrow e^+ + e^-$$

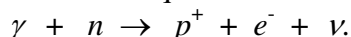
and this model of the smallest of hadrons has now been extended successfully to all mesons. Further, although the theory does not view quarks as actual physical particles, but rather as mathematical objects with a composite structure, this new model for hadrons does prove compatible with the current quark theories, always assuming that quarks have a composite structure. For those interested, further details of this model may be found in a variety of publications but especially in volume 4 of the *Journal of New Energy*, as mentioned earlier. In fact this reference is a veritable goldmine of information on this general topic of hadronic mechanics and its consequences both for physics itself and even, one might venture to suggest, for mankind as a whole through its consideration of the possibilities offered by the theory for alternative new clean energies.

However, what could conceivably turn out to be Santilli's most important achievement was his success in using the new hadronic mechanics to resurrect the Rutherford model for the structure of the neutron successfully. This model recognises a neutron as being composed of a bound state of a proton and an electron at a distance of 1fm; that is, at a distance of 10^{-15} m. As mentioned earlier, such a model is prohibited by conventional quantum mechanics, so, if Santilli's ideas are valid, what are the consequences for physics? The answer is, quite simply, enormous! The abandonment of the original approach to the structure of physical particles will have had a profound and far-reaching effect on research in the area of particle physics obviously. However, it is the possible ecological implications which are staggering and of so much direct relevance to absolutely everyone. The orthodox approach has conceivably prevented the study of the neutron as a major source of clean energy and actually seems to have obstructed the study of new forms of clean nuclear energy. These are now being studied via hadronic mechanics, as is the associated problem of the safe disposal of the nuclear waste presently causing so much trouble.

The main characteristics of the neutron, such as its having a rest energy of 939.6Mev, a mean-life of 916 secs., spin $\frac{1}{2}$, and a charge radius of 0.8×10^{-13} cm., were all explained in a model of the neutron devised by Santilli using hadronic mechanics in 1990 (*Hadronic J.* **13**, 513). This was a non-relativistic treatment, but a relativistic treatment soon followed and appeared in 1993 (*JJINR Comm.* E4-93-352). The crucial point about this is that the model was precisely that proposed by Rutherford so many years earlier. Using hadronic mechanics, Santilli was able to derive all the properties of the neutron when it was viewed as being composed of an electron totally compressed inside a proton. This model, remember, had been abandoned because this structure was inexplicable using orthodox quantum mechanics. However, the fact that the Rutherford model may be explained using this new technique cannot, in itself, be regarded as justification for the new hadronic approach. The real justification is provided by the fact that there appears to be experimental verification of the structure in that experimental verification of the synthesis of neutrons from protons and electrons seems to have been achieved in the 1980's by a group in Brazil under C. Borghi, although the results were published only in 1993 (*J.Nucl.Phys. (Russian)* **56**,147). Although this is exciting, it is by no means conclusive evidence and that is precisely why caution is exercised when reporting and discussing this development. However, the possible ramifications are so important that it is vital for this experiment to be repeated several times independently so that a genuine conclusion may be reached which may be accepted by all in the scientific community.

The ramifications alluded to concern the possibility of utilising these new theoretical ideas to produce new clean energies for mankind. Basically, many of these new energies are characterised by processes in the interior of hadrons, rather than in nuclei or atoms. It might be noted that energy is required if unstable hadrons are to be synthesised from physical particles; in the case of the neutron, 0.80Mev is required to synthesise it from protons and electrons. However, as Santilli points out (*Journal of New Energy*, 1999, **4**), "once created, unstable hadrons become a large reservoir of energy, which is released in their decay". Some of these proposed new energies, therefore, are produced by using mechanisms capable of stimulating the decay of unstable hadrons, or by simply using the energy produced in their natural decay. In this article, he goes on to describe the way in which energy could conceivably be produced via

stimulated neutron decay. He also draws attention to the quantity of energy involved, pointing out that the electron emitted in neutron decay would possess energy roughly 100,000 times more than that of electrons hitting a computer screen. Again, it is noted that this mechanism is possible only if the neutron is composed of the physical particles, the proton and the electron. The main ideas behind the proposal are that the neutron does actually decay spontaneously. Also, its mean-life is not fixed but depends on local conditions; for example, if it's a constituent of some unstable nuclei, the mean-life is a few seconds; in a vacuum, it's more of the order of fifteen minutes; in other unstable nuclei, it's even longer; and in natural, light, stable nuclei, it's infinite. However, the neutron itself is naturally unstable and so it is felt it should be possible to stimulate its decay and hence control its mean-life. The actual proposal suggests testing this possibility through the use of photons with the resonating frequency of 1.294Mev, plus the additional threshold energy required to satisfy conservation requirements of



Here the figure of 1.294Mev for the resonating frequency is another consequence of the hadronic model of the neutron adopted. It has been found, by studying nuclei, that most nuclei do not permit reactions such as that represented by the above equation due to violation of conservation laws. However, some do and it is these which offer the possibility of a new form of usable energy, termed by Santilli *hadronic energy*. In his book, Santilli chooses, as a representative example, Molybdenum ($_{42}\text{Mo}^{100}$) but also draws attention to the fact that other natural, light elements, such as zinc ($_{30}\text{Zn}^{70}$), possess the required prerequisites. Most of this is still in need of experimental verification. It seems that, if successful, these tests would offer a prize too valuable to be ignored. It is to be hoped, therefore, that the necessary experiments will be performed in the near future, so that existing doubts may be cleared up, one way or the other.

A further important reason for having the predictions of hadronic mechanics fully and openly tested is provided by the rapid accumulation of highly radioactive nuclear waste around the world. This is proving a major problem for many countries. The U.S.A. has been seen to have a major problem of disposal and also to have an additional problem posed by those opposed to the current method for attempting to achieve that disposal. Britain, on the other hand, while facing problems concerning disposal of its own nuclear waste, faces additional protests from those opposed to its business of helping in the disposal of nuclear waste from other countries. In both instances, and in others, people are extremely worried by the perceived threat posed by the actual disposal method as well as that posed by the transportation of that waste across country. All of these worries have been exacerbated by the rapidly growing terrorism threat facing so much of the world. There can be no doubt that a great many people, some with scientific knowledge, some without such knowledge, harbour genuine worries. There can be no doubt though that those worries, and indeed fears, are not unjustified. The above discussion surrounding the composition of the neutron obviously offers the possibility of a resolution of the difficulties and concerns. These essentially reborn ideas concerning the structure of the neutron, if valid, offer the possibility of recycling nuclear waste by way of stimulating its decay in such a way as to reduce the extremely long lifetimes to hours or, at worst, days. It is envisaged that this could be achieved by the use of relatively light equipment and that the nuclear power plants could achieve this within their own boundaries, thus eliminating the need for transportation of these highly dangerous materials. If the idea works, although jobs in the industry presently formed around the disposal of nuclear waste would vanish, many new jobs in a much safer nuclear waste disposal industry would appear. The new industry might be expected to grow for the development, production and sale of the new equipment, since it would be a vital requirement for nuclear power plants across the world.

The basic idea revolves around the fact that the nuclei concerned are large and naturally unstable. One idea is to expose the highly radioactive nuclear waste to an intense, coherent flow of photons with the required resonating frequency. It is felt that this may be achieved via a synchrotron of about three metres diameter; - a size which could be accommodated in nuclear power plants. A typical example is provided by uranium ($_{92}\text{U}^{238}$) which has a life-time of the order of 10^9 years. A double stimulated transmutation of this element could change it into Plutonium ($_{94}\text{Pu}^{238}$). Again, this is an unstable quantity and has harmful emissions as well, but its life-time is a mere 86 days and it could well be retained under suitable shields for that period of time.! The advantage of this stimulated transmutation is immediately evident. Will it

work? The theory certainly suggests that it should, but only experimentation will give the actual answer to that question. Possibly the bigger, more relevant, question to ask at this time is whether or not the scientific community and national governments are prepared to finance the experiments necessary to test this thesis?

At this moment in time, it is worth realising that the cost of carrying out the proposed experiments would probably be of the order of a few hundred thousand pounds. This sounds a lot of money, and indeed it is but it is still a small amount when compared with the millions, even billions, of pounds being spent on purely academic projects in the field of cosmology for example. If money was spent checking out Santilli's theories, the worst that could happen would be negative results; in which case a few hundred thousand pounds would have been wasted, but yet again, knowledge would have been gained. Negative knowledge may be, but knowledge nevertheless. If successful though, mankind's energy worries would recede into the background, at least for the immediate future, and nuclear power would become a much safer option. Also, with the problem of the disposal of nuclear waste dealt with so that the genuine worries of so many would be assuaged.

However, the scientific establishment tends to regard orthodox quantum mechanics as a sacrosanct part of 'conventional wisdom', so it must be thought doubtful that it will sanction work which directly challenges that 'foundation stone of modern science'. The positions of national governments are far more difficult to assess. They will consult scientific advisers who will be members of the scientific establishment, so the line of their advice is probably predictable. They will be under pressure from a wide variety of areas of 'big business' but, no doubt, the most vociferous will be those wreaking profits from the present highly questionable methods of nuclear waste disposal. They will also, though, be under pressure from members of their electorates. If news of this possibility of there being a truly safe, in-house method of disposing of nuclear waste did become fully public, then it is probably this final factor that would weigh most strongly with national governments since, at the end of the day when all the political manoeuvring and gesturing has been discarded, it is the thought of votes at the next election which would end up being of paramount importance. Can the possibility of the existence of such a prize really be ignored any longer?

The success in describing the above mentioned model for the neutron using this new hadronic mechanics opened the way to view afresh models for other systems, in particular the deuteron. Here an unresolved problem had lain around for years; that was the inability of conventional quantum mechanics to explain the value of one for the spin of the deuteron. The deuteron was felt to be composed of two particles, each having spin a half and the basic axioms of quantum mechanics would imply, therefore, a spin value of zero for the ground state of such a system. The new hadronic mechanics clears up this problem also. Following on from the reduction of the neutron to an hadronic bound state of a proton and an electron, the deuteron is viewed as a three-body situation comprising two protons and one electron – or, more accurately in Santilli's language, two iso-protons and one iso-electron. This model is able to represent accurately all the characteristics of the deuteron, including its spin. This success led Santilli to extend the notion to all nuclei. The result was to produce a new hadronic structure model of nuclei in terms of combinations of iso-protons and iso-electrons, which reduces to the usual model involving protons and electrons as a first approximation. This all seems at first sight to be merely another huge amount of almost unintelligible theory which will have little or no effect as far as the ordinary person is concerned. Amazingly, that is not the case. If this theory does turn out to be correct, the implications for society are immense because it could result in a number of new forms of clean energy for mankind's use; forms which are not possible with the old proton – neutron model. It does appear, therefore, that this is an area worthy of further open-minded investigation simply because the possible prize at the end is so attractive and, indeed, necessary considering the massive environmental problems and energy demands facing our world at the moment.

Further Applications.

So far, the applications discussed have been associated with elementary particles. It has been seen that, from this area alone, many benefits for mankind as a whole could accrue, if the predictions of the theory prove both accurate and achievable in practice. However, although a major factor in inspiring the researches which have led to these was the concern about energy resources, other fields may benefit from the development of these new mathematical techniques also. An unresolved problem facing astrophysics is the assertion by Halton Arp that some quasars are physically linked with galaxies which appear to possess completely different redshifts. This assertion is based on, and supported by, a substantial body of observational evidence. Arp himself has offered an explanation, which revolves around the actual meaning, or interpretation, of the observed redshifts for objects. He suggests that the redshift possesses two components and only one of these is the so-called Doppler shift; the other being an intrinsic component. The present official position is to discount the interpretation of Arp's observations that the quasars and galaxies are linked physically and to continue to interpret the different redshift values as meaning that the quasars and associated galaxies are at totally different distances from the earth and are moving at totally different speeds relative to us. This, of course, is to interpret it simply as a Doppler type shift, is in line with 'conventional wisdom' and agrees with the accepted Einsteinian treatment of cosmological redshift. In 1991, using his new mathematics, Santilli suggested another explanation, (see *Isotopic Generalization of Galilei and Einstein's Relativities*, vols. I & II, Hadronic Press, 1991). His suggestion amounted to the difference being accounted for by a slowing down of the speed of light within the chromospheres of the quasars. It should be realised that these chromospheres are thought to be extremely large and the suggested effect is very similar to the slowing down of the speed of light within our own atmosphere. The result of this suggested slowing down would be for the light to leave the quasars – or more correctly, the quasar chromospheres – already redshifted. As far as the individual stars of the galaxy are concerned, they are effectively isolated in space and are thought to have dramatically smaller chromospheres. Hence, for the stars of the galaxy, the effect alluded to here will not exist. The end result is that, for physically connected quasars and galaxies having exactly the same expansion speed, the light from each will reach us here on earth with dramatically different redshift values. The reason advanced for the new theory being more suitable for explaining this effect is that traditional theory assumes everything both isotropic and homogeneous. It is thought, however, that chromospheres are both anisotropic and inhomogeneous. Hence, the need for utilising Santilli's iso-mathematics and related results to explain these observational results originally highlighted by Arp. A further consequence is, of course, that redshift is not necessarily a measure of the expansion of the universe. This thought is not one to be accepted too readily by current adherents to 'conventional wisdom'. However, in the *Journal of New Energy*, volume 4, evidence supporting this claim is presented clearly on page 103, where it is noted also that another verification offered within astrophysics for this new theory is provided by the quantitative – numerical representation of the internal red and blue shift of quasars. Basically, it seems that the cosmological redshift for each individual quasar is not constant but actually depends on the frequency of the light with an internal redshift for the infrared part of the spectrum and an internal blue shift for the ultraviolet part. These mean an increase and a decrease respectively of the cosmological redshift for these parts of the spectrum and are, of course, totally incompatible with special relativity since they imply different speeds of light for different frequencies in the interiors of quasar chromospheres. This behaviour is, however, predicted exactly by Santilli's modified theory. The studies associated with this topic also indicate that one contribution towards the red-sky viewed on occasions at both sunrise and sunset is isotropic in origin. The idea is that the anisotropic, inhomogeneous structure of the earth's atmosphere provides an additional contribution to the redshift at sunset since, then, the earth's rotation simulates motion away from the source. It is thought, therefore, that the larger redshift observed at sunset, as opposed to sunrise, is due to the rotation of the earth.

Again, when biological structures are investigated, it soon becomes clear that one of the biggest differences between those and the more usual physical systems is their non-conservative character. This latter thought is becoming more and more important in the present day as biology becomes more and

more dependent on mathematics and theoretical physics in its development in some directions. At present, one of the biggest areas where this occurs is possibly in the theory behind evolution, where thermodynamics is playing an increasingly important role. Indeed, the Second Law of Thermodynamics really is appearing to look as if it may be one of those laws of nature whose influence pervades most, if not all, areas of science. However, as far as Santilli's work is concerned, the power and range of applicability of his new mathematics is apparent when the problem of the growth of sea-shells is considered¹². As he himself points out, it emerges that Euclidean geometry, with which most are so familiar, is insufficient for a consistent representation of the actual growth of sea-shells; the possible shapes of sea-shells are represented perfectly well by Euclidean geometry with no need for any extension into broader theories, but the generalised methods, introduced by Santilli, become vitally important when a detailed examination of the growth in time of these sea-shells is required. One major problem is that the growth of sea-shells is definitely non-conservative and also irreversible. However, the problem was eventually solved by Illert and Santilli¹³ using the new iso-euclidean geometry as developed by Santilli, although the use of the alternative geno-euclidean geometry might have proved more appropriate in some ways since it might allow for a deeper axiomatisation of irreversibility. Obviously, studies such as those alluded to here are in the early stages of applying this new mathematical structure to biological problems. It remains to be seen how widely this new mathematics will be used but, initially, the results of applying it to a wide range of problems are good and so it is to be hoped that mere 'conventional wisdom' will not hinder its future use in even more fields.

¹² J. R. M. Santilli, 1996, *Isotopic, Genotopic and Hyperstructural Methods in Theoretical Biology*, (Naukova Dumka Pub., Kiev)

¹³ C. Illert and R. M. Santilli, 1995, *Foundations of Theoretical Conchology*, (Hadronic Press, Florida)

Entropy, or Entropies, in Physics?

Jeremy Dunning-Davies,

Introduction.

The idea of entropy, or at least its change, first arose in classical thermodynamics via deductions made from the basic traditional forms of the Second Law. Either the Kelvin or Clausius form of that law was used to show mathematically that the quantity representing a change in heat, $d'Q$, an inexact differential, possessed an integrating factor which was the absolute temperature $1/T$. The product $d'Q/T$ was then a total differential denoted by dS , and referred to as a change in entropy. At a later stage, when it became desirable to consider the properties of systems, particularly gases, with large numbers of particles, statistics were introduced and this led to the birth of statistical thermodynamics. Soon quantities in statistical thermodynamics were identified, not unreasonably, with quantities in classical thermodynamics but this identification seems to have been assumed valid, rather than actually proved valid. While all this was occurring, information theory was being developed separately but, in a classic book by Brillouin¹, an apparent link between statistical thermodynamics and information theory was established although this suggested link was hinted at by Shannon in his classic article of 1948². In all three areas, a function termed *entropy* appears but the question of whether or not these three are identical, or not, always seems to be being assumed, not proved. The background to each of these three *entropies* will be looked at in separate sections, before considering their possible inter-relationship.

Classical Thermodynamics.

In the usual approaches to classical thermodynamics, the First Law; Energy is conserved when heat is taken into account, is often represented by the mathematical equation

$$d'Q = dU - d'W$$

where the three terms represent changes in heat, internal energy and work respectively. $d'Q$ and $d'W$ are not differentials of functions of state and the dashes indicate this and the fact that, mathematically, the first and third terms are inexact differentials.

The Second Law is then introduced into the discussion in one of its fundamental forms due to Kelvin or Clausius. In their modern wording, these are:-

Kelvin:

It is impossible to transform an amount of heat completely into work in a cyclic process in the absence of other effects.

and

Clausius:

It is impossible for heat to be transferred by a cyclic process from a body to one warmer than itself without producing other changes at the same time.

As may be seen³, either of these forms, but usually that due to Kelvin, may then be used to show via a mathematical argument that the inexact differential $d'Q$ possesses an integrating factor which turns out to be the reciprocal of the absolute temperature, T . It is then customary to write

$$d'Q/T = dS$$

where dS simply represents the resulting exact differential. In the derivation, no direct physical interpretation is assigned to dS but, customarily, it is deemed to be the change in a quantity termed the

entropy. However, here, *entropy* is simply the name given to the quantity represented by the symbol S but it should be noted that, in classical thermodynamics, the change in this quantity is irrevocably linked to a change in heat experienced by the system under consideration.

The equation representing the combined form of the First and Second Laws is then:

$$TdS = dU - d'W.$$

Again, if the work done in compressing a fluid is being considered, this equation takes on the familiar form:

$$TdS = dU + pdV,$$

where p and V represent the pressure and volume as usual. Note though that this is not the general form of the equation representing the combined First and Second Laws; it refers to a quite specific set of circumstances.

If attention is restricted to systems for which the entropy is an extensive variable then the discussion is easily extended² to open systems and again considering the special case of compression of a fluid, this latter equation becomes

$$TdS = dU + pdV - \mu dN, \quad (i)$$

where μ and N represent the chemical potential and number of particles respectively.

All of the preceding discussion is restricted to so-called quasi-static processes. If considerations are extended to include non-static processes, it may be shown that, for non-static adiabatic processes, the inequality

$$dS \geq 0.$$

If the entropy, S , is a state function, this inequality is a statement of the principle of increase of entropy. However, it is vitally important to realise that this result is *derived* from the basic form of the Second Law; it is *not* an actual statement of the Second Law. Obviously, there are occasions when the entropy of a system does decrease; for example, in a cyclic situation, such as a Carnot cycle, if the entropy increases in one section, there must be a corresponding decrease in another to ensure a successful completion of the cycle. Also, from its actual derivation, it is immediately obvious that, if heat is added to a system, the entropy change is positive while, if heat is taken from a system, the entropy change is negative. Hence, at least as it stands with no stated limitations, claims that the principle of entropy increase is a statement of the Second Law^{1,4} are not accurate and could be thought misleading. This is particularly true when it is remembered that there is controversy⁵ over whether the entropy is always a state function in classical thermodynamics.

Statistical Thermodynamics.

In statistical thermodynamics, there are various approaches to introducing the topic but all seem to rely on equation (i) above to secure a link with the quantities of importance in classical thermodynamics. Hill⁶ devotes an entire section to the association of thermodynamic variables with quantities of statistical mechanics. His approach is to consider the various ensembles separately, to associate immediately the internal energy of classical thermodynamics with the ensemble average of the internal energy. He then proceeds to evaluate the expression for the total derivative of this ensemble average in terms of the independent variables appropriate for the ensemble under consideration and then to compare the resulting equation with equation (i) above. In this way, he is able to identify the entropy, S , as

$$S = -k \sum p \ln p \quad (ii)$$

where p represents the expression for the probability in the relevant ensemble. For example, this leads as far as the grand canonical ensemble is concerned to the identification

$$\frac{pV}{kT} = \ln \Xi,$$

where Ξ represents the grand partition function and, as usual, p represents the pressure, V the volume, k Boltzmann's constant, and T the absolute temperature. By noting further that, if F is the free energy

$$dF = -SdT - pdV + \mu dN,$$

where, additionally, μ represents the chemical potential and N the number of particles, then, once the expression for the pressure is known, those for the entropy, S , and number of particles, N , eventually follow from

$$S = V \left(\frac{\partial p}{\partial T} \right)_{V,\mu} \quad \text{and} \quad N = V \left(\frac{\partial p}{\partial \mu} \right)_{V,T}.$$

The relevant expression for the internal energy, U , then follows from

$$U = TS - pV + \mu N.$$

Hence, the expressions for all the important functions of classical thermodynamics follow by making use of well-known expressions from classical thermodynamics in what might appear to be a circular argument.

In this approach as in others in statistical mechanics/thermodynamics, there is no direct mention of any heat exchange at any point but it seems that, because equation (i) is assumed, success of sorts in linking classical thermodynamics with statistical mechanics/ thermodynamics is assured. In reality though, it seems the entropy of classical thermodynamics is assumed the same as that of statistical mechanics/thermodynamics. However, the nature of the above quoted expression (ii) for the entropy in statistical mechanics/thermodynamics bears no obvious resemblance to that of classical thermodynamics. In classical thermodynamics, as stated already, the entropy is linked irrevocably with the change of heat; here the expression above indicates that the entropy of statistical mechanics/thermodynamics is, first and foremost, linked to a probability distribution. This is why the question of whether or not the two entropies are the same must arise.

It should be noted that, although there are only two fundamental categories of thermodynamic theories which are covered by the classical approach outlined in the first section of this article and the statistical or probabilistic approach being discussed briefly here, there are several approaches to this second approach. Another is beautifully outlined in the book by Lavenda⁷. Basically he derives all the accepted results via use of Gauss' principle and extensive use of error laws; error laws which are discussed in minute detail in Keynes' book on probability⁸. This rather elegant approach has much to commend it but, yet again, the link between probabilistic average values is made by assuming such – especially the entropy – are identical with the corresponding values in classical thermodynamics. Hence, the query raised in relation to the approach of Hill arises again and does so in all approaches to establishing a theory of statistical mechanics /thermodynamics.

However, it must always be born in mind that statistical mechanics/thermodynamics has proved to be an eminently successful branch of physics over many years. Nevertheless, the question of the actual equivalence of the entropy functions of classical and statistical thermodynamics remains a very real one and is one which should not be dismissed lightly. It is probably true to say, though, that this question has only arisen largely because of the rise in usefulness of information theory in both physics and, indeed, other branches of science such as biology and medicine.

Information Theory.

Possibly the best way to approach the introduction of the notion of entropy in information theory is to consider the way Shannon himself introduces the topic. To do this, consider Shannon's own wording beginning on page 48 of the mentioned book:- he begins by pointing out that, up to that point in his presentation, a discrete information source has been represented by a Markov process. He then poses the question of whether or not it is possible to *'define a quantity which will measure, in some sense, how much information is "produced" by such a process, or better, at what rate information is produced'*.

He continues by considering a set of possible events whose probabilities of occurrence are p_1, p_2, \dots, p_n . These probabilities are all that is known concerning which event will occur. The question then is whether

or not a measure of how much “choice” is involved in the selection of the event or of how uncertain the outcome is may be found. If such a measure, say $H(p_1, p_2, \dots, p_n)$, exists it is claimed that it is reasonable to require the following properties for it:

- (i) H should be continuous in the p_i
- (ii) If all the p_i are equal, $p_i = 1/n$, then H should be a monotonically increasing function of n .
- (iii) If a choice be broken down into two successive choices, the original H should be the weighted sum of the individual values of H .

On the basis of these required properties, it is shown in appendix 2 (pages 116-8) of the quoted book that the only H satisfying these three assumptions is of the form:

$$S = -K \sum_{i=1}^n p_i \log p_i \quad (\text{iii})$$

where K is a positive constant which merely amounts to a choice of a unit of measure. Shannon points out that expressions of this form ‘*play a central role in information theory as measures of information, choice and uncertainty*’. He also goes on to point out at this very stage in his discussion that ‘the form of H will be recognised as that of entropy as defined in certain formulations of statistical mechanics where p_i is the probability of a system being in cell i of its phase space. Of course, in statistical mechanics/thermodynamics, the constant K is the Boltzmann constant represented by k . Again at this point in his discussion, Shannon proceeds to say that ‘*we shall call*’ expression (iii) above the entropy of the set of probabilities p_1, \dots, p_n . He also says that, if x is a chance variable, we will write $H(x)$ for its entropy; thus x is not an argument of a function but a label for a number, to differentiate it from $H(y)$ say, the entropy of the chance variable y .

It is quite clear from this abbreviated introduction to a basic formula of information theory that its introduction is purely mathematical and does not rely at all on any genuine physical input – certainly nothing remotely connected with notions of classical thermodynamics. Interestingly, the outline of this derivation also serves to emphasise that the same is basically true of the introduction of the entropy concept into statistical mechanics/thermodynamics. Also it seems the introduction of a link between the entropy functions of information theory and classical thermodynamics followed the route outlined in Brillouin’s book¹; that is that it was simply noted that the entropy expressions of information theory and statistical mechanics/thermodynamics had the same mathematical form and so were assumed to be same. The link with classical thermodynamics then followed via the statistical mechanics link with that subject. Hence, when examining the origins of the three entropy functions, it quickly becomes apparent that as progression occurs from that for classical thermodynamics to statistical mechanics/thermodynamics to information theory, actual physical ideas play a gradually decreasing role and heat only appears in the first of these derivations. These are all points which must come into consideration when examining the claim, implicit at least in some writings, that the entropy functions of classical thermodynamics, statistical mechanics/thermodynamics and information theory are identical functions.

Further Comments.

In the above, very brief introductions to the origins of the entropy concept, or possibly concepts, in classical thermodynamics, statistical mechanics/thermodynamics and information theory have been presented. It is clear immediately that, in the first case, the function termed the entropy is irrevocably linked to heat while this is certainly not so in the other two cases discussed. One can, however, see the possibility of a real link between the concepts of entropy in statistical mechanics/thermodynamics and information theory. Indeed, Lavenda has commented more than once that, in retrospect, it appears unfortunate that the two subjects developed independently of one another. Possibly more and quicker progress could have been achieved if this had not been so. Also, much duplication of effort could have been avoided. However, that is not the case. The position as of now is then that the entropy concepts of statistical mechanics/thermodynamics and information theory do have much in common but their link with the entropy of classical thermodynamics may only be described as tenuous. As pointed out already, the entropy of classical thermodynamics is linked with the concept of heat and nothing can change that.

The other two entropies are introduced with no mention of heat or heat exchange and neither can be linked directly with the concept of heat. Further, all the links with classical thermodynamics introduced into statistical mechanics appear to be done ad hoc; rarely, if ever, is any rational physical justification for the introduction of the functions and equations of classical thermodynamics advanced and yet it is just this introduction which enables so much to be accomplished physically in that branch of physics. Undoubtedly, the route taken has produced many satisfactory results but it must be wondered if that is more by luck than judgement?

Looking especially at the approach of such as Hill and remembering the successes of statistical mechanics/thermodynamics, it is difficult to believe the theory incorrect. However, when the subject of the relevant entropies arises, it is equally difficult to accept that they are one and the same function as their two bases are so completely different. When information theory enters the picture, the connection between the entropies – if, indeed, one exists – becomes even more vague and difficult to accept. In fact, it might be wondered if this is, at partially, behind the somewhat peculiar conjecture of Landauer. In an article of 1961, Landauer suggested that erasure of information is a dissipative process and, therefore, that a small quantity of heat is necessarily produced when a classical bit of information is deleted. This seems another way of artificially introducing the notion of heat into an area of physics where it simply doesn't appear naturally. A quick glance at some of the basic notions of information theory as explained by Shannon² and, possibly more obviously, by Brillouin¹ would seem to suggest that this could have been the case and Landauer was, in a sense, inverting the link between entropy and heat which occurs quite naturally in classical thermodynamics. It might be noted that more appeared querying Landauer's conjecture in an earlier article⁹.

However, these days, more and more applications for all of these traditionally physics' topics are appearing in the biological sciences and medicine. Here different problems are seemingly encountered which appear far removed from the notions of heat engines which led originally to the subject now known as classical thermodynamics. Nevertheless, if classical thermodynamics is to apply, its basic laws must apply and that means that, even if the wording is altered to fit the new regime, the fundamental tenets of the second law must apply too; that is, reference must be made to something not being possible in a cycle in the absence of other effects.

Although not related directly to entropy, it is interesting to note at this point that Ho¹⁰ makes mention of this and refers back to a much earlier article by MacClare¹¹. However, Ho refers to an abbreviated form of the second law, as advanced by MacClare, which states that

*Useful work is only done by a molecular
system when one form of stored energy is
converted into another.*

where by stored energy is meant any form of energy that does not equilibrate, or degrade, into heat in the interval τ , with τ being a standard time greater than that necessary for thermal energies to equilibrate throughout the system and reach equilibrium. However, the drawback with this statement and a modified one due to Ho is that there is no mention of cycles or other conditions. It should be noted though, that, in his original article, MacClare did advance the following form of a modified second law¹¹:

*It is impossible to devise an engine, of any
size whatever, which, acting in a cycle which takes a time τ , shall produce no effect other than the
extraction of energies, which have equilibrated with each other in a time less than τ , from a reservoir at
one temperature and the conversion of these energies into a form in which they would remain stored for
longer than τ ; either at a higher temperature, or in a population inversion.*

He continued to point out that this statement clarifies what the second law actually forbids in practice and shows that weights lifted by Brownian motion have not had any useful work done on them. Unfortunately

in some ways, he then proceeds to express the second law in the previously mentioned form which MacClare himself describes as a very economical form. However, he points out that the abbreviated statement does serve to define useful work and that, together with the definition of stored energy he gives, makes it clear that the statement applies at the molecular level as well – something crucial for biological applications. He concludes by noting that this “means that it follows from the second law (when that law is properly understood) that if energy is stored initially in a single molecule then, once that energy is allowed to exchange with thermal energies, useful work can no longer be done with it.” Nevertheless, it is a pity that it is this abbreviated form which is now quoted because it omits those two points crucial to the second law – the fact that something is not possible in a cycle in the absence of other effects.

It should be noted at this juncture that MacClare was concerned with examining the molecular nature of living things and was interested, in particular, in whether or not such systems could work in the same way as ordinary chemical machines. To this end, he made some extremely useful points concerning the supposed statistical nature of the second law and also made some insightful comments regarding the nature of the quantity referred to as work. On this second point, he was at pains to distinguish between doing work usefully and wastefully and it is for that reason he introduced the terms *stored energy* and *useful work* referred to above.

The paper by MacClare and the article by Ho are important in that they draw attention to the fact that modifications to some wording in classical thermodynamics must be made in order to make that subject directly applicable in the biological sciences. This is something which needs addressing and clarifying as a matter of urgency.

Concluding Comments.

It is virtually impossible to end this article with a definite conclusion. Suffice it to say, though, that serious doubts must exist concerning the equivalence of the entropy function of classical thermodynamics and the corresponding functions of statistical mechanics and information theory; the bases of the functions are totally different and the link between those of classical thermodynamics and statistical mechanics seems contrived in order to produce the statistical thermodynamics theory known and used, albeit with apparent great success, today.

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On the Statistical Nature of the Second Law of Thermodynamics.

Jeremy Dunning-Davies,

Introduction.

It does seem that, over the years, much has been written about the statistical nature of the Second Law of Thermodynamics but the starting point for any such discussion seems to have been the underlying assumption that the Second Law is, in fact, statistical in nature. However, is this so?

It is intended here to examine this important question afresh and, to start, a brief history of scientific events associated with the original establishing of the Second Law will be given before moving on to a brief consideration of concepts more readily associated with statistical thermodynamics. This should enable an attempt to be made to answer the stated question and put some presently accepted ideas into perspective.

The Second Law in Classical Thermodynamics.

Historically, the origin of the Second Law of Thermodynamics is linked with the name of Sadi Carnot. He was born in 1796, the eldest son of Lazare Carnot who was best known for his political activities. Lazare Carnot was a member of the Directory after the French Revolution - having previously been, amongst other things, a member of the notorious Committee of Public Safety - and, later, during the Hundred Days in 1815, Napoleon's Minister of the Interior. However, throughout his political career, he managed to find time for intellectual pursuits. His big interest appears to have been mechanics and, although he did little original work, it is felt nowadays that his attempt to produce a general science of machines did influence his son.

Sadi Carnot himself was educated at the élite École Polytechnique and, after a period as a military engineer, devoted himself to research. His great work, with English title *Reflexions on the motive power of fire*, was published in 1824. In modern terminology, motive power is work and the book was concerned with the maximum efficiency of heat engines. By the 1820's, with the restoration of peace between Britain and France, it became apparent that the French lagged a long way behind the British in some technological areas and nowhere was the disparity worse than in power technology. At that time, this area had become particularly important because of the widespread use of steam engines - in Britain, such machines were used, for example, in the Cornish tin mines both for pumping out water and for hauling men and loads of ore to the surface. The work of such engineers as Watt, Trevithick and Woolf was well-known and must have helped provide some inspiration and incentive for Carnot.

Quite naturally, for the time, Carnot adopted the so-called caloric theory in his work. This theory has been mentioned already in chapter 1 and basically regards heat as some sort of massless fluid. Carnot assumed caloric conserved in the cyclic operation of heat engines and postulated that the origin of the work done by a heat engine is the transfer of caloric from one body to a colder body; - this flow of caloric being regarded as analogous to the flow of fluid which, as in a waterwheel, produces work when falling down a potential gradient. Crucially, Carnot recognised that a heat engine works most efficiently if the transfer of heat occurs as part of a cyclic process and also, that the main factor in determining the amount of work which may be extracted from a heat engine is the temperature difference between the heat source and the sink into which the caloric flows. Both these points turn out to be independent of the actual model of the heat flow process. Finally, he devised a cycle of operations - now known as the **Carnot cycle** - as an idealisation of the behaviour of any heat engine.

From these essentially practical, engineering-linked considerations came much of what is now known as thermodynamics. Tragically, Carnot himself did not live to see any of the far-reaching consequences of his work;- dying from cholera at the early age of 36. However, his work was used and extended by, amongst others, Thomson and Clausius and, once the problem of reconciling Carnot's work, in which

caloric is conserved, with Joule's work demonstrating the interconvertibility of heat and work had been resolved, modern thermodynamics began to emerge.

As mentioned earlier, the Second Law itself has been stated in various ways but probably the two most common forms are those due to Lord Kelvin (William Thomson) and Rudolf Clausius:

Kelvin:

It is impossible to transform an amount of heat completely into work in a cyclic process in the absence of other effects.

Clausius:

It is impossible for heat to be transferred by a cyclic process from a body to one warmer than itself without producing other changes at the same time.

As may be seen in most thermodynamics' text-books, these two statements of the Second Law are equivalent although, strictly speaking, they are only equivalent in the above form for the case of positive absolute temperatures. As has been shown, the Kelvin form of the Second Law has to be modified to take account of negative temperatures but that modified form is totally equivalent to the above Clausius form. It might be noted at this point that the idea of a machine which, in a cyclic process, converts an amount of heat *completely* into work has been suggested. Such a machine, if permissible, would prove an extremely attractive proposition since it could be used to cool both the deserts and oceans and so provide a huge supply of energy for man's use. However, such a machine is prohibited by the Second Law, as is seen by glancing at the above statement of that law due to Kelvin. These machines, which are still sought by some people, are often called *perpetual motion machines of the second kind*; perpetual motions of the first kind being those which violate the First Law of Thermodynamics.

The above forms of the law are those used at the birth of thermodynamics as a subject in its own right. As mentioned already, the laws were deduced from experiment and observation, and many of the ideas were borrowed from engineering. The notions and experiences of the engineer were used to obtain the laws of heat transformation and it is a tremendous achievement that a theory with many highly abstract concepts should be established by this approach. It should be stressed at this point that the above are the two basic forms of the Second Law of Thermodynamics; other so-called forms of the law are deduced from these with the exception of the highly mathematical accessibility criterion proposed by Carathéodory. Here, though, attention will remain focussed on the two basic forms due to Kelvin and Clausius. It should always be remembered, though, when discussing these forms of the Second Law or when making deductions from them that, in both cases, reference is made to the impossibility of something happening *in a cyclic process in the absence of other effects*. These italicised words are crucially important and forgetting them often leads to incorrect deductions and conclusions. In fact, it is often these words which prove the incorrectness of many claimed examples of so-called perpetual motion machines of the second kind.

It is seen immediately that all the discussion leading to these two formulations has been macroscopic in nature; nowhere have any statistical considerations encroached on matters; nowhere has any mention of uncertainty or uncertainty principles raised its head. This is because, in classical thermodynamics, there are no statistical considerations encountered; there is no uncertainty involved at any stage. However, such is not the case in the seemingly closely related subject Statistical Thermodynamics which really grew out of a merging of classical thermodynamic ideas with those of statistical mechanics.

Before proceeding to discuss the related subject of statistical thermodynamics, it should be noted that one of the great achievements of classical thermodynamics was to derive the equation which represents this important Second Law mathematically. That equation is the one which introduces the concept of entropy into classical thermodynamics. The equation is, of course,

$$d'Q = TdS,$$

where $d'Q$ represents a quantity of heat, T is the absolute temperature introduced during the derivation of this equation and dS represents a change in a quantity termed the entropy. The details of this derivation are well-known and can be read up in any thermodynamics textbook. One crucial point to be noted at this

point is that the introduction of the concept of entropy is irrevocably linked to a change in heat and the whole derivation has been via purely macroscopic considerations there with no mention anywhere of anything statistical.

Statistical Thermodynamics.

The emergence of statistical mechanics, quickly followed by statistical thermodynamics, occurred later in the nineteenth century and really started with Boltzmann's work and his definition of entropy, S , in that discipline via the now famous equation

$$S = k \ln W.$$

The great need was to be able to examine subjects consisting of huge numbers of individual particles, systems such as gases. Even for an ideal gas, this posed enormous problems because of the huge numbers of equations involved if the paths of individual particles were to be determined. The obvious answer to the problem lay in the application of statistical techniques and Boltzmann's famous equation helped in this task. Over the years, the use of various so-called ensembles arose, each one determined by the physical quantities assumed known and those which needed to be determined. The most popular for use are the micro-canonical ensemble (given variables being internal energy, number of particles and volume), the canonical ensemble (given variables being number of particles, volume and temperature) and the grand canonical ensemble (given variables being volume, temperature and chemical potential), although others, such as the pressure ensemble, exist and are used on occasions. In all cases, the introduction of statistical ideas and methods necessarily introduced an element of uncertainty into the model; an uncertainty characterised, at least in part, by the fact that only average values of the various physical quantities were derived and also by the presence of fluctuations in these average values. These are all well-known facts associated with statistical mechanical methods but it must be remembered that classical thermodynamics deals only with the actual values of these physical entities *not* average values.

Nevertheless, over the years, these statistical methods have been used with great success to describe various complex systems and to make deductions, which have proved valid, about them. Values of the various functions of classical thermodynamics have been found which are appropriate for the physical system under investigation but, frequently, these derivations have been made by utilising several well-known results, such as the Euler relation, of classical thermodynamics and this does raise the question of whether or not a circular argument has been used to justify the identification of quantities with their counterpart in classical thermodynamics. This must certainly be true of the quantity known in both areas as the *entropy*. This last remark follows because, in classical thermodynamics, any change in this function is irrevocably linked to a change in heat whereas, in statistical mechanics, the quantity is a purely statistical one with *no* necessary link to heat or changes in heat. Of course, this is a question which has been raised previously on several occasions and there seems, as yet, no real consensus of opinion on the outcome. It is, though, a very real and serious question which lies at the very heart of the foundations of the area of physics known as statistical mechanics. Again as has been pointed out before, it also raises the question of the link between classical thermodynamics and information theory because, once again, the real apparent link is via statistical thermodynamics; it is statistical thermodynamics which appears to have several formulae in common with information theory, *not* classical thermodynamics.

It has to be noted that it is in the subject statistical mechanics, or statistical thermodynamics, into which questions of uncertainty encroach. When one reads of thermodynamic uncertainty relations, for example, one is considering deductions made within statistical thermodynamics, *not* classical thermodynamics. The uncertainty involved is really a result of the use of the various statistical distributions involved in helping in the description of genuine physical systems usually comprising large numbers of particles. It would seem the uncertainty involved is not associated with the actual system but rather with the methods used in an attempt to describe that system theoretically and make deductions about that system based on the model adopted. Such uncertainty has no place in classical thermodynamics. In a similar way, all arguments claiming the Second Law is only valid on average and, statistically speaking, violations could

be found are totally dependent on a statistical approach to the subject. The uncertainty enters only because of the mathematical methods employed. No; the Second Law in classical thermodynamics does not admit violations; it is a law which, in its own strict context, is universally valid.

Some Closing Thoughts.

Ever since the Second Law of classical thermodynamics was introduced, attempts have been made to find violations. None has succeeded! Many claims have been made but not one has been valid. The basic reason for this failure in some cases is that people have not adhered to the precise details of the fundamental statements of the said law – those due to Kelvin and Clausius; many have foundered because the proposed machine either did not operate in a complete cycle and/or other effects which took place were ignored. The other category of claim involves recourse to the ideas and associated techniques of statistical thermodynamics and, once this step is made, the conclusions immediately become questionable, if not invalid, as far as classical thermodynamics and its all-embracing Second Law are concerned, since the use of statistical notions immediately introduces uncertainties into the discussion which are definitely not present in classical thermodynamics. Fundamentally, the Second Law of classical thermodynamics is not a statistical law and should never be viewed as such.

Over the years, more and more notions concerned with uncertainty in one form or another have entered into the practice of scientific investigation – whether it be through the realisation that man cannot measure anything with 100% accuracy or, when microscopic situations are being examined, through the uncertainty principles of quantum mechanics. However, it may well be asked if, in the first instance, it is purely man's inability to measure with complete accuracy and, in the second, it is due to the model devised by man to describe these microscopic systems. It is possible that all the problems of uncertainty are man-made and that all the systems themselves are exact with no room for uncertainty anywhere. However, although this may be an area ripe for further philosophical investigation, it cannot be doubted that classical thermodynamics is exact and harbours no uncertainties. This is probably another reason why the exact nature of the relationship between classical thermodynamics and statistical thermodynamics and information theory needs long and careful examination – not least, the question of whether or not the various entropies are equivalent must be resolved, although this seems a tricky question given that any change in the first is purely linked to a change in heat while the other two are definitely statistical in nature with no obvious direct link to heat. Overall, classical thermodynamics seems, in one sense, to stand alone and any possible violations of its laws must be viewed within the subject itself, rather than by incorporating seemingly appropriate statistical notions.

Thoughts on Negative Heat Capacities.

Jeremy Dunning-Davies,

1. Introduction.

With a forthcoming special issue of the American Journal of Modern Physics due to be devoted to the topic of Negative Heat Capacities, it seems appropriate to reconsider the general theoretical position within thermodynamics of these negative heat capacities. This seems all the more important since this general situation, although discussed in detail in the later years of the last century, appears to be missing from much modern thermodynamic literature.

The possibility of a star possessing a negative heat capacity has been accepted for some time (Eddington, 1926). This phenomenon has been attributed to the lack of homogeneity due to gravitational interaction so that, even if the heat capacity of each small element of the system is positive, the overall heat capacity could be negative since the total energy in this case is not the sum of the energies of the individual parts – the energy of the gravitational interactions of these parts must be taken into account also (Landau & Lifshitz, 1958). Subsequently, self-gravitating gas spheres in a bounded region of space and in thermodynamic equilibrium were shown to be possible possessors of negative heat capacities (Lynden-Bell & Wood, 1967). In fact, the virial theorem for an ideal gas with $1/r$ potential has been used to demonstrate the existence of a negative heat capacity (Thirring, 1970, 1972). This somewhat paradoxical result was attributed to lack of a clear distinction between the canonical and micro-canonical ensembles. It was claimed that, when such a distinction was attempted, negative heat capacities occurred over a range of energy values in the micro-canonical ensemble, while a phase transition occurred in the canonical ensemble (Hertel & Thirring, 1971, 1972). This notion was examined further using simple models which obey the virial theorem. However, since the various ensembles are simply mathematical constructs, the fact that different physical effects appear to occur for one and the same system in these two ensembles must raise questions which surely deserve serious investigation followed by answers?

The fact that each of the above demonstrations of the existence of negative heat capacities is flawed, either by a logical error or by a situation in which thermodynamic reasoning may not be applied has been discussed elsewhere already (Lavenda & Dunning-Davies, 1990). However, it seems to be the case that, when negative heat capacities are discussed, there often seems to be an unwritten assumption that their actual existence is allowable and does not violate any well-established laws; invariably attention is confined to making deductions based on this underlying assumption (Landsberg & Pecaric, 1987). In what follows it is intended to examine the validity of this unwritten assumption.

In the first section following it is shown by using established, published results that the very existence of negative heat capacities for *closed* systems is incompatible with the Second Law of Thermodynamics. Further, it has been shown (Lavenda & Dunning-Davies, 1990) that the actual essence of the Second Law is concavity and, as has been demonstrated quite clearly (Dunning-Davies, 1993) this lends added support to this assertion that, *in closed systems*, negative heat capacities are incompatible with the Second Law. This is followed by an examination of an interesting example proposed by Lorentz which adds further credence to the arguments presented here.

Consideration then turns to the specific case of two systems in thermal contact with special attention being devoted to the interpretation of the results when one, or both, systems possess negative heat capacities. (For the content of this section the invaluable help of Dr. d. Pollard must be acknowledged.) This is followed by a consideration of the case of an ideal classical gas undergoing a polytropic change. This is of relevance since it has been claimed (Landsberg & Leff, 1989) that, although not generally

realised, negative heat capacities are possible along certain types of path in this example. Whether or not this is true, is certainly of both importance and relevance as far as these considerations are concerned.

The question of the virial theorem and negative heat capacities – a subject mentioned already – is then addressed before the extension to *open* systems is discussed and it is noted that, in open systems, it is not prohibited for the heat capacity to assume a negative value.

2. The Second Law and Negative Heat Capacities.

It is well-known in thermodynamics that conclusions based on Carathéodory's principle are frequently characterised by a multiplicity of possibilities. In particular, unless supplemented by additional assumptions, this principle leads to four possible types of thermodynamics – all similar in logical structure but distinct in detail. These four types of thermodynamics, together with their main properties, have been derived rigorously by Landsberg (1961). The properties directly relevant to the present discussion are reproduced in Table 1.

Table 1.

Types of Thermodynamics.

Type	I	II	III	IV
Direction of heat flow in terms of empirical temperature	high \rightarrow low	high \rightarrow low	low \rightarrow high	low \rightarrow high
Sign of the absolute temperature	positive	negative	Positive	negative
Direction of heat flow in terms of absolute temperature	high \rightarrow low	low \rightarrow high	low \rightarrow high	high \rightarrow low
Quasistatic heat capacity	positive	negative	negative	Positive

When viewing these various properties, it should be remembered that the idea of an empirical temperature is deduced from the Zeroth Law of Thermodynamics and there is no reason at that stage to suppose that heat flow is from high to low, rather than from low to high, empirical temperatures. It actually follows that Carathéodory's principle leads to the conclusion that either

- (i) heat flows from places of high absolute temperature to those of low absolute temperature
- or
- (ii) heat flows from places of low absolute temperature to those of high absolute temperature.

As is seen from the table, conclusion (i) holds for thermodynamics of types I and IV, while (ii) holds for thermodynamics of types II and III. However, Carathéodory's principle is essentially a mathematical statement concerning the adiabatic accessibility of states. When physics, in the form of the Clausius statement of the second Law is introduced, it is seen that conclusion (ii) must be excluded and, from this, it follows immediately that thermodynamics of types II and III are unacceptable on physical grounds. Referring to the table once again, it is seen that thermodynamics of types II and III are those for which the heat capacity is negative; for types I and IV, the heat capacity is seen to be strictly positive. Hence, in order to ensure the continued validity of the Second Law of Thermodynamics, negative heat capacities cannot occur. However, it should be noted that, if reference is made to Landsberg's book (1961), all the discussion up to this point has been concerned purely with closed systems; the notion of an open system has yet to be introduced and so, the possibility of negative heat capacities in open systems remains an open question at this stage.

It might be noted also that the Second Law of Thermodynamics has been stated in various ways although the basis of the subject is firmly rooted in the two formulations due to Clausius and Kelvin. The

connections between these two forms and that due to Carathéodory have been examined fairly extensively (Landsberg, 196; Dunning-Davies, 196, 1969). However, there is another apparent form of the Second Law which appears in the literature although, in the traditional development of the subject, it is really a deduction from the fundamental forms due to Clausius and Kelvin. This other form is

“For and adiabatically enclosed system
the entropy can never decrease.”

This form attains greater prominence in those approaches to thermodynamics in which the existence of an entropy function is a basic assumption. In the traditional approach, the existence of an entropy function is deduced. It is worth enquiring as to the position of this alternative statement in the present context. Once again, though, the position has been examined in detail by Landsberg (1961) who has shown that this statement concerning entropy increase holds only for thermodynamics of types I and IV; it simply does not hold for those types of thermodynamics which admit negative heat capacities.

Hence, conclusions concerning negative heat capacities based on this alternative statement of the Second Law agree with those deduced earlier – negative heat capacities cannot occur in closed systems if the second Law is to remain inviolate. Again, all the results mentioned here are supported by later work (Lavenda & Dunning-Davies, 1990; Dunning-Davies, 1993) emphasising that the essence of the Second Law is concavity. Indeed, if concavity is indeed the essence of the Second Law, it follows immediately that the heat capacity must be positive in a closed system.

3. Digression on Concavity and the Second Law.

Support for the above mentioned assertion that the essence of the Second Law is concavity and that, when the entropy is not a first-order homogeneous function of the extensive variables, there is no reason to suppose that the entropy will be additive or superadditive is proved by an interesting example provided by Lorentz (Lorentz, 1927):

A pencil of rays of a particular colour is split, by means of a thin plate, into two parts – a reflected part and a transmitted one. If the energy density of the incident pencil is u and those of the reflected and transmitted ones are u_1 and u_2 , then

$$u = u_1 + u_2.$$

It may be shown that, if the entropy is a concave function of the internal energy and is zero when the internal energy is zero, then, if the entropies of the incident, reflected and transmitted waves are s , s_1 , s_2 , respectively,

$$s < s_1 + s_2;$$

that is, the effect of splitting the pencil of rays is to produce an increase in total entropy.

Consider three values of the internal energy u_1 , u_2 and $(u_1 + u_2)$. Between the values $u = 0$ and $u = u_1 + u_2$, the entropy

$$s = s(u)$$

is concave if

$$s[(1 - \lambda)(u_1 + u_2)] \geq (1 - \lambda)s(u_1 + u_2),$$

where $0 \leq \lambda \leq 1$; that is, any point on the curve lies above the chord joining the two given points.

In particular, if

$$(1 - \lambda)(u_1 + u_2) = u_1$$

then

$$\lambda = u_2/(u_1 + u_2), \text{ say.}$$

Similarly, if

$$(1 - \lambda)(u_1 + u_2) = u_2,$$

then

$$\lambda = u_1/(u_1 + u_2), \text{ say.}$$

Using these latter two results separately in the equation expressing concavity of the entropy leads to

$$s(u_1) \geq (1 - \lambda)s(u_1 + u_2) = u_1 s(u_1 + u_2)/(u_1 + u_2)$$

and

$$s(u_2) \geq (1 - \lambda)s(u_1 + u_2) = u_2 s(u_1 + u_2)/(u_1 + u_2).$$

Addition of the latter two equations gives

$$s(u_1) + s(u_2) \geq s(u_1 + u_2).$$

Hence, it has been shown that, if the entropy $s(u)$ is a concave function of the internal energy u for which $s(0) = 0$,

the entropy is subadditive *not* superadditive.

This simple example would appear to support the earlier assertion (Lavenda & Dunning-Davies, 1990) that, when homogeneity no longer holds, it is concavity which contains the essence of the Second Law of Thermodynamics, not superadditivity; the Second Law is assumed valid universally but the above example shows that that is not so for the property of superadditivity.

4. Two Systems in Thermal Contact.

Now consider two *closed*, isolated systems – one with heat capacity C_1 and at temperature T_1 , the other with heat capacity C_2 and at temperature T_2 , where $T_2 < T_1$. Suppose these systems are put into thermal contact with one another and achieve thermal equilibrium at temperature T . Then, by conservation of energy

$$C_1(T - T_1) + C_2(T - T_2) = 0 \quad (i)$$

or

$$T = \frac{C_1 T_1 + C_2 T_2}{C_1 + C_2},$$

this result holding for both positive and negative heat capacities.

If

$$\alpha = \frac{C_1}{C_1 + C_2} \quad \text{and} \quad \beta = \frac{C_2}{C_1 + C_2}$$

the above equation (i) may be written

$$T = \alpha T_1 + \beta T_2 \quad (ii)$$

where

$$\alpha + \beta = 1.$$

Now it remains to examine various separate cases:-

Case 1.

If both heat capacities are positive

$$\alpha > 0, \beta > 0$$

and (ii) gives

$$\begin{aligned} T &= \alpha T_1 + (1 - \alpha) T_2 \\ &= T_2 + \alpha(T_1 - T_2) \\ &> T_2 \end{aligned}$$

and

$$\begin{aligned} T &= (1 - \beta) T_1 + \beta T_2 \\ &= T_1 - \beta(T_1 - T_2) \\ &< T_1 \end{aligned}$$

Hence, in this case

$$T_1 > T > T_2$$

and

$$C_1(T - T_1) < 0, \quad C_2(T - T_2) > 0$$

which means that the system at the higher temperature has lost heat while that at the lower temperature has gained heat or, in other words, heat has flowed from the higher to the lower temperature.

Case 2.

If both heat capacities are negative

$$\alpha > 0, \quad \beta > 0$$

and, using the same argument as in Case 1, it again follows that

$$T_1 > T > T_2.$$

However, in this case, it is seen that

$$C_1(T - T_1) > 0, \quad C_2(T - T_2) < 0;$$

that is, the system at the higher temperature gains heat while that at the lower temperature loses heat or, in other words, heat flows from the lower to the higher temperature in violation of the Second Law of Thermodynamics.

Case 3.

It remains to consider the case when one heat capacity is positive and the other negative. In this case, either

$$\alpha > 0, \quad \beta < 0$$

or

$$\alpha < 0, \quad \beta > 0.$$

If $\alpha > 0, \beta < 0$, (ii) gives

$$T = T_2 + \alpha(T_1 - T_2) > T_2$$

0,

$$T = T_1 - \beta(T_1 - T_2) > T_1$$

so that

$$T > T_1 > T_2.$$

An analogous argument shows that, if $\alpha < 0, \beta > 0$, then

$$T_1 > T_2 > T.$$

However, the situation covered by the case $\alpha > 0, \beta < 0$ may be achieved if either

$$C_1 < 0, \quad C_2 > 0, \quad C_1 + C_2 < 0$$

or

$$C_1 > 0, \quad C_2 < 0, \quad C_1 + C_2 > 0.$$

In the first of these

$$C_1(T - T_1) < 0, \quad C_2(T - T_2) > 0$$

so that heat flows from the higher to the lower temperature in accordance with the Second Law.

However, in the second

$$C_1(T - T_1) > 0, \quad C_2(T - T_2) < 0$$

so that heat flows from the lower to the higher temperature in violation of the Second Law.

Again, the case $\alpha < 0, \beta > 0$ may be achieved if either

$$C_1 > 0, C_2 < 0, C_1 + C_2 < 0$$

or

$$C_1 < 0, C_2 > 0, C_1 + C_2 > 0.$$

A similar argument shows that, in the first of these, heat flows from the higher to the lower temperature but, in the second, it flows from the lower to the higher temperature in violation of the Second Law.

It might be noted also that, if

$$C_1 = -C_2,$$

the equation representing conservation of energy is satisfied only if

$$T_1 = T_2.$$

If T_1 and T_2 are unequal, the said equation leads to the conclusion that the equilibrium temperature is infinite.

All the above results are well-known (Landsberg & Pecaric, 1987), as is the interpretation. Since the Second Law of Thermodynamics precludes the flow of heat from a system at one temperature to a system at a higher temperature in the absence of other effects, it must be concluded that, when negative heat capacities are involved, the *only* allowable case is when the two heat capacities are of different sign and their sum is negative. However, while this conclusion may seem reasonable theoretically, in practice, if a closed system has a negative heat capacity, it cannot be ensured that it comes into contact only with other closed systems possessing positive heat capacities and such that the sum of the two heat capacities is negative. Hence, the only realistic conclusion which may be drawn from these considerations is that closed systems must have positive heat capacities; the existence of closed systems with negative heat capacities would lead to violations of the Second Law.

5. An Ideal Gas undergoing a Polytropic Change.

For an ideal classical gas

$$pV = RT,$$

where all the symbols have their usual meanings, and Joule's Law

$$\left(\frac{\partial U}{\partial V}\right)_T = 0$$

hold.

Also, for such a gas,

$$C_p - C_v = p\left(\frac{\partial V}{\partial T}\right)_p = R.$$

Now consider an ideal classical gas of constant heat capacities C_p, C_v undergoing a quasistatic change for which $d'Q = CdT$, where C is a constant. In this case

$$d'Q = dU + pdV = \left(\frac{\partial U}{\partial T}\right)_V dT + \left[\left(\frac{\partial U}{\partial V}\right)_T + p\right] dV$$

that is

$$CdT = C_v dT + pdV = C_v dT + (RT/V)dV$$

or

$$(C_v - C) \frac{dT}{T} = (C_p - C_v) \frac{dV}{V},$$

which may be integrated to give

$$TV^{n-1} = \text{constant},$$

$$n = (C_p - C)/(C_v - C).$$

With n defined in this way, it follows that

$$C = \frac{(n - \gamma)}{(n - 1)} C_v$$

where $\gamma = C_p/C_v$.

It follows immediately that C may be negative if $1 < n < \gamma$. Hence, it might appear, at first sight, that an ideal classical gas of constant heat capacities may have a negative heat capacity along so-called polytropic paths described by $TV^{n-1} = \text{constant}$ if $1 < n < \gamma$. However, *all* the discussion thus far has been independent of the Second Law and, as has been shown already, introduction of the Second Law results in the exclusion of negative heat capacities for closed systems. Hence, in the above, both C and C_v must be positive and so either

$$n > 1 \quad \text{and} \quad n > \gamma$$

or

$$n < 1 \quad \text{and} \quad n < \gamma.$$

In a sense, this final result is not surprising since, as Chandrasekhar (1957) points out, the above situation is only an ordinary ideal classical gas undergoing a particular type of change.

6. The Virial Theorem and Negative Heat Capacities.

Ω Astrophysical arguments leading to negative heat capacities are all based on the virial theorem (Thirring, 1970, 1972). The error in these arguments is to be found in a confusion between total energy and internal energy and is all the more surprising since the correct application of the virial theorem is laid out clearly in the book by Chandrasekhar (1957). As is shown there, if E is the total energy, U the internal energy, Ω the potential energy and τ the kinetic energy

$$E = U + \Omega$$

and

$$\tau = \frac{3}{2}(\gamma - 1)U$$

so that

$$\tau = U \text{ if and only if } \gamma = 5/3$$

where γ is, as usual, the ratio of the constant pressure and constant volume heat capacities.

Again, it is shown that, by the virial theorem

$$2\tau + \Omega = 3(\gamma - 1)U + \Omega = 0$$

which, together with the above equation for E gives

$$E = -(3\gamma - 4)U.$$

Since a stable configuration for gas spheres is possible only if $\gamma > 4/3$, it follows that the rate of change of *total* energy with temperature T will be opposite that of the *internal* energy. Hence, since the rate of change of total energy with temperature has been found to be negative (Thirring, 1970, 1972) it follows that the heat capacity of the system, which is the rate of change of the internal energy with temperature, is positive. Hence there is no negative heat capacity and no paradox.

7. Extension to Open Systems.

Although not mentioned repeatedly in each section, attention thus far has been confined explicitly to closed systems. For such systems, the equation representing the combination of the First and Second Laws assumes the form

$$TdS = d'Q = dU + pdV$$

and the heat capacity at constant volume is

$$C_V = T(\partial S/\partial T)_V = (\partial U/\partial T)_V.$$

However, when open systems are considered, the form of the equation representing the combined First and Second Laws becomes

$$TdS = d'Q = dU + pdV - \mu dN,$$

where μ and N represent chemical potential and number of particles respectively, and so, in this case, the heat capacity at constant volume is given by

$$C_V = T(\partial S/\partial T)_V = (\partial U/\partial T)_V - \mu(\partial N/\partial T)_V.$$

Since the second term on the right-hand side of this latter equation may be either positive or negative, the sign of the heat capacity in this case remains indeterminate. Hence, it follows that the heat capacity of an open system could be negative. However, this in no way contradicts the earlier discussion. An open system cannot be isolated and, if an open system and its surroundings are in equilibrium and are considered together as a composite system, that composite system will be a closed system possessing a positive total heat capacity.

8. Conclusions.

In much of what appears in the literature concerning negative heat capacities, there is a tacit assumption that systems possessing such heat capacities are allowable and attention is confined to drawing conclusions based on this assumption. However, here it has been shown quite clearly that a *closed* system of negative heat capacity would violate the Second Law of Thermodynamics; only *open* systems may have negative heat capacities.

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Aspects of the Second Law Re-examined.

Jeremy Dunning-Davies,

1. Introduction.

Much, though not all, of what appears in the following sections has been published before but here the aim is to gather a collection of material together and attempt to present it as a coherent whole. Possibly somewhat surprisingly, thermodynamics is a subject which affects all but, as far as students are concerned, it seems to permeate most, if not all, branches of science and does cause some concern because certain basic concepts are not always explained clearly and honestly and leads to confusion. The end result is that some regard this subject, with its basis in such everyday ideas as heat engines, as even mystical.

Thermodynamics is the branch of science which considers how changes of temperature affect the various properties of matter and of systems. The subject may be viewed on a microscopic level, in which case the interactions of atoms and molecules are studied as the temperature alters. For such a study, a specific model for the phenomenon under consideration is required. However, the truly unique status of classical thermodynamics becomes apparent when the subject is viewed macroscopically. In this case, only the behaviour of matter and radiation in bulk is considered: any internal structure they may possess is ignored. Hence, classical thermodynamics is concerned solely with relations between macroscopic observable quantities.

In many physical problems, details of the correct microscopic physics may not be known, but the thermodynamic approach may still provide answers about the macroscopic behaviour of the system - answers which are independent of the unknown detailed physics. In fact, thermodynamic arguments have absolute validity independent of the actual model used to explain any particular phenomenon.

It is remarkable to realise that these far-reaching statements may be made on the basis of the four laws of thermodynamics - the first and second being arguably more important than the remainder. These laws themselves are remarkable also in that, in reality, they are no more than reasonable hypotheses formulated as a result of practical experience. Nevertheless, they prove to be of immense power, having been applied successfully to matter in extreme physical conditions; such as matter in bulk at nuclear densities inside neutron stars and in the early stages of the hot big bang model of the Universe, as well as at very low temperatures in laboratory experiments. However, there is no way in which the laws of thermodynamics may be proved - they are simply expressions of common experience of the thermal properties of matter and radiation.

From the outset, it is important for the student new to this field to realise that by 'common experience' is meant simply what it states: the experiences which form the basis of thermodynamics are ones with which, in one way or another, everyone is familiar. Words such as 'hot' and 'cold' retain their everyday meanings; the idea of one body being 'hotter' than another is familiar to anyone who has inadvertently touched a heated towel rail; the idea of heat flowing from a body to a colder one is, again, a concept familiar to all who have wished to become warm after venturing out on a cold winter's day and have gained comfort from sitting close to a roaring fire. These simple experiences are at the heart of the subject and, when faced with a problem of understanding in thermodynamics, students would do well to remember these simple everyday occurrences with which everyone is familiar. Concepts such as temperature and pressure (where pressure, as usual, is simply the force acting on unit area) also retain their everyday meanings and students should bear this in mind when meeting these in future thermodynamic discussions.

However, while thermodynamics *is* rooted in experiences which are familiar to all, some more advanced aspects of the subject place it among the most abstract branches of physics. Although rarely emphasized, this is an important point to note, since the main reason for it is that the basic theory contains results which, within broad limits, are independent of any particular system. This leads to the surprisingly wide

range of applications for thermodynamic results: for example, as well as being of obvious use in physics and chemistry, parts of the theory find application in biology, information theory, communications, and even the study of language.

Anticipating what is to follow, it might be noted that the First Law of Thermodynamics concerns conservation of energy and may be stated as

Energy is conserved when heat is taken into account.

The Second Law gives information concerning the way in which systems evolve. There are several statements of this particular law but possibly the most important are those dating from the very beginnings of thermodynamics as a subject in its own right; that due to **Lord Kelvin** is:

It is impossible to transform an amount of heat completely into work in a cyclic process in the absence of other effects

and that due to **Clausius** is:

It is impossible for heat to be transferred by a cyclic process from a body to one warmer than itself without producing other changes at the same time.

It is well-known that these two seemingly different forms of the law are, in fact, equivalent so either form may be used when making deductions. It is vitally important also to note that Kelvin isn't simply saying that 'it is impossible to transform an amount of heat completely into work' and Clausius isn't simply saying that 'it is impossible for heat to be transferred from a body to one warmer than itself'. Both declare these changes to be impossible *in a cyclic process in the absence of other effects*. It is this imposition of restrictions which is so important in these traditional statements of the Second Law. A moment's reflection shows that writing which quotes either of these statements of the Second Law without specifying these crucial restrictions is insufficient.

It should always be remembered also that there is a third form of the Second Law which has been used on many occasions and whose links to the above mentioned forms are well-established; that is the form due to Carathéodory which states that

All points *A* in thermodynamic phase space are *i*-points; that is; in every neighbourhood of every point *A* there are points adiabatically inaccessible from *A*.

This is the form introduced by Carathéodory at Max Born's instigation because of his concerns over the, to him, unrigorous, engineering approach to the subject. However, as mentioned already, the links between this form and the more fundamental forms of the law are well established and these days the methods evolved using Carathéodory's approach have been modified so that the same rigorous deductions may be made using, specifically, Kelvin's statement of the Second Law.

These days it is probably the Second Law which causes more problems of understanding but, historically, it was the First Law which easily proved the more difficult to establish - possibly due the difficulty of understanding the precise nature of heat. In the 18th Century, heat was regarded as some sort of massless fluid, called **caloric**. It was thought that when one body is at a higher temperature than another and both are brought into thermal contact, caloric would flow from the hotter to the colder body until they came to equilibrium at the same temperature. However, this theory had problems. For example, when a warm body is brought into contact with ice, caloric will flow from the warm body to the ice; but, although ice is converted into water, the temperature of the ice-water mixture remains unaltered. Also in the 18th Century, an alternative view developed according to which heat is associated with the motions or vibrations of the microscopic particles which make up matter. This theory - the so-called **kinetic theory** - *associated heat with the kinetic energy of the motions of the microscopic constituents of matter*.

The two theories came into conflict at the end of the century when the experiments of Count Rumford weighed heavily against the caloric theory. Rumford was an American who moved to Britain during the American War of Independence. He was made a count of the Holy Roman Empire for service in Bavaria in 1791, and was also something of a soldier of fortune. In 1798, by attempting to bore cannon with a

blunt drill, he showed that heat could be produced by friction. In this experiment there is no obvious source of caloric, which apparently may be produced in indefinite amounts.

A major breakthrough came in 1822 with the publication of Fourier's *Analytical Theory of Heat*. In this book, Fourier evaluated the mathematical theory of heat transfer in the form of differential equations which did not require the construction of a specific model of the physical nature of heat. His methods gave mathematical expression to the *effects* of heat without enquiring into its causes. Also, and most importantly for future developments, this process of assigning mathematical substance to physical effects profoundly influenced the future generation of Scottish physicists - in particular William Thomson, who was later to become Lord Kelvin.

By the 1820's, the relation between kinetic energy and work done had been clarified. Then, in the 1840's, a number of scientists independently came to the correct conclusion concerning the interconnectibility of heat and work. In 1842, Mayer proposed that heat and work are interchangeable and proceeded to derive a value for the mechanical equivalent of heat from the adiabatic expansion of gases. However, the most important contributions were to come from another Scot, James Prescott Joule, who carried out a superb series of experiments which was crucial to the foundation of the law of conservation of energy.

Joule came from a family which had become wealthy through the brewery it owned and ran. He himself was really an amateur scientist and performed his experiments in laboratories installed and equipped at his own expense in his home and at the brewery. His genius was as a truly meticulous experimenter and the reason for singling him out for special mention is that he, above all others, gave thermodynamics a sound experimental basis. He established experimentally that the different forms of energy - heat, mechanical energy, and electricity - are equivalent and may be converted one into another, confirming the principle of conservation of energy. An important aspect of his work was the ability, even in the mid 19th century, to measure very small temperature changes very accurately. Indeed, by taking the utmost care to estimate all heat losses, he derived a value for the mechanical equivalent of heat of 4.13 Joules/calorie. This should be compared with the modern accepted value of 4.187 Joules/calorie.

The early results of Joule's experiments greatly excited Thomson who appreciated their significance immediately and used them as the foundation for the subject now called thermodynamics. The basic results became widely known and, by 1850, Helmholtz and Clausius had formulated what is known now as the law of conservation of energy or the **First Law of Thermodynamics**.

However, before embarking on the main topic of this piece - a re-examination of some aspects of the Second Law - it might be beneficial to quickly consider the various stages in the development of thermodynamics from the various laws. Hence, this will be considered next.

2. The Laws of Thermodynamics.

(i) The Zeroth Law.

Possibly somewhat illogically the first law encountered in an initial meeting with thermodynamics is termed the Zeroth Law purely because it was formulated as an actual law after titles had been assigned to the traditional First and Second Laws. As will be seen almost immediately, this zeroth law is no more than a fact of experience but its usefulness lies in that it enables temperature to be introduced into the discussion of the thermal properties of systems.

Everyone is familiar with such elementary notions as 'A is warmer than B', 'B may gain heat from A', and the qualitative notion of the 'flow of heat'. Also, everyone accepts that, when the flow of heat between two systems has ceased, those systems are said to be in thermal equilibrium. As mentioned already, the above might all be termed '*facts of experience*' and, in many arguments which lead to the formulation of the laws of thermal physics, such '*facts of experience*' play an important role.

Now, if the influence of, for example, electric or magnetic fields is absent, it is a fact of experience that the properties of a stationary fluid are determined completely by just two properties - the pressure p and volume of the containing vessel V . A system defined by only two properties is termed a two-coordinate

system. Such systems occur widely but the formalism may be generalised easily to cope with multi-coordinate systems.

Consider two isolated systems consisting of fluids with coordinates p_1, V_1 and p_2, V_2 . If brought into thermal contact and left for a long time, the properties of these two systems will change so that a state of thermal equilibrium is achieved. This means that all components making up the system are allowed to interact thermally until, after a long time, no further changes are observed in the bulk properties of the system. Generally, heat will be exchanged and work done in attaining this final situation. Eventually, the two come to thermal equilibrium such that their thermodynamic coordinates assume the values p_1', V_1' and p_2', V_2' . However, it is a fact of experience that the four coordinates cannot be totally independent if the two systems are in thermal equilibrium. Hence, there must be some relation linking these four quantities:

$$F(p_1, V_1, p_2, V_2) = 0.$$

This equation enables one quantity to be found in terms of the other three.

So far, use of the word 'temperature' has been avoided but a suitable definition may be found by using another 'fact of experience' which is so central to the subject that it appears as a law of thermodynamics - the **Zeroth Law**. This states that

If two systems, 1 and 2, are separately in thermal equilibrium with a third 3, then they must be in thermal equilibrium with one another.

Systems 1 and 3 being in thermal equilibrium means a relation of the form

$$F(p_1, V_1, p_3, V_3) = 0$$

holds. Solving this equation for p_3 gives

$$p_3 = f(p_1, V_1, V_3).$$

Similarly, systems 2 and 3 being in thermal equilibrium implies $p_3 = g(p_2, V_2, V_3)$. Hence,

$$f(p_1, V_1, V_3) = g(p_2, V_2, V_3). \quad (1.2.1)$$

However, according to the Zeroth Law, systems 1 and 2 must be in thermal equilibrium also and so, a relation of the form

$$H(p_1, V_1, p_2, V_2) = 0$$

must hold.

This implies that (1.2.1) must be of a form such that the dependence on V_3 on either side cancels; that is, for example,

$$f(p_1, V_1, V_3) = \phi_3(p_1, V_1)\xi(V_3) + \eta(V_3)$$

and

$$g(p_2, V_2, V_3) = \phi_2(p_2, V_2)\xi(V_3) + \eta(V_3).$$

Hence, if the dependence on V_3 is cancelled out, it is seen that, in thermal equilibrium

$$\phi_1(p_1, V_1) = \phi_2(p_2, V_2) = \phi_3(p_3, V_3) = t = \text{constant}.$$

This is the logical consequence of the Zeroth Law - there exists a function of p and V which may well vary in form from one system to another but which takes a constant value for *all* systems in thermal equilibrium with one another. Different equilibrium states will be characterised by different constants. This constant, which characterises the equilibrium, is termed a **function of state** - that is, it is a quantity which assumes a definite value for a particular equilibrium state - and is called the **empirical temperature** t . (Here it might be noted that the word *empirical* means based on observation and experiment, not on theory.)

An equation of state relating p and V to this empirical temperature emerges also

$$\phi(p, V) = t.$$

All the combinations of p and V which correspond to a fixed value of the empirical temperature t may be found from experiment. Of these three quantities, any two are sufficient to define the equilibrium state completely. Lines of constant t plotted on a pressure - volume, (p - V), diagram are called **isotherms**.

At this stage, the empirical temperature looks nothing like what is normally called temperature. To place everything on a firm experimental foundation, a thermometric scale must be chosen. Once that is fixed for one system, it will be fixed for all others since all systems must have the same value of the empirical temperature when they are in thermal equilibrium.

Now consider a device which, in attaining thermal equilibrium with a physical system, disturbs that system to a negligible extent. Also, suppose that all its thermodynamic variables except one are constrained to practically fixed values. When this device is allowed to reach thermal equilibrium with a system, ideally its variable characteristic is a strictly increasing or strictly decreasing function of the empirical temperature. Hence, the device may be calibrated to read temperature directly and is a *thermometer*. If a gas is used as the medium, the thermometer may be of the constant volume or constant pressure variety.

It might be noted that the notions of 'hot' and 'cold' may be associated with high and low temperatures respectively - but the reverse may be true equally well. As yet, it is not required to restrict the choice of an empirical temperature and so, both possibilities must be allowed.

(ii) The First Law.

A simple straightforward statement of this law has been given already; that is,

Energy is conserved when heat is taken into account.

However, to give real meaning to this, heat, energy and work must be defined clearly. The first two have been met already but what about work? Work has a different meaning in science from its everyday one. In fact, work is done when a force moves, so that, if someone lifts a pile of books, work is done since the force acting on the books actually moves; but, if someone simply holds a pile of books, no work is done because, although an upward force is exerted, no motion results and the force does not move. The amount of work done in this simple example will depend on both the number of books to be lifted and the height through which they are lifted. Hence, work is measured by the product of the force acting and the distance moved in the direction of the force. In mathematical terms, therefore, if a force \mathbf{F} acts on a body which is moving along the path $\mathbf{r} = \mathbf{r}(t)$, the work done in a small displacement $d\mathbf{r}$ is defined to be $\mathbf{F} \cdot d\mathbf{r}$, and so the total work done in moving the body from $\mathbf{r} = \mathbf{r}_1$ to $\mathbf{r} = \mathbf{r}_2$ is given by

$$W = \int_{\mathbf{r}_1}^{\mathbf{r}_2} \mathbf{F} \cdot d\mathbf{r}$$

and when work is done *on* a body, the energy of that body is increased. Now consider a few examples:

The work done in compressing a fluid.

When work is done on a fluid, the work done is regarded *by convention* as being positive. Then, since the volume decreases when mechanical work is done to compress the fluid, the work done is

$$W = - \int p dV$$

where p is the pressure of the fluid and V is the volume. Note that, if the fluid does work by expanding, the work done on the surroundings is positive and that done on the fluid is negative. Hence, the sign of the volume increment is important. Also, it is vitally important to realise that this expression for work done is a special case; it is certainly **not** a generally valid expression.

Work done on a charge q by an electric field.

In this case, if the electric field is \mathbf{E} and the charge moves through a distance $d\mathbf{r}$, the work done is given by

$$dW = q\mathbf{E} \cdot d\mathbf{r}$$

Work done by a magnetic field.

In this case, if \mathbf{B} is the magnetic field and \mathbf{m} the magnetic dipole moment, an increment of work done by the magnetic field is given by

$$dW = B.dm$$

These are simply examples quoted to illustrate the different forms taken by the expression for the work done in a variety of cases; it isn't always given by $p.dV$. It may be noted that, in each case, the work done is the product of a generalised force X and a generalised displacement dx , so that

$$dX = X.dx.$$

Now consider an isolated system in which there is no thermal interaction with the surroundings. It is a 'fact of experience' that, if work is done on the system in some way, the system attains a new equilibrium state and it does not matter how the work which achieves this is done: for example, a gas may be compressed, or stirred, or have an electric current passed through it. It was one of Joule's great contributions to thermodynamics to demonstrate experimentally that this is the case. The result is that energy is given to the system during the process and, since no thermal interaction is involved, the process is said to be **adiabatic**. It follows that, if a system is caused to change from some initial state to a final state by adiabatic means, the work done is the same no matter how it is done.. Hence, there must exist a function of the coordinates of the system whose value in the final state minus its value in the initial state equals the work done in going from one state to the other. This function of state is called the **internal energy** and is denoted by U . For the isolated system

$$W_a = U_2 - U_1$$

where U_2 and U_1 are the final and initial values respectively of the internal energy and W_a is the work done in this adiabatic process; the suffix a indicating that the process is adiabatic.

Suppose now that the system is not isolated as above but that thermal interaction between the system and its surroundings is allowed. In this case, the system may be taken from the state with internal energy U_1 to that with internal energy U_2 by a process which is not necessarily adiabatic. Such a process may be achieved by performing work which may be mechanical - for example, the use of a stirrer, or non-mechanical - for example, the use of a heating element, or a combination of the two. Let W_{na} denote the mechanical work done on the system in a process which is not necessarily adiabatic; the suffices na indicating that the process is not necessarily adiabatic. Then

$$W_a - W_{na} = Q$$

and for all such processes

$$Q + W_{na} = U_2 - U_1 \quad (a)$$

Here Q is zero for adiabatic processes only. In a non-adiabatic process, Q may be thought of as making up the deficit of mechanical work by heat. Hence, the amount of heat is defined in terms of mechanical work only. The convention adopted is that positive values of Q will mean heat supplied to the system. Also, it should be noted that, although it has not been stated explicitly, attention has been confined to **closed** systems; that is, systems which do not transmit mass to, or receive mass from, the surroundings. On occasions, it proves useful to consider equation (a) written in differential form:

$$dQ = dU - d'W.$$

Here dU is the difference in internal energy between the two states and is a differential of a function of state. However, $d'Q$ and $d'W$ are not differentials of functions of state - the system may be taken from state 1 to state 2 by adding different amounts of heat and mechanical work. The dashes on $d'Q$ and $d'W$ are to draw attention to this and to the fact that neither turns out to be an exact differential.

Consider now the idea of a so-called perpetual motion machine of the first kind. Such a machine would be a system which interacts with its surroundings only mechanically and does a positive amount of work on the surroundings during a closed transition; where a closed transition is one for which the initial and final states are the same, that is, $U_2 = U_1$. However, by equation (a), this is seen to be impossible to achieve since the simultaneous conditions $U_2 = U_1$ and $Q = 0$ are incompatible with $W_{na} > 0$. Hence, the First Law declares the impossibility of constructing perpetual motion machines of the first kind. The validity of the First Law is supported by the fact that, so far, all attempts to construct such machines have failed.

Although the results following will be familiar to many, it seems worthwhile to include these applications of the First Law for completeness of other arguments to follow:

Specific heat capacities.

As mentioned already, the internal energy, U , is a function of state and, for a two-coordinate system such as a perfect, or ideal, gas, properties may be described in terms of two other functions of state. Suppose the volume, V , and empirical temperature, t , are taken as these two independent variables so that

$$U = U(V, t)$$

and

$$dU = \left(\frac{\partial U}{\partial V} \right)_t dV + \left(\frac{\partial U}{\partial t} \right)_V dt.$$

Then, since, as was seen earlier, $d'W = -pdV$,

$$d'Q = \left(\frac{\partial U}{\partial t} \right)_V dt + \left\{ \left(\frac{\partial U}{\partial V} \right)_t + p \right\} dV.$$

The heat capacity at constant volume is given by

$$C_V = \left(\frac{\partial Q}{\partial t} \right)_V = \left(\frac{\partial U}{\partial t} \right)_V$$

and the heat capacity at constant pressure is given by

$$C_p = \left(\frac{\partial Q}{\partial t} \right)_p = \left(\frac{\partial U}{\partial t} \right)_V + \left\{ \left(\frac{\partial U}{\partial V} \right)_t + p \right\} \left(\frac{\partial V}{\partial t} \right)_p.$$

These expressions for the two heat capacities show how much the temperature rises for a given input of heat under the conditions of constant volume and constant pressure respectively. It will be found that both these quantities occur frequently in thermodynamic manipulations and calculations. However, the two expressions given do not refer to any particular volume or mass. Often it proves convenient to use the so-called *specific heat capacities* or *specific heats*, which are heat capacities per unit mass; that is

$$c_V = C_V/m \quad \text{and} \quad c_p = C_p/m.$$

It follows immediately from the above expressions for the two heat capacities that

$$C_p - C_V = \left\{ \left(\frac{\partial U}{\partial V} \right)_t + p \right\} \left(\frac{\partial V}{\partial t} \right)_p.$$

It might be noted at this stage that an ideal, or perfect, gas is one satisfying the equation

$$pV = Rt$$

where R is the gas constant for one mole of gas, and

$$\left(\frac{\partial U}{\partial V} \right)_t = 0,$$

this second equation in the definition of an ideal gas stemming from an experiment by Joule in which a compressed gas was released into a vacuum. Hence, for an ideal gas

$$C_p - C_V = p \left(\frac{\partial V}{\partial t} \right)_p = R.$$

It might be noted also that a *mole* is defined as the amount of substance that contains as many particles (whether atoms, ions or molecules) as exactly 12gms. of carbon-12. The number of atoms in 12gms. of carbon-12 is found by experiment to be 6.02×10^{23} ; a number known as Avogadro's constant, after the nineteenth century Italian chemist Amadeo Avogadro.

The enthalpy and the Joule-Kelvin expansion.

In the following discussion, p and t are taken to be the independent variables so that, here, U is of the form

$$U = U(p, t)$$

and

$$dU = \left(\frac{\partial U}{\partial p} \right)_t dp + \left(\frac{\partial U}{\partial t} \right)_p dt.$$

Then, as before

$$\begin{aligned} d'Q &= dU + pdV \\ &= \left(\frac{\partial U}{\partial p} \right)_t dp + \left(\frac{\partial U}{\partial t} \right)_p dt + pdV \end{aligned}$$

and

$$\begin{aligned}\left(\frac{\partial Q}{\partial t}\right)_p &= \left(\frac{\partial U}{\partial t}\right)_p + p\left(\frac{\partial V}{\partial t}\right)_p \\ &= \left(\frac{\partial(U + pV)}{\partial t}\right)_p.\end{aligned}$$

$(U + pV)$ is composed entirely of functions of state and so, must itself be a function of state. It is known as the **enthalpy**, is denoted by H and

$$H = U + pV.$$

It follows immediately that

$$C_p = \left(\frac{\partial Q}{\partial t}\right)_p = \left(\frac{\partial H}{\partial t}\right)_p.$$

The enthalpy often appears in flow processes and, in particular, occurs when discussing the Joule-Kelvin (*sometimes called the Joule-Thomson*) expansion process. In this process, gas at a relatively high pressure, say p_1 , is allowed to stream through a throttling valve into a region of lower pressure, say p_2 , in a continuous stream. The expansion through the valve is irreversible and, after emerging from the valve, the gas is in a state of turbulent flow. It soon comes to an equilibrium state at a lower pressure and is found to have changed its temperature. To make the approach to equilibrium as rapid as possible, the valve is replaced by a porous plug, which removes all irregular currents from the gas before it emerges. It is necessary to obtain a steady flow and to measure the pressure and temperature differences on the two sides of the plug. If the pressure and temperature changes are Δp and Δt respectively, the Joule-Kelvin coefficient is defined to be $\Delta t / \Delta p$.

The change actually takes place at constant enthalpy and the Joule-Kelvin coefficient is $(\partial t / \partial p)_H$.

Adiabatic expansion.

In an adiabatic expansion, the volume of the gas changes with *no* thermal contact between the system and its surroundings. An important point to note about processes of this type is that they proceed very slowly so that the system passes through an infinite number of equilibrium states in passing from the initial state to the final state. Obviously these processes are ideal and cannot actually occur in practice. However, it is vital to realise that such processes can be approximated to very closely, so considering them is not too far removed from reality. Consider the expansion to be for an ideal gas for which, as seen earlier,

$$pV = Rt \quad \text{and} \quad C_p - C_v = R.$$

Then, the First Law gives

$$dU + pdV = d'Q = 0.$$

Also, since for an ideal gas

$$\begin{aligned}(\partial U / \partial t)_t &= 0, \\ C_v &= (\partial U / \partial t)_v \Rightarrow dU = C_v dt.\end{aligned}$$

Hence, equation (3.6) leads to

$$0 = C_v dt + pdV = C_v dt + (Rt/V)dV$$

or

$$\left(\frac{C_v}{C_p - C_v}\right) \frac{dt}{t} = -\frac{dV}{V}$$

that is

$$\frac{1}{\gamma - 1} \frac{dt}{t} = -\frac{dV}{V}$$

where γ is the ratio of the constant pressure and constant volume heat capacities.

Integrating this last equation gives

$$Vt^{1/(\gamma-1)} = \text{constant}$$

or, more familiarly,

$$pV^\gamma = \text{constant},$$

where, once again, $pV = R\theta$ has been used.

(iii) The Second Law.

As mentioned earlier, the Second Law itself has been stated in various ways but probably the two most common forms are those due to Lord Kelvin (William Thomson) and Rudolf Clausius:

Kelvin:

It is impossible to transform an amount of heat completely into work in a cyclic process in the absence of other effects.

Clausius:

It is impossible for heat to be transferred by a cyclic process from a body to one warmer than itself without producing other changes at the same time.

As may be seen in most thermodynamics' text-books, these two statements of the Second Law were thought to be equivalent. Also, it may be noted that, in previous section, the idea of a perpetual motion machine of the first kind was introduced and it was noticed that the existence of such a machine is prohibited by the First Law. It might be noted at this point that the idea of a machine which, in a cyclic process, converts an amount of heat *completely* into work has been suggested also. Such a machine, if permissible, would prove an extremely attractive proposition since it could be used to cool both the deserts and oceans and so provide a huge supply of energy for man's use. However, such a machine is prohibited by the Second Law, as is seen by glancing at the above statement of that law due to Kelvin. These machines, which are still sought by some people, are often called *perpetual motion machines of the second kind*.

These forms of the law are those used at the birth of thermodynamics as a subject in its own right. As mentioned already, the laws were deduced from experiment and observation, and many of the ideas were borrowed from engineering. The notions and experiences of the engineer were used to obtain the laws of heat transformation and it is a tremendous achievement that a theory with many highly abstract concepts should be established by this approach. However, the approach to be adopted here is more mathematical in nature than some earlier arguments and is a modification of the method introduced at the beginning of this century by the mathematician Constantin Carathéodory. Carathéodory became interested in the problem of the formulation of thermodynamics at the instigation of his colleague, the physicist Max Born, and his highly mathematical original paper appeared in 1909. Because of the mathematical complexities of his approach, his work passed largely unnoticed, until the post-war work of such as Buchdahl, Landsberg, Turner and Zemansky made it far more accessible to scientists in general. Here, as a starting point, the Kelvin formulation of the Second Law will be used rather than the more abstract principle of Carathéodory. However, before proceeding with a discussion of the Second Law and its consequences, it is necessary to consider what is meant by a *quasistatic* process but first, the meaning of thermodynamic equilibrium must be introduced.

A system in *thermodynamic equilibrium* must satisfy three requirements:

mechanical equilibrium means there are no unbalanced forces acting on any part of the system or on the system as a whole.

thermal equilibrium means there are no temperature differences between parts of the system or between the system and its surroundings.

chemical equilibrium means there are no chemical reactions within the system.

If a system is in thermodynamic equilibrium and the surroundings are kept unchanged, no motion will take place and no work will be done. If the situation is changed so that a finite unbalanced force acts on the system, then the system may proceed from one state to another but, in so doing, *may* pass through non-equilibrium states. A *quasistatic process* is an idealised process during which the system passes only

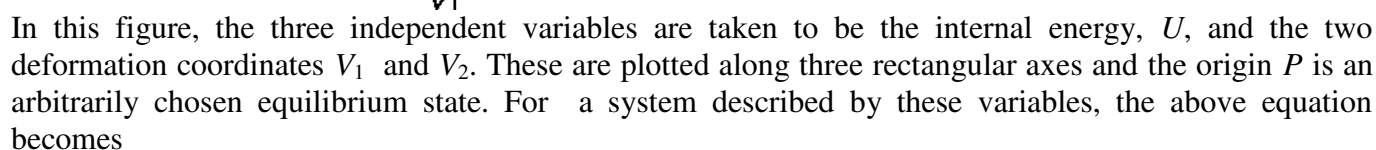
Generalising some earlier results to systems of more than two coordinates, it may be noted that a typical increment of non-thermal energy given in a quasistatic change to its surroundings *by* a system of interest has the form

where some, or all, of the a 's are 'external parameters' or 'generalised deformation coordinates' and the p 's are the corresponding generalised forces. (Here, by 'deformation coordinate' is meant a coordinate, such as volume, whose change implies an alteration or deformation in the size and/or shape of the system). Certain 'internal variables' may be included also among the a 's but it is found necessary merely that the internal energy, U , and the a 's form a complete set of independent variables for the system: for example, in the case of a gas, a typical increment of quasistatic mechanical work done by the gas is $p dV$, where dV is the increment of volume swept through by a piston at pressure p .

is valid for a quasistatic process. This gives an expression for an increment of heat added to a system. Only infinitesimal changes are required to make a quasistatic process proceed through the same continuum of equilibrium states in reversed time order and so quasistatic processes are *reversible*.

At this point it proves convenient to restrict considerations to a three-coordinate system; that is, a system described by three independent variables. This is done for two reasons:

all conclusions concerning the mathematical properties of $d'Q$ will hold equally well for systems with more, or less, independent variables.



$$d'Q = dU + p_1 dV_1 + p_2 dV_2.$$

Suppose that f_1 is an equilibrium state the system may reach from P by a quasistatic adiabatic process. Through f_1 construct a line L , at every point of which the values of V_1 and V_2 are constant; that is, L is a line of constant deformation. Let f_2 be any other equilibrium state on this line. It will be proved now that only one of f_1 and f_2 may be reached from P by a quasistatic adiabatic process - not both!

First it is assumed that both of the paths $P \rightarrow f_1$ and $P \rightarrow f_2$ are quasistatic adiabatic and it will be shown that this assumption leads to a contradiction of the Kelvin form of the Second Law. Let the system start at P , proceed to f_1 , then to f_2 , and finally back to P along the path $f_2 \rightarrow P$. Since the process $P \rightarrow f_2$ is merely a sequence of equilibrium states, the sequence $f_2 \rightarrow P$ may be treated as a quasistatic adiabatic process also. Since f_2 lies above f_1 , in passing from f_1 to f_2 the system undergoes an increase in energy at constant V_1 and V_2 , during which process no work is done. From the First Law it follows that a quantity of heat Q must be absorbed in the process $f_1 \rightarrow f_2$. However, in the two quasistatic adiabatic processes, no heat is transferred but an amount of work W is done. In the complete cycle $P \rightarrow f_1 \rightarrow f_2 \rightarrow P$ there is no resultant change in energy and so $Q = W$. Hence, the system has performed a cycle in which the sole effect is the absorption of heat and the conversion of this heat completely into work. Since this violates the Kelvin statement of the Second Law, it follows that both f_1 and f_2 may not be reached from P by quasistatic adiabatic processes; only one point, say f_1 , on a line of constant V_1 and V_2 (that is, a line of constant deformation) may be reached from P by a quasistatic adiabatic process.

This argument may be repeated for displaced lines L', L'', \dots parallel to L and the point f_1 is seen to trace out a surface on which P itself must lie. The complete argument may be repeated for different initial states P and the (U, V_1, V_2) space is found to be decomposed into a family of non-intersecting surfaces. These surfaces may be labelled by a continuously varying parameter ϕ - called the **empirical entropy** - such that distinct values of ϕ refer to distinct surfaces, and conversely. It may be noticed that any two points in a particular surface are connected by quasistatic adiabatic processes but this is *not* so for points in different surfaces.

The method of construction of the so-called level surfaces implies that each quasistatic adiabatic process lies in one such surface. Now use is made of the fact that the decomposition of the space into a family of level surfaces is equivalent mathematically to saying that there exists a function $\lambda(U, V_1, V_2)$ of the thermodynamic variables such that, for quasistatic processes, $d'Q = \lambda d\phi$, where $d\phi$ is the exact differential of the empirical entropy. This may be seen as follows:

Consider a family of surfaces

$$\phi(y_1, y_2, y_3) = c.$$

Such a family has been obtained for the case in question and for each value of c , within some continuous range, one surface is selected. For each increment of a line in such a surface

$$d'Q = \sum_{j=1}^3 X_j(y_1, y_2, y_3) dy_j = 0$$

where the expression for $d'Q$ is just an alternative way of writing (1.4.3); in other words, the notation has been changed for convenience because of that which follows but the two are linked as indicated below:

$$dU \rightarrow dy_1, 1 \rightarrow X_1; dV_1 \rightarrow dy_2, p_1 \rightarrow X_2; dV_2 \rightarrow dy_3, p_2 \rightarrow X_3.$$

However, for distinct surfaces, $d'Q$ does not equal zero; that is, for a line element connecting two infinitesimally close surfaces $d'Q$ does not equal zero.

Any element ds of a line describing a quasistatic change satisfies two equations. Write

$$ds = (dy_1, dy_2, dy_3), \mathbf{R} = (X_1, X_2, X_3).$$

Then, from the condition for a quasistatic adiabatic change

$$d'Q = \mathbf{R} \cdot ds = 0.$$

Also, due to the existence of a family of level surfaces

$$\mathbf{R}' \cdot ds = 0$$

where $\mathbf{R}' = (\partial\phi/\partial y_1, \partial\phi/\partial y_2, \partial\phi/\partial y_3)$.

This result follows easily on differentiating $\phi(y_1, y_2, y_3) = c$.

Hence, at *each point* P in the space, any element ds of a line in a surface $\phi(y_1, y_2, y_3) = c$ is orthogonal to two vectors, \mathbf{R} and \mathbf{R}' , whose directions are functions of the coordinates of P . It follows that, throughout the simultaneous range of definition of the vectors \mathbf{R} and \mathbf{R}' , these are parallel vectors and they are perpendicular to the element of surface at P . Therefore, there exists a scalar function of position, λ , such that

$$\mathbf{R} = \lambda \mathbf{R}'.$$

Then

$$d'Q = \mathbf{R} \cdot d\mathbf{s} = \lambda \mathbf{R}' \cdot d\mathbf{s} = \lambda d\phi.$$

It should be noted that, for quasistatic adiabatic processes, $d\phi = 0$ since such processes are confined to surfaces of constant ϕ but, of course, this is not true of processes in general.

According to equation (1.4.3), the three independent thermodynamic variables are the internal energy and two deformation coordinates V_1 and V_2 . It must be shown next that the empirical temperature, t , depends on at least one of V_1 and V_2 . Certainly t must depend on at least one of the three variables mentioned; otherwise there would be *four* independent variables for the three dimensional space described. Hence, suppose t to be a function of the internal energy, U , alone. If this is the case, arbitrary variations in the remaining variables will leave t and, therefore, the internal energy unaltered. Such arbitrary variations are not restricted if the system is enclosed adiabatically. However, if this is the case, it implies that both $d'Q$ and dU equal zero in the equation

$$d'Q = dU - d'W$$

for all changes of V_1 and V_2 . Hence, by the First Law, $d'W$ must be zero also for all such changes. This implies the existence of a relation between the supposedly independent V_1 and V_2 , which is contrary to hypothesis. Therefore, any empirical temperature must depend on at least one of the variables V_1 and V_2 . It will be assumed that the empirical temperature does, in fact, depend on V_1 and, in expressions involving V_1 , the empirical temperature may be introduced by virtue of this relation.

Now write $d'Q = \lambda d\phi$, where λ is an integrating factor and $d\phi$ an exact differential. Then

$$\begin{aligned} d'Q &= dU + p_1 dV_1 + p_2 dV_2 \\ &= \lambda \frac{\partial \phi}{\partial U} dU + \lambda \frac{\partial \phi}{\partial V_1} dV_1 + \lambda \frac{\partial \phi}{\partial V_2} dV_2. \end{aligned}$$

Hence,

$$\lambda \frac{\partial \phi}{\partial U} = 1; \lambda \frac{\partial \phi}{\partial V_1} = p_1; \lambda \frac{\partial \phi}{\partial V_2} = p_2.$$

This equation shows that $\partial \phi / \partial U$ is non-zero; and so ϕ may be used instead of U as one of the independent thermodynamic variables.

Now consider the thermal equilibrium of two systems, each described by three independent variables. It might be noted at this point that attention has been confined to systems described by just three independent variables since, as mentioned earlier, any results obtained for such systems will apply also to systems described by more than three independent variables. Again, in what follows, the two systems could be described by different numbers of independent variables but, here, attention will be restricted to the simplest case; - although the extension to higher numbers of independent variables is quite easy and straightforward once the technique involved is grasped. Hence, suppose the variables corresponding to the two systems are

$$t', \phi', V_2' \text{ and } t'', \phi'', V_2''.$$

Thermal equilibrium means that $t' = t'' = t$, say. As has been shown already, an integrating factor exists for each system. This result may be applied to each system separately and also to the joint system. Using

$$d'Q = d'Q' + d'Q''$$

for the increment of thermal energy supplied to the combined system by quasistatic processes, it follows that

$$\lambda d\phi = \lambda' d\phi' + \lambda'' d\phi''.$$

Also, $d\phi$ may be expressed in terms of all the independent variables used to describe the composite system:

$$d\phi = (\partial\phi/\partial t)dt + (\partial\phi/\partial\phi')d\phi' + (\partial\phi/\partial\phi'')d\phi'' \\ + (\partial\phi/\partial V_2)dV_2 + (\partial\phi/\partial V_2'')dV_2''.$$

From these latter two equations, it follows that

$$\partial\phi/\partial\phi' = \lambda'/\lambda ; \quad \partial\phi/\partial\phi'' = \lambda''/\lambda ;$$

and

$$\partial\phi/\partial t = \partial\phi/\partial V_2' = \partial\phi/\partial V_2'' = 0.$$

Then,

$$\partial^2\phi/\partial\phi'\partial t = \partial^2\phi/\partial\phi''\partial t = 0$$

that is

$$\frac{\partial}{\partial t}\left(\frac{\lambda'}{\lambda}\right) = \frac{\partial}{\partial t}\left(\frac{\lambda''}{\lambda}\right) = 0.$$

As was first noted by Born, this implies

$$\frac{1}{\lambda'}\frac{\partial\lambda'}{\partial t} = \frac{1}{\lambda''}\frac{\partial\lambda''}{\partial t} = \frac{1}{\lambda}\frac{\partial\lambda}{\partial t}.$$

Here λ' depends on t and on variables associated with the first system; whereas λ'' depends on t and variables associated with the second system. Hence, each expression in this last equation must be a function of t only, $g(t)$ say. $g(t)$ is a universal function of the chosen empirical temperature scale. If a positive function λ is an integrating factor, then a corresponding negative function $-\lambda$ is an integrating factor also and both choices lead to the same function $g(t)$. No special assumptions will be made concerning the sign of λ .

Integration shows that the integrating factor has the form

$$\lambda'(t, \phi', V_2') = \Phi'(\phi', V_2') \exp \int_{t_0}^t g(x) dx$$

or

$$\lambda''(t, \phi'', V_2'') = \Phi''(\phi'', V_2'') \exp \int_{t_0}^t g(x) dx.$$

Here t_0 is a standard empirical temperature which is assumed to be the same for all physical systems. At $t = t_0$,

$$\lambda'(t_0, \phi', V_2') = \Phi'(\phi', V_2') \quad \text{and} \quad \lambda''(t_0, \phi'', V_2'') = \Phi''(\phi'', V_2'').$$

It is seen that the integrating factor for the combined system may be written in this form also.

If now, not only t_0 , but also a constant C are given for a whole class of physical systems, then

$$d'Q = \lambda d\phi = TdS,$$

where

$$T(t) = C \exp \int_{t_0}^t g(x) dx$$

and

$$S(\phi) = C^{-1} \int_{\alpha}^{\phi} \Phi(\phi, V_2', V_2'') dy.$$

Here α refers to a standard value of ϕ for the particular system under discussion, and the value $\phi = \alpha$ has the property that $S(\alpha) = 0$. T is called the **absolute temperature** and depends only on t_0 and the empirical temperature t , while S is called the **entropy** and depends on the variables V_2' , V_2'' , the function ϕ and the value $\phi = \alpha$.

Therefore, if the process under consideration is *quasistatic*, it is seen that the equation

$$d'Q = TdS$$

holds. This is one of the most important equations occurring in thermodynamics; indeed, it is one of the most important equations in physics!

At this point, it does not seem unreasonable to ask "What is entropy?". Most people feel they have some intuitive idea concerning what is meant by temperature, heat, flow of heat, and many other concepts which, although met in everyday life, are seen to be parts of thermodynamics. Entropy seems different. Whichever approach is adopted, the introduction of entropy appears to be due to a purely mathematical manipulation. However, entropy is not simply a hazy, mathematical concept; it is, rather, a measurable, physical quantity - for example, when a substance is taken from one state to another by a series of small, quasistatic steps, the increase of entropy is found by dividing the quantity of heat supplied in each of these steps by the temperature at which it was supplied and then summing all these small contributions.

When the absolute temperature has been defined as above, one question remains; - what form does the equation of an ideal gas take in terms of T ?

In terms of t , the equation of an ideal gas is

$$pV = Rt$$

as was mentioned in section (ii). Also, from the well-known Joule - Kelvin experiment, it is known that the internal energy is independent of volume; that is, $U = U(t)$.

Therefore,

$$\begin{aligned} d'Q &= dU + pdV \\ &= \frac{dU}{dt} dt + \frac{t}{V} dV \\ &= t \left\{ \frac{1}{t} \frac{dU}{dt} dt + d(\log V) \right\} \end{aligned}$$

or, if χ is defined by

$$\log \chi = \int \frac{1}{t} \frac{dU}{dt} dt$$

then

$$d'Q = t d(\log \chi V).$$

Therefore, $1/t$ may be chosen as integrating factor: that is, if we choose $t = \lambda$ and $\log \chi V = \phi$, the latter equation becomes

$$d'Q = \lambda d\phi.$$

Also, it has been shown that

$$g(t) = \frac{\partial \log \lambda}{\partial t}$$

is a universal function; the same however the integrating factor is chosen. From this, it follows that

$$\lambda = \exp \int_{t_0}^t g(x) dx.$$

Hence,

$$T = C \exp \int_{t_0}^t g(x) dx = C \lambda = Ct.$$

Therefore,

$$pV = RT/C.$$

Hence, absolute temperature is proportional to empirical temperature.

Using the Kelvin form of the Second Law, the equation

$$d'Q = TdS$$

has been derived. The actual derivation is rather long and involved. However, it might be noted that the derivation may be split into three distinct parts:

- (a) showing that the thermodynamic phase space may be decomposed into a family of level surfaces which may be labelled by a continuously varying parameter ϕ ,
- (b) showing that a consequence of (1) is the existence of an integrating factor for the inexact differential $d'Q$,
- (c) proceeding to introduce the absolute temperature, T , and the entropy, S .

One final point worth emphasising is that, in all this discussion based on the Second Law, the change in the function called entropy may be noted to be irrevocably linked to a change in heat. In classical thermodynamics, the entropy change has absolutely no link whatsoever with any statistical ideas. This is something worth bearing in mind for what follows later.

(iv) The Third Law.

For the sake of completeness, it seems sensible to include a brief mention of the Third Law which states that

The contribution to the entropy of a system by each aspect which is in internal thermodynamic equilibrium tends to zero at the absolute zero of temperature.

One of the most important generalisations which may be made from this law is that *the specific heats of all substances tend to zero at absolute zero*. This statement will not be discussed further here but it is known experimentally that all specific heats do tend to zero at the absolute zero of temperature. The vanishing of the specific heats is of great importance since it allows the use of absolute zero as a reference level for all thermodynamic calculations. As has been seen already, the definition of entropy is based on the Second Law but is sufficient to define differences of entropy only. Thus, if S_T and S_0 are the entropies of a substance in thermodynamic equilibrium at temperatures T and zero respectively,

$$S_T - S_0 = \int_0^T \frac{CdT}{T}.$$

Since the specific heat tends to zero at absolute zero, this integral is finite. Hence, by stating that S_0 is zero for all simple substances, the Third Law allows a unique value to be allotted to the entropy at any temperature:

$$S_T = \int_0^T \frac{CdT}{T}.$$

Strictly speaking, the accurate statement of the Third Law is that given above which, stated more simply, is that the entropy of every system at absolute zero may be taken equal to zero. However, another commonly used form is the so-called **unattainability principle**, which states that **it is impossible to cool any substance to the absolute zero of temperature**. It is interesting to note that this statement has never been violated experimentally, although, as long ago as 1960, by using nuclear cooling techniques, Kurti did succeed in reaching a temperature of 10^{-6} degrees, and even lower temperatures have been recorded more recently.

The question of whether the principle of unattainability implies the vanishing of the entropy at absolute zero will be examined now. Consider a quasistatic adiabatic change between two states of a system brought about by varying some external parameter from a value α to a value β . The system passes from a state with temperature T_1 and entropy S_1^α to a state with temperature T_2 and entropy S_2^β .

Using the Second Law,

$$S_1^\alpha = S^\alpha(0) + \int_0^{T_1} \frac{C_\alpha}{T} dT,$$

$$S_2^\beta = S^\beta(0) + \int_0^{T_2} \frac{C_\beta}{T} dT,$$

where $S^\alpha(0)$ and $S^\beta(0)$ are the entropies at absolute zero. For a quasistatic adiabatic change, $S_2^\beta = S_1^\alpha$, so that

$$S^\beta(0) + \int_0^{T_2} \frac{C_\beta}{T} dT = S^\alpha(0) + \int_0^{T_1} \frac{C_\alpha}{T} dT.$$

Thus, if T_2 is to be zero,

$$\int_0^{T_1} \frac{C_\alpha}{T} dT = S^\beta(0) - S^\alpha(0).$$

This equation gives the value of T_1 which will lead to an end temperature of absolute zero. It has a real solution provided the right-hand side is positive. However, if absolute zero is unattainable from any temperature T_1

$$S^\alpha(0) \geq S^\beta(0).$$

If the same transition is used now in the reverse direction to reach a temperature $T_1 = 0$ from an initial temperature T_2 , the argument would lead to the inequality

$$S^\alpha(0) \leq S^\beta(0).$$

Hence, it follows that

$$S^\alpha(0) = S^\beta(0).$$

The restriction on a system implied by the unattainability principle is that entropy *differences* between different states of the system disappear at the absolute zero of temperature. It is *not* necessary for the entropies themselves to vanish.

3. Some Extensions of the Theory.

(i) Extension to open systems.

The simplest thermodynamic systems are two-coordinate systems; that is, they have two independent variables. For example, a gas may be considered and the internal energy, U , and volume, V , taken as independent variables. Then, for any increment of a quasistatic process,

$$TdS = dU + pdV,$$

where p is the pressure, holds. If the system is split up into various parts, this equation may be generalised to allow for several pressures p_i and external parameters V_i , since the pressure need not be uniform throughout the volume of the gas. If there are r external parameters, let \mathbf{p} and $d\mathbf{V}$ represent the appropriate r -dimensional vectors so that

$$TdS = dU + \mathbf{p} \cdot d\mathbf{V}.$$

So far, systems under consideration have been supposed *closed* - that is, unable to exchange matter with their surroundings. However, at times it becomes necessary to consider *open* systems, which may exchange matter with their surroundings, and increments of processes whose end-points are non-equilibrium states. One way of generalising previous results to cover this new situation is to consider an r - coordinate, χ - component simple thermodynamic system. A state of such a system may be specified uniquely in terms of an internal energy function, U , r external parameters V_1, V_2, \dots, V_r , and χ additional independent variables x_1, x_2, \dots, x_χ such that the entropy of the system is defined to satisfy

$$S(aU, aV_1, \dots, aV_r, ax_1, \dots, ax_\chi) = aS(U, V_1, \dots, V_r, x_1, \dots, x_\chi)$$

for all positive a .

At this stage, the new variables x_i may be thought of as supplementing the information provided by knowledge of the internal energy and of the external parameters (or deformation coordinates) V_i ; that is, they may be regarded as providing additional information about the internal state of the system.

Any thermodynamic function f which may be expressed in terms of a complete set of independent thermodynamic variables X_1, X_2, \dots such that

$$f(aX_1, aX_2, \dots) = af(X_1, X_2, \dots)$$

is called an **extensive** variable in thermodynamics; mathematically, it is a homogeneous function of degree one.

If the relation

$$f_0 = f(X_1, X_2, \dots)$$

may be solved for X_i , suppose the solution is

$$X_i = g_i(X_1, \dots, X_{i-1}, f_0, X_{i+1}, \dots).$$

Then the solution of

$$af_0 = f(aX_1, aX_2, \dots)$$

will be

$$aX_i = g_i(aX_1, \dots, aX_{i-1}, af_0, aX_{i+1}, \dots)$$

and from these latter two equations, it follows that X_i is also an extensive variable. Hence, it follows from (1.7.2) that $S, U, V_1, \dots, V_r, x_1, \dots, x_\chi$ are **all** extensive variables.

This introduction to the idea of extensivity is somewhat abstract and it is not clear what it means in simple physical terms. Hence, consider two identical systems and suppose they are taken together as a single system. The value of the volume for the composite system is twice that for a single subsystem; and similarly for the value of the total number of particles - in the composite system, its value is twice that for a subsystem. Parameters which have values in a composite system equal to the sum of the values in each of the subsystems - that is, parameters which depend on the *extent* of the system - are called **extensive parameters**. Parameters which are not extensive are said to be **intensive**. There can be little doubt that knowledge of these two terms is not vital to an understanding of thermodynamics - both are merely pieces of jargon - but the words do occur fairly frequently in the literature surrounding the subject, so having met them can prove useful.

For a simple, one-coordinate, one component system, equation the above equation becomes

$$S(aU, aV, aN) = aS(U, V, N). \quad (a)$$

This equation refers to a system consisting of one type of particle only; V represents volume and N number of particles. Also, as usual, U represents the internal energy.

Now, for such a system,

$$TdS = T\left(\frac{\partial S}{\partial U}\right)_{V,N} dU + T\left(\frac{\partial S}{\partial V}\right)_{N,U} dV + T\left(\frac{\partial S}{\partial N}\right)_{U,V} dN.$$

It is **convention** to use the following definitions:

$$T\left(\frac{\partial S}{\partial U}\right)_{V,N} = 1, T\left(\frac{\partial S}{\partial V}\right)_{N,U} = p, T\left(\frac{\partial S}{\partial N}\right)_{U,V} = -\mu,$$

where μ is called the *chemical potential* and, as usual p is the pressure.

These definitions may be seen to be correct dimensionally and, using them, the earlier equation becomes

$$TdS = dU + pdV - \mu dN. \quad (b)$$

This equation applies to the general case of varying particle number. In the special case when the number of particles is constant ($dN = 0$), this equation takes the form

$$TdS = dU + pdV.$$

However, it is important to realise that the derivation of this equation given here is a purely mathematical one based on the definition of the entropy introduced in earlier. It is found in practice that equations such as this do, in fact, apply in genuine physical situations and it is that, and to a certain extent, that alone,

which justifies the equation as derived in the approach adopted here. In general, it is important to realise that, beautiful as some mathematical deductions may be, their relevance in physics is determined solely by their success in describing the physical events, they purport to describe, accurately.

The increment

$$d'W = pdV - \mu dN$$

is referred to as the generalised increment of work done by the system. This concept of generalised work done includes the work, μdN , which is, in a sense, internal to the system.

The most important properties of simple thermodynamic systems may be established now. However, for simplicity, attention will be confined to a simple, one-coordinate, one-component system and so, equation (a) will be the starting point for the manipulations. Hence, first differentiate (a) with respect to a to give

$$S = \left(\frac{\partial \mathcal{S}}{\partial (aU)} \right)_{V,N} U + \left(\frac{\partial \mathcal{S}}{\partial (aV)} \right)_{N,U} V + \left(\frac{\partial \mathcal{S}}{\partial (aN)} \right)_{U,V} N.$$

Since (a) holds for all a , it must hold for $a = 1$ and so, the above equation becomes

$$S = \frac{1}{T} (U + pV - \mu N)$$

or

$$TS = U + pV - \mu N,$$

where the earlier definitions have been used.

This equation is the **Euler relation** which links the extensive and intensive variables of a system.

Again, From the Euler relation it is seen that

$$TdS + SdT = dU + pdV + Vdp - \mu dN - Nd\mu.$$

Subtracting equation (b) from this result gives

$$SdT = Vdp - Nd\mu$$

or, more usually,

$$SdT - Vdp + Nd\mu = 0.$$

This is the well-known **Gibbs-Duhem relation** which can prove extremely useful in a number of thermodynamic manipulations. It is important to note that this relation shows that only two of the three intensive variables are independent.

Finally, consider generalised forms of the Euler relation and the Gibbs-Duhem relation. In this instance, consider a simple thermodynamic system described by n extensive variables, denoted by E_j , and $(n-1)$ intensive variables, denoted by I_j , so that the equations become

$$\sum_{j=1}^n E_j I_j = 0$$

where $I_1 = 1$ and

$$\sum_{j=1}^{n-1} E_j dI_j = 0$$

respectively.

In the Euler equation and the Gibbs-Duhem equation, the only non-zero E_j 's and I_j 's were, apart from sign, $E_1 = U$, $E_2 = S$, $E_3 = V$, $E_4 = N$ and $I_1 = 1$, $I_2 = T$, $I_3 = p$, $I_4 = \mu$.

Now differentiate the Euler relation with respect to E_r keeping I_i , for $i \neq k$, constant to give

$$\sum_{j=1}^n I_j \left(\frac{\partial E_j}{\partial E_r} \right)_X + E_k \left(\frac{\partial I_k}{\partial E_r} \right)_X = 0$$

where $X = \{I_j ; i \neq k\}$

However, from the Gibbs-Duhem relation,,

$$\left(\frac{\partial \mathcal{E}_k}{\partial \mathcal{E}_r} \right)_X = 0$$

and so, the equation above becomes

$$\sum_{j \neq r} I_j \left(\frac{\partial \mathcal{E}_j}{\partial \mathcal{E}_r} \right)_X + I_r = 0.$$

Using the Euler relation, this equation may be written

$$\sum_{j \neq r} \left\{ \left(\frac{\partial \mathcal{E}_j}{\partial \mathcal{E}_r} \right)_X - \frac{E_j}{E_r} \right\} I_j = 0.$$

In this equation, which holds for all values of r , the I_j are independent, and so

$$\left(\frac{\partial \mathcal{E}_j}{\partial \mathcal{E}_r} \right)_X = \frac{E_j}{E_r}.$$

This result relating to differentiating one extensive variable with respect to another while keeping the intensive variables constant proves to be of great use on several occasions.

(ii) The Second Law and Non-static Processes.

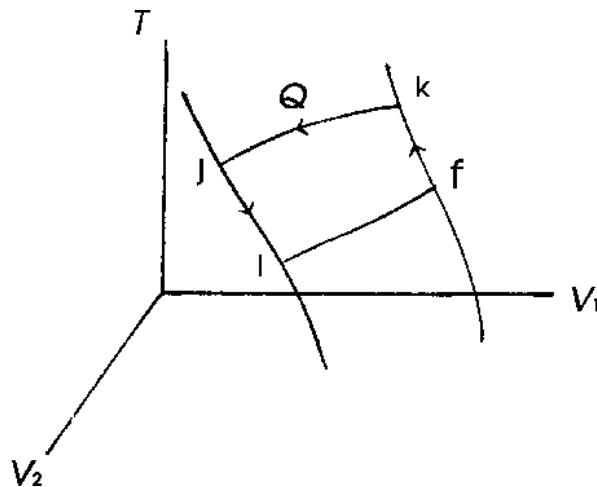
It has been seen earlier that, provided the process under consideration is quasistatic, the equation

$$d'Q = TdS$$

holds. It is necessary now to discuss briefly the status of non-static processes.

Referring back to the decomposition of what may be termed thermodynamic phase space into a family of level surfaces, it may be remembered that any two points in such a surface may be linked by a quasistatic adiabatic process. Also, any two points (or states) may be linked theoretically by an adiabatic process since all this means is that a system may proceed from one state to another without exchange of heat. However, if the two points (or states) lie in different level surfaces, the adiabatic process linking them cannot be quasistatic since this would imply $dS = 0$ for every increment of such a process. Hence, if the process is adiabatic, it must be non-static. To sum up, points (or states) with different entropy values cannot be linked by any quasistatic adiabatic process - only by a non-static adiabatic process. Of course, such states may be linked by a quasistatic process but, if it is quasistatic, it cannot be adiabatic - some exchange of heat with the surroundings must be involved.

Consider a system possessing three independent variables T , V_1 and V_2 and let this system be taken around the cycle illustrated in the figure.



Suppose the initial state of this system is i and suppose it undergoes a non-static adiabatic process to a state f , where i and f are both assumed to be equilibrium states of the system. Then, the entropy change is

$$\Delta S = S_f - S_i.$$

During this process, a temperature change may, or may not, have occurred. Whether it has or not, now suppose the system undergoes a quasistatic adiabatic process $f \rightarrow k$ to bring its temperature to that of some arbitrary heat reservoir at temperature T' . Since S_f and S_k are equal,

$$\Delta S = S_k - S_i.$$

The system may be brought into contact with the reservoir and caused to undergo an isothermal process $k \rightarrow j$ until its entropy is the same as it was initially. A quasistatic adiabatic process $j \rightarrow i$ returns the system to its initial state and, since S_j and S_i are equal.

$$\Delta S = S_k - S_j.$$

The only heat transfer, Q , that has taken place in the cycle is during the isothermal process where

$$Q = T'(S_j - S_k).$$

Also, a net amount of work, W , has been done in the cycle where

$$W = Q.$$

From the Second Law, it is clear that the heat Q cannot have entered the system - that is, Q cannot be positive - for then, the cyclic process would have been such as to produce no effect other than the extraction of heat from a reservoir and the performance of an equivalent amount of work. Of course, as discussed here, the first stage is the performance of work and heat results in the third stage. Evidently that heat must be produced as a result of the work done and so, this proposed cycle does involve the transfer of work into heat and not a Second Law violating transfer of heat into work.

Hence,

$$Q \leq 0,$$

from which it follows that

$$T'(S_j - S_k) \leq 0$$

or

$$\Delta S = S_k - S_j \geq 0.$$

Here it has been assumed that an entropy change is associated with the original non-static adiabatic process. If this were not so, it would be possible to return the system to state i by one quasistatic adiabatic process. Since the nett heat transferred in this cycle is zero, the nett work would be zero also. Under these circumstances, the system and its surroundings would have been restored to their initial states without producing changes elsewhere - implying that the original process was quasistatic. This is contrary to the original assertion, and so the entropy of the system cannot remain unchanged.

Again, the system considered was assumed homogeneous and of uniform temperature and pressure. If this were not so, it would be necessary to subdivide the system into parts - each one infinitesimal in an extreme case - and to ascribe a definite temperature and pressure to each part, so that each part would have a definite entropy depending on its coordinates. The entropy of the system as a whole would be defined to be the sum of the entropies of the various parts. If it is possible to return each part to its initial state in the manner described earlier, using the same reservoir for each part, it follows that ΔS is positive for the whole system.

The final result is that the entropy of a system in a given state cannot be decreased adiabatically for a thermodynamics in which the absolute temperature is positive and heat tends to flow from high to low absolute temperatures. This is a statement of the **principle of the increase of entropy** of systems in adiabatic enclosures.

It then follows that, if the entropy is a function of state, any process - not just an adiabatic one - linking the original two states will be accompanied by an increase in the value of the thermodynamic entropy.

However, it is vitally important to realise that this result is *derived* from the basic form of the Second Law; it is *not* an actual statement of the Second Law. Obviously, there are occasions when the entropy of a system does decrease; for example, in a cyclic situation, such as a Carnot cycle, if the entropy increases in one section, there must be a corresponding decrease in another to ensure a successful completion of the cycle. Also, from its actual derivation, it is immediately obvious that, if heat is added to

a system, the entropy change is *positive* while, if heat is taken from a system, the entropy change is *negative*. Hence, *at least as it stands with no stated limitations, claims that the principle of entropy increase is a statement of the Second Law are not accurate and could be misleading.*

4. Further Thoughts Occasioned by the Previous Chapters.

Except possibly for one or two isolated comments indicating what might follow in later chapters, the entire content of chapters 2 and 3 follows the normal course of development of thermodynamics. However, here no mention has been made of heat engines which played such an important part in the initial development of the subject but that is because the more analytical approach to the Second Law, originally due to Carathéodory and developed by such as Landsberg, has been adopted. The accepted development does, though, lead at a later stage to a few unasked and definitely unanswered questions. It is proposed now to consider some of these and, in order to aid an unbroken line of thought, some definitions and results which were considered in more detail earlier will be included again for completeness of the relevant section. Among these requoted pieces will be the modern wordings of the fundamental forms of the Second Law due to Kelvin and Clausius.

(i) Entropy, or Entropies, in Science?

As has been seen earlier, the idea of entropy, or at least its change, first arose in classical thermodynamics via deductions made from the basic traditional forms of the Second Law. Either the Kelvin or Clausius form of that law was used to show mathematically that the quantity representing a change in heat, $d'Q$, an inexact differential, possessed an integrating factor which was the absolute temperature $1/T$. The product $d'Q/T$ was then a total differential denoted by dS , and referred to as a change in entropy. At a later stage, when it became desirable to consider the properties of systems, particularly gases, with large numbers of particles, statistics were introduced and this led to the birth of statistical thermodynamics. Soon quantities in statistical thermodynamics were identified, not unreasonably, with quantities in classical thermodynamics but this identification seems to have been assumed valid, rather than actually proved valid. While all this was occurring, information theory was being developed separately but, in a classic book by Brillouin¹, an apparent link between statistical thermodynamics and information theory was established although this suggested link was hinted at by Shannon in his classic article of 1948. In all three areas, a function termed *entropy* appears but the question of whether or not these three are identical, or not, always seems to be being assumed, not proved. The background to each of these three *entropies* will be looked at in separate sections, before considering their possible inter-relationship.

(a) Classical Thermodynamics.

In the usual approaches to classical thermodynamics, the First Law; Energy is conserved when heat is taken into account, is often represented by the mathematical equation

$$d'Q = dU - d'W$$

where the three terms represent changes in heat, internal energy and work respectively. $d'Q$ and $d'W$ are not differentials of functions of state and the dashes indicate this and the fact that, mathematically, the first and third terms are inexact differentials.

The Second Law is then introduced into the discussion in one of its fundamental forms due to Kelvin or Clausius. As was seen in chapter 2, either of these forms, but usually that due to Kelvin, may then be used to show via a mathematical argument that the inexact differential $d'Q$ possesses an integrating factor which turns out to be the reciprocal of the absolute temperature, T . It is then customary to write

$$d'Q/T = dS$$

where dS simply represents the resulting exact differential. In the derivation, no direct physical interpretation is assigned to dS but, customarily, it is deemed to be the change in a quantity termed the entropy. However, here, *entropy* is simply the name given to the quantity represented by the symbol S but it should be noted that, in classical thermodynamics, the change in this quantity is irrevocably linked to a change in heat experienced by the system under consideration.

The equation representing the combined form of the First and Second Laws is then:

$$TdS = dU - d'W.$$

Again, if the work done in compressing a fluid is being considered, this equation takes on the familiar form:

$$TdS = dU + pdV,$$

where p and V represent the pressure and volume as usual. Note though that this is not the general form of the equation representing the combined First and Second Laws; it refers to a quite specific set of circumstances.

If attention is restricted to systems for which the entropy is an extensive variable then the discussion is easily extended² to open systems and again considering the special case of compression of a fluid, this latter equation becomes

$$TdS = dU + pdV - \mu dN, \quad (i)$$

where μ and N represent the chemical potential and number of particles respectively.

All of the preceding discussion is restricted to so-called quasi-static processes. If considerations are extended to include non-static processes, it may be shown – again as was seen earlier - that, for non-static adiabatic processes, one derives the inequality

$$dS \geq 0.$$

If the entropy, S , is a state function, this inequality is a statement of the principle of increase of entropy. However, it is vitally important to realise that this result is *derived* from the basic form of the Second Law; it is *not* an actual statement of the Second Law. Obviously, there are occasions when the entropy of a system does decrease; for example, in a cyclic situation, such as a Carnot cycle, if the entropy increases in one section, there must a corresponding decrease in another to ensure a successful completion of the cycle. Also, from its actual derivation, it is immediately obvious that, if heat is added to a system, the entropy change is positive while, if heat is taken from a system, the entropy change is negative. Hence, *at least as it stands with no stated limitations, claims that the principle of entropy increase is a statement of the Second Law are not accurate and could be thought misleading.* This is particularly true when it is remembered that there is controversy⁵ over whether the entropy is always a state function in classical thermodynamics.

(b) Statistical Thermodynamics.

In statistical thermodynamics, there are various approaches to introducing the topic but all seem to rely on equation (i) above to secure a link with the quantities of importance in classical thermodynamics. Hill devotes an entire section to the association of thermodynamic variables with quantities of statistical mechanics. His approach is to consider the various ensembles separately, to associate immediately the internal energy of classical thermodynamics with the ensemble average of the internal energy. He then proceeds to evaluate the expression for the total derivative of this ensemble average in terms of the independent variables appropriate for the ensemble under consideration and then to compare the resulting equation with equation (i) above. In this way, he is able to identify the entropy, S , as

$$S = -k \sum p \ln p \quad (ii)$$

where p represents the expression for the probability in the relevant ensemble. For example, this leads as far as the grand canonical ensemble is concerned to the identification

$$\frac{pV}{kT} = \ln \Xi,$$

where Ξ represents the grand partition function and, as usual, p represents the pressure, V the volume, k Boltzmann's constant, and T the absolute temperature. By noting further that, if F is the free energy

$$dF = -SdT - pdV + \mu dN,$$

where, additionally, μ represents the chemical potential and N the number of particles, then, once the expression for the pressure is known, those for the entropy, S , and number of particles, N , eventually follow from

$$S = V \left(\frac{\partial p}{\partial T} \right)_{V,\mu} \quad \text{and} \quad N = V \left(\frac{\partial p}{\partial \mu} \right)_{V,T}.$$

The relevant expression for the internal energy, U , then follows from

$$U = TS - pV + \mu N.$$

Hence, the expressions for all the important functions of classical thermodynamics follow by making use of well-known expressions from classical thermodynamics in what might appear to be a circular argument.

In this approach as in others in statistical mechanics/thermodynamics, there is no direct mention of any heat exchange at any point but it seems that, because equation (i) is assumed, success of sorts in linking classical thermodynamics with statistical mechanics/thermodynamics is assured. In reality though, it seems the entropy of classical thermodynamics is assumed the same as that of statistical mechanics/thermodynamics. However, the nature of the above quoted expression (ii) for the entropy in statistical mechanics/thermodynamics bears no obvious resemblance to that of classical thermodynamics. In classical thermodynamics, as stated already, the entropy is linked irrevocably with the change of heat; here the expression above indicates that the entropy of statistical mechanics/thermodynamics is, first and foremost, linked to a probability distribution. This is why the question of whether or not the two entropies are the same must arise.

It should be noted that, although there are only two fundamental categories of thermodynamic theories which are covered by the classical approach outlined in the first section of this article and the statistical or probabilistic approach being discussed briefly here, there are several approaches to this second approach. Another is beautifully outlined in the book by Lavenda. Basically he derives all the accepted results via use of Gauss' principle and extensive use of error laws; error laws which are discussed in minute detail in Keynes' book on probability. This rather elegant approach has much to commend it but, yet again, the link between probabilistic average values is made by assuming such – especially the entropy – are identical with the corresponding values in classical thermodynamics. Hence, the query raised in relation to the approach of Hill arises again and does so in all approaches to establishing a theory of statistical mechanics/thermodynamics.

However, it must always be born in mind that statistical mechanics/thermodynamics has proved to be an eminently successful branch of physics over many years. Nevertheless, the question of the actual equivalence of the entropy functions of classical and statistical thermodynamics remains a very real one and is one which should not be dismissed lightly. It is probably true to say, though, that this question has only arisen largely because of the rise in usefulness of information theory in both physics and, indeed, other branches of science such as biology and medicine.

(c) Information Theory.

Possibly the best way to approach the introduction of the notion of entropy in information theory is to consider the way Shannon himself introduces the topic. To do this, consider Shannon's own wording beginning on page 48 of his book:- he begins by pointing out that, up to that point in his presentation, a discrete information source has been represented by a Markov process. He then poses the question of whether or not it is possible to *'define a quantity which will measure, in some sense, how much information is "produced" by such a process, or better, at what rate information is produced'*.

He continues by considering a set of possible events whose probabilities of occurrence are p_1, p_2, \dots, p_n . These probabilities are all that is known concerning which event will occur. The question then is whether or not a measure of how much “choice” is involved in the selection of the event or of how uncertain the outcome is may be found. If such a measure, say $H(p_1, p_2, \dots, p_n)$, exists it is claimed that it is reasonable to require the following properties for it:

- (i) H should be continuous in the p_i
- (ii) If all the p_i are equal, $p_i = 1/n$, then H should be a monotonically increasing function of n .
- (iii) If a choice be broken down into two successive choices, the original H should be the weighted sum of the individual values of H .

On the basis of these required properties, it is shown in appendix 2 (pages 116-8) of the quoted book that the only H satisfying these three assumptions is of the form:

$$S = -K \sum_{i=1}^n p_i \log p_i \quad (\text{iii})$$

where K is a positive constant which merely amounts to a choice of a unit of measure. Shannon points out that expressions of this form ‘*play a central role in information theory as measures of information, choice and uncertainty*’. He also goes on to point out at this very stage in his discussion that ‘the form of H will be recognised as that of entropy as defined in certain formulations of statistical mechanics where p_i is the probability of a system being in cell i of its phase space. Of course, in statistical mechanics/thermodynamics, the constant K is the Boltzmann constant represented by k . Again at this point in his discussion, Shannon proceeds to say that ‘*we shall call*’ expression (iii) above the entropy of the set of probabilities p_1, \dots, p_n . He also says that, if x is a chance variable, we will write $H(x)$ for its entropy; thus x is not an argument of a function but a label for a number, to differentiate it from $H(y)$ say, the entropy of the chance variable y .

It is quite clear from this abbreviated introduction to a basic formula of information theory that its introduction is purely mathematical and does not rely at all on any genuine physical input – certainly nothing remotely connected with notions of classical thermodynamics. Interestingly, the outline of this derivation also serves to emphasise that the same is basically true of the introduction of the entropy concept into statistical mechanics/thermodynamics. Also it seems the introduction of a link between the entropy functions of information theory and classical thermodynamics followed the route outlined in Brillouin’s book – *Science and Information Theory*; that is that it was simply noted that the entropy expressions of information theory and statistical mechanics/thermodynamics had the same mathematical form and so were assumed to be same. The link with classical thermodynamics then followed via the statistical mechanics link with that subject. Hence, when examining the origins of the three entropy functions, it quickly becomes apparent that as progression occurs from that for classical thermodynamics to statistical mechanics/thermodynamics to information theory, actual physical ideas play a gradually decreasing role and heat only appears in the first of these derivations. These are all points which must come into consideration when examining the claim, implicit at least in some writings, that the entropy functions of classical thermodynamics, statistical mechanics/thermodynamics and information theory are identical functions.

(d) Further Comments.

In the above, very brief introductions to the origins of the entropy concept, or possibly concepts, in classical thermodynamics, statistical mechanics/thermodynamics and information theory have been presented. It is clear immediately that, in the first case, the function termed the entropy is irrevocably linked to heat while this is certainly not so in the other two cases discussed. One can, however, see the possibility of a real link between the concepts of entropy in statistical mechanics/thermodynamics and information theory. Indeed, Lavenda has commented more than once that, in retrospect, it appears unfortunate that the two subjects developed independently of one another. Possibly more and quicker progress could have been achieved if this had not been so. Also, much duplication of effort could have been avoided. However, that is not the case. The position as of now is then that the entropy concepts of

statistical mechanics/thermodynamics and information theory do have much in common but their link with the entropy of classical thermodynamics may only be described as tenuous. As pointed out already, the entropy of classical thermodynamics is linked with the concept of heat and nothing can change that. The other two entropies are introduced with no mention of heat or heat exchange and neither can be linked directly with the concept of heat. Further, all the links with classical thermodynamics introduced into statistical mechanics appear to be done ad hoc; rarely, if ever, is any rational physical justification for the introduction of the functions and equations of classical thermodynamics advanced and yet it is just this introduction which enables so much to be accomplished physically in that branch of physics. Undoubtedly, the route taken has produced many satisfactory results but it must be wondered if that is more by luck than judgement?

Looking especially at the approach of such as Hill and remembering the successes of statistical mechanics/thermodynamics, it is difficult to believe the theory incorrect. However, when the subject of the relevant entropies arises, it is equally difficult to accept that they are one and the same function as their two bases are so completely different. When information theory enters the picture, the connection between the entropies – if, indeed, one exists – becomes even more vague and difficult to accept. In fact, it might be wondered if this is, at partially, behind the somewhat peculiar conjecture of Landauer. In an article of 1961, Landauer suggested that erasure of information is a dissipative process and, therefore, that a small quantity of heat is necessarily produced when a classical bit of information is deleted. This seems another way of artificially introducing the notion of heat into an area of physics where it simply doesn't appear naturally. A quick glance at some of the basic notions of information theory as explained by Shannon and, possibly more obviously, by Brillouin would seem to suggest that this could have been the case and Landauer was, in a sense, inverting the link between entropy and heat which occurs quite naturally in classical thermodynamics. It might be noted that more appeared querying Landauer's conjecture in an earlier article.

However, these days, more and more applications for all of these traditionally physics' topics are appearing in the biological sciences and medicine. Here different problems are seemingly encountered which appear far removed from the notions of heat engines which led originally to the subject now known as classical thermodynamics. Nevertheless, if classical thermodynamics is to apply, its basic laws must apply and that means that, even if the wording is altered to fit the new regime, the fundamental tenets of the second law must apply too; that is, reference must be made to something not being possible in a cycle in the absence of other effects.

Although not related directly to entropy, it is interesting to note at this point that Ho makes mention of this and refers back to a much earlier article by MacClare. However, Ho refers to an abbreviated form of the second law, as advanced by MacClare, which states that

*Useful work is only done by a molecular system when
one form of stored energy is converted into another.*

where by stored energy is meant any form of energy that does not equilibrate, or degrade, into heat in the interval τ , with τ being a standard time greater than that necessary for thermal energies to equilibrate throughout the system and reach equilibrium. However, the drawback with this statement and a modified one due to Ho is that there is no mention of cycles or other conditions. It should be noted though, that, in his original article, MacClare did advance the following form of a modified second law.

It is impossible to devise an engine, of any size whatever, which, acting in a cycle which takes a time τ , shall produce no effect other than the extraction of energies, which have equilibrated with each other in a time less than τ , from a reservoir at one temperature and the conversion of these energies into a form in which they would remain stored for longer than τ ; either at a higher temperature, or in a population inversion.

He continued to point out that this statement clarifies what the second law actually forbids in practice and shows that weights lifted by Brownian motion have not had any useful work done on them. Unfortunately in some ways, he then proceeds to express the second law in the previously mentioned form which MacClare himself describes as a very economical form. However, he points out that the abbreviated statement does serve to define useful work and that, together with the definition of stored energy he gives, makes it clear that the statement applies at the molecular level as well – something crucial for biological applications. He concludes by noting that this “means that it follows from the second law (when that law is properly understood) that if energy is stored initially in a single molecule then, once that energy is allowed to exchange with thermal energies, useful work can no longer be done with it.” Nevertheless, it is a pity that it is this abbreviated form which is now quoted because it omits those two points crucial to the second law – the fact that something is not possible in a cycle in the absence of other effects.

It should be noted at this juncture that MacClare was concerned with examining the molecular nature of living things and was interested, in particular, in whether or not such systems could work in the same way as ordinary chemical machines. To this end, he made some extremely useful points concerning the supposed statistical nature of the second law and also made some insightful comments regarding the nature of the quantity referred to as work. On this second point, he was at pains to distinguish between doing work usefully and wastefully and it is for that reason he introduced the terms *stored energy* and *useful work* referred to above.

The paper by MacClare and the article by Ho are important in that they draw attention to the fact that modifications to some wording in classical thermodynamics must be made in order to make that subject directly applicable in the biological sciences. More will be made of this in the next section but, undoubtedly, this is a topic which needs addressing and clarifying as a matter of urgency.

(e) Concluding Comments.

It is virtually impossible to end this section with a definite conclusion. Suffice it to say, though, that serious doubts must exist concerning the equivalence of the entropy function of classical thermodynamics and the corresponding functions of statistical mechanics and information theory; the bases of the functions are totally different and the link between those of classical thermodynamics and statistical mechanics seems contrived in order to produce the statistical thermodynamics theory known and used, albeit with apparent great success.

(ii) Further Thoughts on Entropy in Science.

Recent readings of attempts to make classical thermodynamics more obviously applicable to situations totally outside its normally accepted field have awakened further thoughts relating to the basic structure of the subject. The specific field of study which was concerned in these readings was biology but, by direct implication, that would have to include medicine also. This led to an appreciation of the difficulties people in disciplines other than physics experience when attempting to apply results developed in physics to their own areas of interest and expertise. This can, and does, lead to a greater understanding of the problems others experience with one's own area of interest but also can, and does, lead to mistakes being made by them due to a lack of appreciation of some basic tenets of some areas. This is particularly true of thermodynamics and the unfortunate truth is that this is due, in part at least, to a lack of clarity of understanding of various relevant concepts by those in physics. As with many issues in thermodynamics, the fundamental problem often seems to be associated directly with the notion of entropy. This is something which caused confusion almost since the function was first introduced or, at least, since its interpretations in statistical mechanics and information theory entered into considerations. Up to that point, the idea of a change of entropy in classical thermodynamics had arisen out of the Second Law as something resulting from a change in heat. Heat and entropy in classical thermodynamics were, and remain, linked irrevocably. This was due to the fact that, up to this point, heat engines had been the main

objects of interest and these were undoubtedly macroscopic entities. However, once attention veered away from these and the statistical idea of entropy was introduced from both statistical mechanics and information theory, the picture became less clear and much confusion seems to have arisen virtually from the date of this introduction. The reason for the introduction is quite clear and is, indeed, reasonable; many of the systems requiring discussion consist of huge numbers of particles and the only way to deal with them as far as past and present knowledge is concerned is through utilising statistical techniques. However, it does seem that the accepted link-up between the expressions of classical thermodynamics and both statistical mechanics and information theory does seem somewhat contrived. Admittedly, the link-up, even if it has been contrived, has proved extremely successful in dealing with a wide range of scientific problems but, when biological processes begin to be involved, it becomes evident that the question must be investigated afresh. Any such investigation, though, must be carried out with no preconceived notions as to the outcome. It should be recognised also that physics itself could possibly benefit from such a reappraisal too since the whole topic of entropy, for example, is one which arouses confusion for so many at all levels of science.

(a) The Laws of Thermodynamics.

Probably, the first and second laws of thermodynamics are by far the most important and far-reaching for many. Of course, the first law is really only a form of expressing conservation of energy but taking heat into account. As such, this law presents few difficulties these days and certainly is not a source of controversy. The same may not be said of the second law though. In its basic forms due to Kelvin and Clausius, or even that due to Carathéodory, few real problems arise immediately. The problems begin to arise when the question of entropy is introduced and when the notion of the second law being claimed to state that entropy never decreases. In conventional texts on thermodynamics, the function known as the entropy is introduced directly from the second law in one of the mentioned forms – usually the form due to Kelvin – and appears only when, mathematically, an integrating factor is deduced for the inexact differential representing a quantity of heat given to, or taken from, a system; that is,

$$dS = d'Q/T,$$

where $d'Q$ represents the quantity of heat, T the absolute temperature which is the mentioned integrating factor, and dS the total differential called the change in entropy. Immediately, it is seen that classical thermodynamics is concerned with changes in entropy, *not* with absolute values of the quantity. It is also obvious immediately that, if heat is added to a system, $d'Q$ is positive and so, dS is positive but, if heat is taken from a system, $d'Q$ is negative and so dS is negative as well. In other words, entropy may either increase or decrease depending on whether heat is added to a system or taken from that system.

This immediately raises one important problem since some often claim that the second law of thermodynamics may be stated in the form *the entropy always increases*. In fact, as Weaver has commented, Eddington remarked that “The law that entropy always increases – the second law of thermodynamics – holds, I think, the supreme position among the laws of Nature”. Obviously this supposed statement of the second law is incorrect but, unfortunately, it seems to have become accepted by many as a genuine form of that law. Whether this belief is purely due to Eddington’s statement or not is immaterial, it is undeniable that the acceptance by many of this as a statement of the second law is not helpful in the development of the subject itself or to increasing use of thermodynamics in more and more areas of science. It might be noted also that this problem is seen clearly only when a return to fundamentals is made; that is, when considerations return to the original introduction of the concept of entropy via heat changes. Also, the notion of a sort of general entropy increase arises when consideration is restricted to so-called ‘irreversible’ processes. As has been noted previously, the whole idea of ‘reversibility’ can lead to difficulties and that is why Landsberg is so careful, when discussing cycles, to consider such cycles run in forward or reverse directions separately so that he is not faced with extra problems such as some which he enumerates.

At this juncture it is possibly worth reflecting on some words written by Tatiana Ehrenfest-Afanassjewa in 1959 in the preface to the translation of the book she authored with her husband –*The Conceptual Foundations of the Statistical Approach in Mechanics*. She wrote:

*At the time the article was written, most physicists were still under the spell of the derivation by Clausius of the second law of thermodynamics in the form of the existence of an integrating factor for the well-known expression for the quantity of heat ΔQ put into the system. In this derivation the irreversibility in time of all processes occurring in nature played an important role. Hence it seemed that the possibility of a reversal of the natural development (which according to the ‘Wiederkehrwand’ of Zermelo should occur after a sufficiently long time) threatened the validity of some of the most important results of thermodynamics. However, it became clear to me afterwards, that the existence of an integrating factor has to do only with the mathematical expression of $\Delta Q = dU + dA$ in terms of the differentials dx_1, dx_2, \dots, dx_n of the **equilibrium** parameters x_1, x_2, \dots, x_n and is completely independent of the direction in time of the development of the natural processes. As a result, the fact of the reversibility of the mechanical motion, which is inescapable in the kinetic interpretation of the laws of thermodynamics, lost some of its importance. Nevertheless, even today many physicists are still following Clausius, and for them the second law of thermodynamics is still identical with the statement that the entropy can only increase.*

There can be little doubt that this powerful statement from an acknowledged high-class theoretician is deserving of much wider publicity than it has received so far. There can be little doubt that she is casting grave doubt on the validity of the statement that the ‘*entropy can only increase*’ as a statement of the second law of thermodynamics. Also, she is clearly drawing attention to the fact that the derivation of the mentioned integrating factor is involved only with the differentials of *equilibrium* parameters. This latter point is crucial and, as suggested to me by a colleague, might be interpreted as meaning that some thermodynamic results at least do not strictly apply to real systems as the examination of such systems is rarely concerned with purely equilibrium parameters. Of course, considering the undoubted success of so much thermodynamic theory in so many areas, this latter interpretation of the above quotation must be viewed with a degree of caution. Also, the details of the approach adopted by Landsberg and mentioned above should be born in mind. As with so many results in theoretical physics it is vital to remember *all* the assumptions made in their derivations and to adhere strictly to any restrictions imposed by such assumptions. Here in thermodynamics, the role of equilibrium states in so many basic derivations probably has real consequences when real systems come under consideration. On the other hand, it should be remembered also that the practical origin of much of this work was concerned with heat engines – actual physical heat engines – and, certainly in this context, the theory has had great success.

(b) The Search for Clarity.

The above considerations might well be construed as indicating a need for more clarity of detail in the foundations of classical thermodynamics. If so, this also indicates a muddying of the waters at the amalgamation of ideas on classical thermodynamics with those of statistical mechanics and information theory. However, all three areas seem to be attempting to describe broadly similar systems and so it is not really unreasonable to accept that some sort of amalgamation should occur. Unfortunately, on reading his writings, it becomes clear that some, if not much, of the confusion in this area originates in the writings of Clausius. This is unfortunate for several reasons but the fact that there is implied criticism of someone as eminent as Clausius is a major problem and evidence for this surely follows from the fact that the above quoted piece by Tatiana Ehrenfest-Afanassjewa has not achieved greater prominence, even though it appears in a well-regarded and widely consulted text.

It would seem that the search for clarity in this area is at least one of the motivations for the work of MacClare when he set out to consider whether or not conventional chemical machines might be used in

living organisms. Remembering that thermodynamics owes its origin to a need to understand and improve the operation of heat engines, it seems reasonable to suppose that, if and when applied in other areas, changes in detail might prove appropriate, even possibly necessary. As MacClare points out, due to their molecular nature, living systems pose unique thermodynamic problems, especially in relation to Maxwell's demon. By introducing time into the statement of the second law he claims to solve these problems. He also points out that this proposal, while clarifying certain logical anomalies in classical thermodynamics, makes no difference to it in practice. Of course, any discussion of Maxwell's demon is outside the realm of pure classical thermodynamics since it necessarily involves a statistical element. The proposed modified statement of the second law to which he refers, and which, by analogy with Kelvin's statement, is:

It is impossible to devise an engine, of any size whatever, which, acting in a cycle which takes a time τ , shall produce no effect other than the extraction of energies, which have equilibrated with each other in a time less than τ , from a reservoir at one temperature and the conversion of these energies into a form in which they would remain stored for longer than τ ; either at a higher temperature or in a population-inversion.

However, this statement creates more confusion in that it is more akin to Clausius's statement of the second law rather than Kelvin's. Having said that, this statement does contain references to the importance of cycles and to the absence of other effects. Unfortunately, MacClare proceeds to claim that the second law could be expressed very economically in the form:

Useful work is only done by a system when one form of stored energy is converted into another.

This abbreviated form contains no mention of either cycles or absence of other effects and so must be regarded with suspicion at the very least. Strangely also, his definition of so-called *stored energy* renders it quite distinct from *thermal energy*, which seems a little strange given that thermodynamics is under discussion and, as mentioned already, that subject's entire raison d'être is linked with heat engines. Again, since there is no mention of work in MacClare's original more detailed original statement of the second law and since it is generalised from the Clausius statement of that law, it is difficult to see from where the abbreviated form, which is all to do with work, comes. It would seem that MacClare's restatement of the second law should have been more along the lines of:

It is impossible to devise an engine, of any size whatever, which, acting in a cycle which takes a time τ , shall produce no effect other than the extraction of energies, which have equilibrated with each other in a time less than τ , from a reservoir and the conversion of these energies completely into work.

which is seen to be a direct modification of Kelvin's form but doesn't appear to offer an immediate link with the notion of *useful work*.

However, it should be noted that Ho, while appreciating much of MacClare's work, noting in particular the importance of his introduction of time, criticises his suggested new form of the second law – especially the abbreviated form. Her immediate objection is that the statement is simply incorrect and queries on what a motor car engine depends if not thermal energy? She feels him correct in stressing that useful work may be done by a molecular system through a direct transfer of stored energy without thermalization, pointing out that photosynthesis involves the non-thermal absorption of photon energy and non-thermal energy transfer is the rule in living processes. She feels MacClare's suggested restatement of the second law unnecessarily restrictive since thermal energy may be organised to do useful work in a cooperative system such as is the case of enzymes embedded in a non-equilibrium

membrane. Again, as she points out also, thermalized energy from a small compartment is still stored energy within a larger compartment enclosing it. For this reason, Ho has proposed

*Useful work may be done by molecules by a direct transfer
of stored energy, and thermalized energy cannot be converted
into stored energy in the same system*

as an alternative statement of the second law where the first part is the same as MacClare's and the second suggests a means of defining a system as the extent to which thermalized energies equilibrate in a characteristic time. However, once again this statement excludes all mention of cycles and of the absence of other effects. This is a vitally important point which simply cannot be ignored.

(c) Useful Work.

As MacClare makes quite clear, the notion of *useful work* is understood fairly easily. He illustrates the point by noting that work done against friction does not produce any useful effect, only heat, but working against a spring has the effect of storing energy which may be used later. He further points out that, even at the macroscopic level, distinguishing being doing work beneficially and wastefully is important but that that is not too difficult because it is easily seen if a process leads to a useful end effect or not. However, he asserts that it is necessary to consider the question in more detail if classical thermodynamics is to be applied at the molecular level in order to understand biological processes. Rather than redefining the whole concept of work, he resorts to introducing two new terms: - stored energy and useful work. However, as may be seen by considering comments in Moore's book, the second term is one which is already in use among practising engineers. The first term refers to energies which remain in a distribution other than that of Boltzmann for longer than some standard time but is not of concern here.

Moore is really concerned with quantities of energy actually available to do work. To this end, he introduces an availability function, Φ , defined by

$$\Phi = U + p_0V - T_0S$$

where U , S , V are properties of a closed system in an equilibrium initial state and T_0 and p_0 are the temperature and pressure of the surrounding environment. The decrease of this function in a process during which the system comes to equilibrium with its environment is

$$-\Delta\Phi = \Phi - \Phi_0 = (U + p_0V - T_0S) - (U_0 + p_0V_0 - T_0S_0).$$

He then considered the form of the first applicable to closed systems:

$$d'W = -dU + d'Q$$

where the dash indicates an inexact differential as usual. Again as usual, $d'Q$ represents heat added to the system from a reservoir at temperature T_0 , $d'W$ is the work done and dU the change in internal energy. From the second law it follows that

$$d'Q = TdS$$

if so-called reversible processes are considered.

Hence, in this case

$$d'W_{rev} = -dU + T_0dS$$

but it is normally assumed that, in general, $d'W \leq -dU + T_0 dS$ with the equality sign referring to the reversible situation, although there are problems associated with the validity of this inequality as has been noted previously.

Moore points out that, during the process under consideration, some of the total work done is used to push back the boundary of the system, thus increasing the system's volume by dV while the resisting environment's pressure is p_0 . It is the remainder of the work which is termed useful work and denoted by $d'W_{\text{useful}}$. Then

$$d'W = d'W_{\text{useful}} + p_0 dV$$

that is

$$d'W_{\text{useful}} \leq -dU + T_0 dS - p_0 dV$$

Integrating this expression between its initial and final states leads to

$$W_{\text{useful}} \leq (U + p_0 V - T_0 S) - (U_0 + p_0 V_0 - T_0 S_0).$$

or

$$W_{\text{useful}} \leq -\Delta\Phi$$

where it must be stressed that a closed system is under consideration and that the whole notion of 'useful work' has been introduced via a quite specific example. It is also important to note any assumptions made here, particularly bearing in mind the dependence on the idea of reversible processes since the whole idea of reversibility can raise problems, as has been discussed elsewhere.

This abbreviated discussion of Moore's introduction of the notion of availability and useful work serves to illustrate the fact that the notion of 'useful work' is not new but has been very much in the minds of those who use thermodynamics in a practical context. Nevertheless, it is something which needs to be remembered particularly when attempting to extend results of classical thermodynamics to cover situations pertaining in the biological sciences. To this end at least, the work of MacClare is important and deserves to be noted, as has been acknowledged by Ho.

As mentioned above, an important consequence of MacClare's work arises from the explicit introduction of time. There seem to be two distinct ways of doing useful work; not just slowly as usually considered by conventional thermodynamic theory but also quickly. This, it seems, might be the most important outcome from this work to consider for thermodynamics as a whole. As far as the slow process is concerned, it should be viewed as one which occurs at the same rate as that taken to go to equilibrium or, alternatively, slow in comparison with the time required for exchanging energies to equilibrate or distribute themselves evenly throughout the entire system. As far as classical thermodynamics is concerned, such a process would be thought to be reversible and most efficient when it comes to producing a maximum amount of work. By introducing time into considerations, a so-called reversible thermodynamic process needs to be slow enough for all thermal-exchanging energies to be able to equilibrate; that is, slower than τ , which may, in reality, be a very short period of time. The processes involved might, however, be intrinsically fast. As is pointed out quite specifically by Ho⁷, according to these considerations, most catalysis is a slow process when compared with the time for thermal equilibration. It is pointed out further that each enzyme molecule is a 'microdomain' isolated from its surroundings for the time of the catalytic reaction and so that reaction may be regarded as occurring at equilibrium provided the above condition is satisfied. It follows, therefore, that high efficiencies of energy conversion may still be achieved in thermodynamic processes which occur quite rapidly provided that equilibration is fast enough. This immediately represents a huge departure from normal thinking in classical thermodynamics but it is something which has powerful experimental back-up and so should be regarded seriously and possibly brought more to the fore in discussions of thermodynamics in all separate disciplines that topic pervades.

(d) Concluding Comments.

It seems a great pity that the easily avoidable confusion concerning MacClare's clarification of the second law in the context of biological problems has been allowed to arise because MacClare appears to have raised some genuinely interesting points and introduced some fascinating new notions into thermodynamics. His stress on the need to identify *useful* work is one obvious example and possibly links with ideas on available and unavailable energy as discussed by Moore and other mechanical engineers with an interest in thermodynamics, who also discuss the concept of useful work during the discussion of what they call the availability concept. Just as MacClare was approaching the overall problem from the viewpoint of a physiologist, so Moore's approach was motivated, at least in part, by his background in mechanical engineering. In both cases emphasis is placed on this notion of useful work; the backgrounds and basic approaches of the two may be somewhat different but the end result is the same and one which should probably be brought more to the fore in many traditional undergraduate and, indeed, postgraduate introductions to this important topic of thermodynamics. However, as far as classical thermodynamics in general is concerned, the fact that thermodynamic reasoning is seen to be applicable in situations where useful work may be done quickly and not just slowly seems to herald a major change in thermodynamic thought. No doubt this point is deserving of much more detailed consideration by the scientific body at large but the considerations sparked by MacClare and pushed even further by Ho are vitally important and may not be ignored. There is possibly little awareness of the work alluded to here in conventional thermodynamic circles but, while conventional classical thermodynamics is usually concerned with so-called quasi-static processes, particularly adiabatic ones, here the inclusion of such processes occurring in real time becomes a genuine possibility. Let it be hoped that this note has the effect, at least, of helping bring this work to the attention of a wider audience and, specifically, an audience stretching across all traditional scientific boundaries.

(iii) The Mechanical Equivalent of Heat.

As discussed already, for many years now, much work on basic ideas in thermodynamics has concentrated on mathematically acceptable approaches. This follows Max Born's unhappiness with what he regarded as an engineering approach to the subject. There can be little doubt that the subject has benefitted from this more analytical approach but it has lost some physical insight too as is illustrated by the following:

It should never be forgotten that the subject thermodynamics originated with the study of heat engines which worked in cycles. All this started with Carnot whose work was clarified and extended by Clausius and Kelvin. Much of what follows here is recorded in Tait's book *Sketch of Thermodynamics*, which basically chronicled Kelvin's contributions to the subject. The starting point is the cyclically operating heat engine devised by Carnot. It is noted that, in the original engine, each stage may be operated in reverse and so the entire engine may be so operated also. It is shown that such an engine is the most efficient that can be produced. It follows immediately, therefore, that any engine which may not be operated in reverse must be less efficient than this ideal Carnot engine. This very straightforward point must be remembered for what follows.

Some fundamental ideas.

Following Tait, suppose an engine of finite range is composed of an infinite number of engines with infinitesimal range and let $q + dq$ and q be the amounts of heat absorbed and expelled at temperature t . Then, by the First Law, the work done is

$$Jdq$$

where J is the mechanical equivalent of heat. Although this quantity, J , rarely appears in modern literature on thermodynamics due to the widely accepted definitions of the units used throughout the subject, it is used here exactly as Tait himself used it. It also helps recall the enormous contribution of Joule to the early formulation of thermodynamics since it was he who first determined an accurate value of the quantity experimentally. As an aside, it might be speculated that a return to the use of units so that this factor appeared once again might lead to students obtaining a better understanding of at least some aspects of the overall subject which is classical thermodynamics; after all, the fact that the existence of a mechanical equivalent of heat was recognised and its value determined was a vital point in the initial development of the subject as we know it today.

Again, by the Second Law, Tait shows quite clearly that the work done is given by

$$Jqdt/t.$$

also. Equating these two expressions leads to

$$dq/q = dt/t$$

which leads to

$$q/t = \text{const.}$$

Hence, for an engine where an amount of heat q is taken in at temperature t and an amount q_0 is given out at temperature t_0 ,

$$q/t = q_0/t_0.$$

Then the work done is

$$J(q - q_0) = Jq(t - t_0)/t.$$

As noted by Tait, whatever the temperature of a quantity, dq , of heat, the real dynamical value is Jdq . However, in practice, the work produced by an engine will be $J(1 - t_0/t)dq$. This may be written in the form

$$Jdq - Jt_0dq/t.$$

Hence, in any cyclic process whatever, if q_1 is the total heat taken in and q_0 that given out, the practical value of the work is

$$J(q_1 - q_0) - Jt_0 \int \frac{dq}{t}.$$

However, for a reversible cycle, the practical value is just $J(q_1 - q_0)$ by the first law and so, in this particular case, the value of the integral term is zero. In general, though, the integral term has a positive value because, in all non-reversible engines, the practical value for the work done is always less than this value of $J(q_1 - q_0)$, as was mentioned earlier. Of course, this is the origin of the notion that

$$\int \frac{dq}{t} \geq 0.$$

However, all this implies is that

$$dS \geq 0;$$

that is,

$$TdS = d'Q \geq 0.$$

It is important to note that this does *not* mean

$$TdS \geq d'Q;$$

in fact, it is difficult to see how this inequality follows from anything.

Also, it might be noted that the acceptable inequality

$$TdS = d'Q \geq 0,$$

does not violate the First Law but merely asserts that for an irreversible process

$$d'Q = dU - d'W \geq 0$$

and that raises no problems.

It is vitally important to note that all of the above discussion relates to cycles. The inequality derived refers quite specifically to the fact that, in all non-reversible engines, the practical value of the work done must be less than a specific value always and it is this demand that introduces the inequality. The question of the actual range of applicability of the said inequality remains. All the basics of classical thermodynamics are based on cycles so any result so derived cannot necessarily be valid for individual processes. This is precisely the main point here; the said inequality has been derived for a cycle *not* for an individual process and there is nothing in what has gone before to even suggest the inequality true for an individual process. Indeed, reference to the workings of a Carnot cycle shows that this cannot be the case for, in such a cycle, there is one leg in which the entropy increases but that is balanced by a leg in which the entropy decreases in order for the total entropy change in the cycle to be zero and ensure that, at the end of the cycle, everything is in exactly the same state as it was at the beginning of the cycle. Hence, a true cycle has been negotiated.

Again, all of the above discussion relates to classical macroscopic thermodynamics and *not* to statistical thermodynamics. Hence, the subject under discussion involves no indeterminacy whatsoever; classical thermodynamics must be – by its very nature – deterministic. Therefore, for example, talk of thermodynamic uncertainty relations must refer to statistical thermodynamics – to the subject *after* some statistical elements have been introduced, so that the subject is classical thermodynamics no longer. This point is brought out very clearly in appendix D of Baierlein's book *Atoms and Information Theory*, where he states that the conceptual bases of thermodynamics and statistical mechanics are "sufficiently different that one can expect only a close *correspondence* between the theoretical quantities, not a true equality or identity". He points out that, for example, the energy in thermodynamics has a definite value but, in statistical mechanics, that is simply not so – an expectation value would be calculated in that discipline and a root mean square estimate of the anticipated deviations could be found also. This, of course, links in extremely well with a comment at the bottom of page 84 of Elsasser's book *The Physical Foundation of Biology*, where he draws attention to "the efforts to get some profit out of the very rare statistical failures of the second law of thermodynamics". Such possible 'failures' can only exist if a statistical element is introduced into things but, in classical thermodynamics, that is simply not possible as it is – as stated above – a completely deterministic subject. Hence, *no* violations of the second law of thermodynamics are allowable as far as classical thermodynamics is concerned!

The deterministic nature of classical thermodynamics possibly leads to another relevant point re the subject as a whole and that refers to the nature of the function known as the entropy. Is it a state function or not? Some recent evidence would suggest it isn't, but other would seem to indicate the opposite.

From the First Law

$$d'Q = dU - d'W$$

which in certain special circumstances takes on the form

$$d'Q = dU + pdV.$$

Also, in equation form, the Second Law may be written

$$d'Q = TdS.$$

Combining the two gives

$$TdS = dU + pdV$$

or

$$dS = \frac{1}{T}dU + \frac{p}{T}dV.$$

Mathematically, this is akin to regarding the function S as being dependent on two independent variables - U , the internal energy and V , the volume.

Now in any cyclic process where the end point is the same as the starting point, the internal energy will undergo no change and neither will the volume. Hence, the function denoted by S can undergo no change either. Hence, in this sense, in classical thermodynamics S must be a so-called function of state also. This may be regarded as a long winded argument to establish this fact since it might be deemed to follow immediately from the fact that the Second Law establishes $1/T$ as an integrating factor for the inexact differential $d'Q$ and, as such, the integral of the product of the two, indicated by the symbol dS , around a closed loop must equal zero, which is essentially what has just been illustrated. However, in statistical thermodynamics, because of the very nature of the subject, an element of uncertainty is introduced and so, theoretically, one can imagine a situation where such uncertainty in the value of S could lead to the end value in a cycle not being quite the same as the initial value. However, in traditional classical thermodynamics, no such possibility would seem allowable.

(iv) **Reversibility.**

Reversibility is a topic which raises its head in thermodynamics frequently and often tends to lead to confusion over true understanding of some physical realities. Consider the situation described so graphically in the book '*Thermodynamics*' by P. T. Landsberg. In question 1 on page 95 of his book, the following statements are listed:

- a) reversible processes are really not processes at all, but sequences of equilibrium states
- b) the real criterion for reversibility is that no changes of any kind must remain in the surroundings of a system when the given process is followed by the same process taken in the opposite sense, (Surely this must imply also that, at the end of both processes being run one after the other, there are no changes of any kind in the system itself either?)
- c) a process which is reversible must take place infinitely slowly. However, a process which takes place infinitely slowly need not be reversible; an example being provided by the discharge of a condenser through a very high resistance.

(a) is the notion used by Landsberg throughout his book. He continually talks of sequences of equilibrium states rather than actual reversible processes. (b) is the common definition of reversibility but Landsberg doesn't believe it equivalent to (a), or to (c) for that matter. As he points out, any simple mechanical system without dissipation of energy, such as a bouncing, perfectly elastic ball or a swinging pendulum, conforms to (b), but not to (a) or (c). The example quoted under (c) shows that (a) and (c) are not equivalent either: an infinitely slow process need not be quasistatic.

It follows that, until or unless the contrary is established, (a), (b) and (c) must be regarded as referring to three different types of process. In fact, the introduction of the whole notion of reversibility into thermodynamics always presents a very serious problem of definition. However, if attention is restricted to reversible cycles, where by the term **reversible cycle** is meant a cyclic process which may be run either in the forward or reverse direction, is there still a problem? It is possible to make a distinction

between reversible cycles and reversible cyclic processes, but it's not necessary here. Reversible cyclic processes do not, it seems, need to occur infinitely slowly nor would there seem to be any need to restrict attention to sequences of equilibrium states.

The approach in the book alluded to above is to derive the basic equations via a modification of the mathematical formalism introduced by Carathéodory, a formalism which has been refined even more since this book first appeared. Hence, 'reversible' processes are not discussed and Carnot cycles do not enter the argument at all. One consequence of this, as noted quite clearly by Landsberg, is that Carnot cycles – and heat engines in general – must be discussed separately at a later stage. This he does but initially attention is restricted to what he terms *Forward Carnot Cycles* or, in other words, Carnot cycles run as heat engines – which was what was being considered in the first instance by Carnot himself. Later, having duly noted the problems alluded to above relating to the exact meaning of the notion of *reversibility*, Landsberg separately examines the Carnot cycle run in the reverse direction – a *Reverse Carnot Cycle*. He quite specifically rules out the use of the term *reversible engine* and, instead, examines in detail what happens in each particular case. This means that he avoids all problems of meaning of *reversibility*. However, the working fluid in the two cycles considered starts from the same state and ends up back in that state in both cases. What happens in between is, however, not quite the same in the two cases. In the forward cycle, using Landsberg's terminology, heat Q_1 is withdrawn from the large heat reservoir at temperature T_1 and heat Q_2 is delivered to a large heat reservoir at temperature T_2 , where $T_2 < T_1$. The difference between these two quantities of heat is the work done *by* the working fluid on its surroundings. However, in the reverse cycle, heat Q_2 is absorbed by the working fluid from the large heat reservoir at temperature T_2 and heat Q_1 is rejected into the large heat reservoir at temperature T_1 , with the difference being the work done *on* the working fluid. The two cycles are complete cycles and, while one is run in one direction, the other is simply run in the other, or reverse, direction. This is fundamentally what occurs in practice; in the forward direction, the engine is a heat engine and does work; in the reverse direction, the engine acts as a refrigerator.

Hence, in this approach, direct use of the notion of reversibility and all the problems associated with the meaning and use of that term are avoided also. The question which arises now, although he didn't make any categorical statements about it, is did Landsberg recognise that many of the difficulties arising in classical thermodynamics seem to revolve around the use of the notions of *reversibility* and *irreversibility* – particularly the first of these two terms? He certainly shows that neither notion is required when considering the operation of a Carnot engine – whether run in the forward or reverse directions. It must follow that there must be a question hanging over the use of the notion in any approach to classical thermodynamics. It is certainly the case that a totally different initial approach is used when discussing *Non-Equilibrium Thermodynamics* or *The Thermodynamics of Irreversible Process*. However, in the modern version of the Carathéodory approach as discussed, for example, in my own book *Concise Thermodynamics* and outlined in chapter 2 here, the idea of a process being capable of being run in the reverse direction is used and, at first sight at least, its use actually seems essential to the development of the topic. Here the idea of running an adiabatic change in one of two directions is in mind since it is used in the derivation of the vitally important relation

$$d'Q = TdS$$

particularly in the stage which shows how the Kelvin form of the Second Law implies that the thermodynamic phase space may be split up into a family of level surfaces. In this derivation, though, it is the notion of being able to progress from one state to another by an adiabatic process, progress from that state to another along a line of constant deformation by suitable means, and then back to the original state along a different adiabatic path which is important. It is merely being able to go to and from the line of constant deformation by adiabatic means which is important; the actual adiabatic paths are not assumed – nor do they need to be – reversible.

In fact, is not the basic idea with the Carathéodory approach simply that two states on a line of constant deformation cannot be accessible one from the other by adiabatic means in both directions? It is conceivable that one-way accessibility is allowable but not two-way as that would lead to violation of

Kelvin's form of the Second Law. It would be that the state at higher internal energy would be accessible from the other state by adiabatic means because that way around would involve work being done *on* the system to raise the internal energy; so it would be work being completely converted into heat in a cyclic process with no other effects, and that is allowable. This line of argument would lead to thermodynamic phase space being split into a family of level surfaces because it follows that only *one* state on a second line of constant deformation could be accessible from any one point on the first line of constant deformation for exactly the same reason as that outlined above. States on different lines would normally possess different values of the internal energy and, from the first law

$$d'Q = dU - d'W \Rightarrow dU = d'Q + d'W$$

It follows that this difference in internal energy could be overcome by a combination of heat and work and, as in the above case, the cycle could be completed by an adiabatic process. However, in this case, the cycle could be run in either direction and there would be no contradiction since something other than the conversion of an amount of heat completely into work would be occurring in each cycle – that is, the one part of the cycle concerned with the system being taken between states with different internal energy values would involve not only the giving of a quantity of heat to the system but also some work being done to overcome the fact that the two states lie on different lines of constant deformation. Hence, for two states lying on different lines of constant deformation, the cycle may be run forwards and in reverse. These two arguments may be combined and the result is that the thermodynamic phase space is seen to be divided up into a family of level surfaces. Hence, Landsberg's argument may be modified to depend only on the notion of running a cycle forwards and in reverse, rather than introducing the notion of a 'reversible change' or of a 'quasistatic change' which could be run in reverse. This heralds a return to Carnot who stressed the idea of reversible cycles, a notion discussed widely in 19th century books on thermodynamics. Also, by a reversible cycle was meant one which could be run forwards and in reverse – in just the same way as Landsberg discusses the Carnot cycle in his 1961 book.

It seems that this sees the removal of the difficult notion of a reversible process from the modified Carathéodory approach to the fundamentals of thermodynamics and appears to bring it more into line with the original approach via Carnot cycles. Hence, Born's worry concerning too much dependence on engineering concepts is overcome but everything now depends on cycles as, possibly, it should.

It is interesting and informative to read the account of Carnot's work in, for example, *Classical Thermodynamics* by Arnold Münster. In the work relating to Carnot's theorem and the Carnot cycle, Münster constantly refers to a '*reversible cyclic process*', never to simply a *reversible process*. The two concepts are obviously totally different and it seems especially important to reflect on the fact that it may be possible to run a cyclic sequence of events in reverse, even though the individual processes are not necessarily each reversible individually. This view is not accepted by everyone, since some refer to the Carnot engine utilising a reversible cycle and by this is meant a series of reversible processes that take a substance from an initial equilibrium state through many other equilibrium states and return it again to the same initial state. When Münster refers specifically to an *irreversible* process, it is, for example, to the *irreversible process of heat conduction*. Such a reference does not seem unreasonable. Heat conduction is a truly irreversible process and such terminology seems appropriate. The problems seem to arise when talk of reversible processes occurs – processes which are not cyclic! Hence, Landsberg's apparent reticence, referred to above, seems entirely justified and sensible. It seems wise to consider forward and reverse Carnot cycles separately; in that way, it seems there should be reduced confusion. Also, once again the question of whether or not the notion of a reversible process is needed is raised; - the answer would appear to be in the negative.

Support for this view seems to be available in Porter's little Methuen monograph entitled *Thermodynamics*. In it, when referring to the work of Carnot, he points out that Carnot introduced the requirement that the *cycle* of change necessary be a *reversible* one; 'by which is meant that, by making only an infinitesimal change in the temperatures and pressures of the surroundings, the cycle may be traversed either in a clockwise or an anticlockwise sense: in other words, at each instant the substance must be indefinitely near to an equilibrium state, both as regards pressure and heat flow. This, of course, describes an unattainable limit, because it would require an infinite time to effect any change.' Once again, as pointed out above, the indication is that what is required is something which works in a cycle

and may be run both forwards and backwards. Reversibility in this sense is a perfectly reasonable idea and is one occurring naturally – there are engines which when run in the forward direction act as normal heat engines but, when run in reverse, act as refrigerators.

Porter also points out that no actual motion of a body can occur without frictional effects and this ensures that such changes must be irreversible. He then claims that, to ensure reversibility, only infinitesimal changes in the neighbourhood of an equilibrium state are to be allowed. He interestingly likens this to the virtual displacements made in mechanics in the calculation of virtual work. This restriction ensures that changes in kinetic energy then don't enter into the discussion because they are of second order in small quantities when the displacements are of the first order.

Where do all these considerations appear to be pointing? It does seem that the notion which is of use and importance in thermodynamics is that of a reversible cycle or reversible cyclic change and that is certainly not the same thing as a reversible change because in any random change the end state is not the original state. Making this differentiation may seem pedantic but the crucial point, pedagogically at least, is that the only notion occurring in the actual development of thermodynamics is that of a reversible cyclic change; talking separately of reversible changes and generally of reversibility serves only to create unnecessary confusion.

5. Summing Up and Final Comments.

A number of serious questions are raised in the above discussion relating to results normally attributable to classical thermodynamics but used extensively in statistical thermodynamics and also in applications of information theory. As discussed, much of this revolves around the notion of the function called *entropy*, which appears in all three disciplines and is assumed to be exactly the same function in all three, with common properties in all three. The first major question raised and yet to be answered effectively is 'Is this true?' or 'In what sense is this true, if at all?' It is undoubtedly true that all the uncertainty over the meaning of entropy and its precise position in physics, as well as whether or not one and the same function is being discussed when considering problems in any one of the three mentioned branches, is a genuine cause for misunderstandings arising amongst professionals. It is also true that the puzzle over the meaning of entropy provides a real cause for concern for students new to the subject of thermodynamics; although, as has been said before, those approaching the subject from a more mathematical, rather than purely physical, background probably find it easier to accept the arguments presented because, for them, the entire argument leading to the introduction of the entropy function in classical thermodynamics may be treated as a fairly straightforward mathematical exercise. Nevertheless, it is still the case that no really straightforward reasonable physical meaning has been attributed to the function known as the entropy. Whether it is strictly true or not, many believe they possess a basic physical understanding of what internal energy, volume and number of particles are. Much the same may be felt true of notions such as heat and heat flow. Entropy, though, remains firmly fixed outside this group and most feel they have no real idea what the function is physically. Of course, from classical thermodynamics, it is clearly seen from the derivation that a change in the function entropy is equivalent to a change in heat (either positive *or* negative) occurring at a given value of the absolute temperature. This may not be quite as clear a meaning as some might like but, at least in classical thermodynamics, some sort of physical meaning for entropy change is readily available. In the other two fields of interest here – statistical thermodynamics and information theory – the same cannot be said to be the case but then, in those two cases, the whole basis is a probabilistic one not a physical one and so the same outcome might not be expected. The detailed physical meaning of the entropy remains a problem, though, and one which genuinely causes real problems for seasoned professional and new student alike.

Having said this, though, the problem of the links between the entropy functions of classical mechanics on the one hand and those of statistical thermodynamics and information theory on the other remains as well. Any change in the first is linked irrevocably with a change of heat either into or out of, the system in question and, therefore, such a change may be either positive or negative. The other two entropy functions are linked with probability distributions; changes of heat have no immediately apparent link. Of course, as has been admitted earlier, assuming these entropy functions the same as that of classical thermodynamics and assuming all the well-known relations of classical thermodynamics apply equally well in the other two branches has led to much increased theoretical knowledge of physical systems which appears to agree with experiment and observation extremely well. However, it does unwise if that fact alone is regarded as sufficient justification for assuming all three entropy functions equivalent.

Several others seemingly small points should be born in mind also. Firstly, classical thermodynamics only introduces, via the Second Law, a change in entropy. The other two branches introduce an actual entropy function. Also, since both these latter areas of study are probabilistic in nature, they introduce average values of such functions as the internal energy, the volume, the number of particles and so on. Hence, in these latter areas a discussion of the fluctuations occurring in these and other variables is introduced and has a definite role to play within those areas of study. This is not true, though, of classical thermodynamics which is a purely macroscopic theory dependent on quite definite values of variables such as those mentioned above. In classical thermodynamics, fluctuations in these, and other, quantities would have no role to play. Hence, any discussion of fluctuations in thermodynamic quantities is confined to statistical thermodynamics but it must be acknowledged that such discussion has proved useful when considering such phenomena as critical opalescence. It might be noted at this juncture that it is within statistical thermodynamics there arises the debate concerning violations of the Second Law. This is purely due to the supposed statistical nature of that law within that discipline. No such violations are allowable in classical thermodynamics.

One further point might be noted at this juncture and this again refers to the three different entropy functions. In classical thermodynamics, the entropy function's change is deduced from the Second Law and that law is something deduced by man from observations and experiment; it is not based on any particular model. However, the entropy functions of both statistical thermodynamics and information theory arise out of considerations involving probability distributions. The certainty of classical thermodynamic functions is replaced immediately by average values together with their inherent uncertainties but, more importantly, in a very direct sense, a model has been introduced into the picture and so, the situation is not quite as general as that perceived in classical thermodynamics.

Much has been written on the statistical interpretation of thermodynamics. Indeed I have worked on the topic myself and my friend and colleague, Bernard Lavenda, has produced an excellent book on the subject – *Statistical Physics: A Probabilistic Approach* – which makes extensive use of Gauss' law of error, which is itself discussed in Keynes book, *Treatise on Probability*, and leads to a good rigid foundation for the subject of statistical thermodynamics. However, that approach is still based on the hope that the statistical approach will lead to a greater understanding of physical systems. The fact that it has is testament to its genuine usefulness but recourse to probabilistic techniques is also an admission that we are not capable at the present time of explaining the said systems by exact means. The statistical approach by its very nature introduces an element of uncertainty into all considerations and hence the appearance of fluctuations in the values of physical quantities when examined using these techniques. This is why the statistical approach appears to allow violations of the Second Law whereas, within the area in which it was first announced, *no* such violations are possible. Again, when details of the statistical approach are examined, it is found that much progress in the field is dependent on assuming that relations such as the Euler and Gibbs-Duhem relations automatically apply but with the very definite quantities of classical thermodynamics replaced by the average values of those quantities appropriate to that statistical approach. The resulting theory has undoubtedly been extremely successful but its base is not as rigid as that of classical thermodynamics, as long as the true nature of classical thermodynamics is remembered. Here one crucial fact to be born in mind is that, in the basic formulation of the Second Law, the idea of cycles is all important so, when it is claimed that the Second Law has been violated in some process, if that process is not cyclic there is no need to consider the claim any further. For questions concerning the

Second Law, reference must always be made to one of the two early forms – either that due to Kelvin or the one due to Clausius. Reference to supposedly equivalent derived forms always leads to problems especially if such a form makes no mention of cycles.

Returning specifically to the question of the three entropies, it was seen in the earlier discussion how and where these arise. However, after all the talk both here and elsewhere, the question remains as to how the entropy of classical thermodynamics whose change is irrevocably linked to a change in heat – either positive *or* negative – may be linked definitely to either the entropy of statistical thermodynamics or of information theory, both of which have a probabilistic base. Assuming them the same leads to many useful, seemingly correct results but this major query must remain. Also classical thermodynamics only deals with changes in the value of the entropy; it does not introduce an absolute value. Again this is not true of the other two entropies, leading to yet another query, albeit possibly more minor than the first.

As mentioned earlier, no definite answer to these problems surrounding the entropy function or functions of physics is immediately forthcoming but it might be noted that that of classical thermodynamics is introduced as an entropy change and is equal to a change in heat (either positive or negative) divided by the absolute temperature at which the heat change takes place, while those of both statistical thermodynamics and information theory arise as properties associated with probability distributions. Hence, that of classical thermodynamics has a genuine physical interpretation while the other two are definitely more mathematical or theoretical in nature. At this point in time and with the present state of knowledge it seems this is about as far as one may go in seeking a realistic physical interpretation of the function known as entropy.

Mention has been made also of the Mechanical Equivalent of Heat and, in the relevant section on this topic, it was shown, following work by Tait how this quantity, denoted by the letter J , originally entered into classical thermodynamics and how its importance in the overall development of the subject came about. It is undoubtedly the case that the disappearance of this quantity from the literature due to the definitions of the measuring units now adopted has led to a decreased understanding of the basis of classical thermodynamics and, as a consequence, has seen more problems arise for students coming to the subject afresh. This may seem a trivial point to raise but it is surprising how few have today heard of the Mechanical Equivalent of Heat or of the great experimentalist James Prescott Joule, without whose ground-breaking work the subject might never have progressed as it did. As a more general point, it might be noted that the use of many systems of units in vogue in physics today can lead, at least to the uninitiated, to difficulties. This point has been mentioned here in relation to the mechanical equivalent of heat but, to the beginner, using units for which quantities such as the speed of light are put equal to unity, as is common in many general relativistic manipulations, can prove very confusing.

The final major query raised concerned the whole question of ‘reversibility’. This, indeed, is a topic which has caused many problems over the years; in fact, it’s probably caused more problems than many realise. Here the work of Landsberg has been quoted and used extensively and this is because he truly recognised the problems surrounding the use of this word and devised means to avoid them. It must be recognised at the outset that the ideas of a reversible change and a reversible cycle, while possibly linked, are nevertheless distinct notions. When discussing cyclic heat engines which formed the background and basis for much fundamental classical thermodynamics, it is often tempting to talk of them as reversible but, cleverly, Landsberg avoids this trap by considering such an engine moving in its forward direction and then considering its reverse operation totally separately. In this way, all the problems that may be associated with the notion of reversible cyclic engines are avoided but with no lack of understanding of the operation of the cyclic engines involved. The great care exercised by Landsberg over this seemingly small point is also apparent in the thermodynamic writings of Münster. Indeed, anyone new to the subject of classical thermodynamics could do worse than consult the books quoted in the bibliography by these two thermodynamicists. The actual discussion of ‘reversibility’ here is possibly as complete as it could be at this stage but it is certainly something worth noting for further future consideration.

A further book well worth consulting is that by Tait; a man somewhat maligned in his day but an extremely lucid writer on classical thermodynamics as well as on other topics – his essay on *force* appearing in his book *Recent Advances in Physical Science* being a little gem! To read the works by the

people mentioned, as well as perusing other works by leading figures of the past – especially from the later years of the nineteenth century - can lead to better understanding today.

Possibly the final point to be made is to draw attention to the oft quoted notion that, as is even stated by some today, the scientific community has solved all the truly great puzzles; it only remains to tie up a few loose ends. Just as such a claim was untrue in the past, so it is definitely untrue today. All true scientists must remain aware of this truism and act accordingly. Some points in thermodynamics to which attention has been drawn here provide excellent cases in point. The frequently quoted claim that the Second Law may be stated in the form *Entropy never decreases* and questions surrounding the notion of reversibility provide two almost perfect examples. In both cases, people should pause and reflect before advancing the claims they do. Both should be considered carefully and with no preconceived ideas. Probably the most important general point to emerge from the discussion here is not restricted to the Second Law or even thermodynamics as a whole and that is, whatever issue is being considered, approach it with a completely open mind and be prepared to question all that has gone before, even some basic principles which appear, at least at first sight, to form the actual foundation of the topic to be examined.

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Practical and theoretical assessment of relativistic theory.

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Abstract.

The Special and General theories of Relativity (SR and GR) have provided a deep mathematical formalism which has proven scientifically useful. However, it must be remembered that all scientific theory is but a model, and any model will necessarily demonstrate limitations and particular discrepancies compared to experimental results, which in turn define its limitations of theoretical utility and correspondence to reality. Theories are subject to the particular conditions of constraint under which they are devised, and also, the associated formalism may create artifacts within expressed physical theoretical applications which, although born of abstract formalism, might be taken as real physical quantities and effects. Within these concerns, one might ascertain the proper limits of a model like GR and the extrapolation of curved space time, and re-examine SR as well, for GR is based on SR.

Introduction.

The sorts of errors noted above have, in our personal view, contributed to the existence of several, likely false, pieces of science which are reflections of theoretical limitation, and the mistaking of abstract formalism for real physical objects; for example, black holes, dark matter, dark energy, and curved space-time. [1, 2]

Although touted as a complete explanation of much of our observed world there are questions, often unacknowledged, which should be addressed in order to understand the limits and identify the useful aspects of relativistic theory. From van Flandern's seminal essay *Gravity, What the Experiments Say* [2] the following points are brought forward (See also [1]):

Why do photons from the Sun travel in directions not parallel to the direction of Earth's gravitational acceleration toward the Sun?

Why do total eclipses of the Sun by the Moon reach maximum eclipse about 40 seconds before the Sun and Moon's gravitational forces align?

How do binary pulsars anticipate each other's future position, velocity, and acceleration faster than the light time between them would allow?

How can black holes have gravity when nothing can escape because escape speed is greater than the speed of light?

Also, there is the question of causality involving static field dynamics. [2, 3]

Gravitational lensing and red shift can be explained without recourse to theory involving paradoxical notions. One can explain it with refraction (and atmospheric interactivity) as in: [4,5,6,7] and [2]. Remembering the basic relation between a foundational SR and dependent GR, note the following from the above reference [7]:

“ . . . special relativity is nowhere exactly valid in the universe at large, because at cosmological distances the universe is a medium with high energy density (since it is

everywhere filled up with light or stars), and the space within galaxies is a notorious physical medium filled up of gases, particles and dust.” Please recall SR was conceived within particular conditions of constraint: light moves at c **only** as it propagates *in a vacuum*.

From, [6] “General Relativity predicts no diffraction with gravitational lensing since gravity warped space-time should bend all wavelengths equally. General Relativity theorists suggests the lack of diffraction in lensing is evidence their theory is correct. Yet “Einstein Rings” are blue. . . . The blue color is an indication of diffraction.” And also from the same source: “If refraction is the actual cause of lensing, a major assumption driving the dark matter search would be swept away. Because of such assumptions, critics suggest that even after decades of searching, dark matter remains dark — because it does not exist.” Indeed, this is our view as well. See also [8,9].

Do recall that GR, is in fact, based all but entirely upon (minimization of) time dilation. Is Bernard Burchell correct in his startling conclusion which states: “The acceleration time dilation aspects of General Relativity (GR) are internally self-contradictory and thus could not be true.” [10]? He may well be. We suggest that there are alternatives which can provide scientifically useful systems of calculation and analysis, and those systems are free from relativistic paradox.

In Tom Van Flandern’s essay, *The Speed of Gravity what the experiments say*, a solid and specific empirical answer is provided (see original article for embedded parenthetical references):

“The most amazing thing I was taught as a graduate student of celestial mechanics at Yale in the 1960s was that all gravitational interactions between bodies in all dynamical systems had to be taken as instantaneous. [2]

Yet, anyone with a computer and orbit computation or numerical integration software can verify the consequences of introducing a delay into gravitational interactions. The effect on computed orbits is usually disastrous because conservation of angular momentum is destroyed. [2]

While relativists have always been partial to the curved space-time explanation of gravity, it is not an essential feature of GR. Eddington (1920, p. 109) was already aware of the mostly equivalent “refracting medium” explanation for GR features, which retains Euclidean space and time in the same mathematical formalism. In essence, the bending of light, gravitational redshift, Mercury perihelion advance, and radar time delay can all be consequences of electromagnetic wave motion through an underlying refracting medium that is made denser in proportion to the nearness of a source of gravity. (Van Flandern, 1993, pp. 62-67 and Van Flandern, 1994) . . . The principal objection to this conceptually simpler refraction interpretation of GR is that a faster-than-light propagation speed for gravity itself is required. In the context of this paper, that cannot be considered as a fatal objection. [2]

We conclude that the speed of gravity may provide the new insight physics has been awaiting to lead the way to unification of the fundamental forces. . . . Moreover, the modest switch from SR to LR [\[Lorentzian Relativity\]](#) may correct the “wrong turn” physics must have made to get into the dilemma

presented by quantum mechanics, that violate the locality criterion may now be welcomed into conventional physics.” [2]

Note in [3] we find the following conclusion: "Therefore, the energy of potential energy of static fields was transported and, accordingly, represents information." We will state the matter even more clearly: Between refraction and information one may yet account for gravitation and resultant effects without any paradox, even mysterious quantum ones! [11]

Also recall the familiar fact that the celebrated Apollo missions used instantaneous gravitational propagation speed in the calculations which assured mission success [1]. Also please remember van Flandern's central role in creating the GPS system, and that no relativistic corrections are made to the system. "The system manages to work, even though they use no relativistic corrections after launch," Van Flandern said. "They have basically blown off Einstein." [12]

With these facts in mind, one must wonder if valid alternative theories and models exist which do not depend on Relativity as defined by Einstein, that may allow the usage of vital equations like $E = mc^2$? Is there another way to look at the situation, which does not depend on curved space-time, or the limit of light speed? We will present several such solutions for consideration.

Alternative systems of calculation and valid theoretical alternatives.

In the nineteenth century, the existence of a material medium, the aether, pervading all space was a generally accepted concept. The supposed mechanical vibrations of this medium were used to explain the wave propagation of light. One great challenge facing experimentalists, therefore, was to detect the actual presence of this medium. At the time, optical experiments were the most accurate available. Easily the best known was that performed by Michelson and Morley in the 1880's. It is well recorded that this experiment failed to detect the physical existence of the aether. In the history of the development of special relativity, this is the first juncture where questions should be raised. Was it actually true that the experiment did fail to detect the physical existence of an aether? The controversy surrounding this seemingly straightforward question continued throughout the twentieth century and is not resolved even today. It is claimed in the vast majority of, if not all, textbooks that no absolute motion was detected but, in truth, the published data revealed a speed of 8km/s. However, this made use of Newtonian theory to calibrate the equipment and was a figure much less than the 30km/s orbital speed of the earth. It was purely due to this second point that the detected speed was less than the orbital speed of the earth that a null result was claimed. It is now claimed by some that modern analysis leads to a different calibration for the equipment and that this, in turn, leads to a speed in excess of 300km/s. The claim is then that the experiment both detected absolute motion and the breakdown of Newtonian theory. This first supposed detection of absolute motion has supposedly been confirmed by other experiments.

However, it quickly became accepted generally that the Michelson - Morley experiment did, in fact, fail to detect the existence of an aether and there then resulted a major challenge to the theoreticians to explain this null result. After much preliminary work by such as Lorentz and Poincaré, Einstein's special theory of relativity emerged as the accepted explanation but that acceptance came several years after the appearance of his basic paper, years during which Lorentz's relativity theory had been widely accepted as valid. However, since those early years of the twentieth

century, there has been much discussion of the results of the Michelson-Morley experiment; it being claimed on many occasions that the experiment did not, in fact, produce a null result. The controversy still exists, to the extent that there are plans to perform the experiment yet again in an attempt to establish beyond all doubt the true facts of the situation. Nevertheless, one important piece of physics is invariably omitted from all these considerations. At the time of the original Michelson-Morley experiment and, indeed, at the emergence of the special theory of relativity, the notion of a boundary layer was unknown. Although Stokes had broached the idea in the middle years of the nineteenth century [13], boundary layer theory was introduced only in 1904 by Prandtl. His original publication was in an obscure journal [14] and it was quite some time before the ideas became both known and accepted.

However, if an aether did exist and if the ideas of boundary layer theory are accepted, then the Michelson-Morley experiment, since it was performed on the surface of the earth, would have been performed within the boundary layer between the earth and the aether. At the earth's surface the relative speed of earth and aether would be zero and so, on the basis of this, a null result should have been expected. Ideally, the Michelson-Morley experiment should be repeated, but this time well away from the possible boundary layer. Seemingly this would necessitate performing it well away from the earth and from all other planets. If the results of such an experiment were not null, the existence of an aether could be denied no longer and it would not be mandatory to assume the constancy of the speed of light. An important consequence would be that, as has been shown by Thornhill, the speed of light would be proportional to the square-root of the temperature of the background radiation. In turn, as has been noted elsewhere [15], this would negate the need for the inflationary scenario in the description of the very early universe.

In a series of articles going back to at least 1985, Thornhill has revisited the whole question of the validity of the special theory of relativity. However, he has approached the question from the point of view of a fluid mechanician. More recently [16], he concerned himself with contrasting the space-real time of Newtonian mechanics, including the aether concept, with the space-imaginary time of relativity involving no aether. By using the theory of characteristics, he showed that the usual Maxwell equations and sound waves in any uniform fluid at rest possess identical wave surfaces in space-time. Also, in the absence of charge and current, Maxwell's equations reduce to the same wave equation which governs such sound waves. This equation is not general and invariant but becomes so when transformed by Galilean transformation to any other reference frame. The same is true of Maxwell's electromagnetic equations which are not general but unique to one frame of reference; in fact, if the argument of Abraham and Becker [17] is followed through to its logical conclusion, it is seen that, in a general frame of reference, Maxwell's equations assume a form which is invariant under Galilean transformation and in which the operator $\partial/\partial t$ is replaced by Euler's total time derivative moving with the fluid, namely

$$D/Dt \equiv \partial/\partial t + \mathbf{u} \cdot \nabla$$

where \mathbf{u} is the constant relative velocity between the two frames in question [18]. The resulting progressive equations are then invariant and apply to electromagnetic waves in a uniform aether moving with constant velocity \mathbf{u} relative to the frame of reference. It is what Thornhill regards as the mistake of believing Maxwell's original equations invariant which has led to the Lorentz transformation and special relativity. Also, he would contend that it has led to the misinterpretation of the differential equation for

the wave cone through any point as the quadratic differential form of a Riemannian metric in space-imaginary time.

It should be noted that the modified form of the Maxwell electromagnetic equations referred to here has been derived independently on a number of occasions by a variety of people. Possibly most notable among these is Heinrich Hertz, whose derivation of the modified form is included in his 1893 book, *Electric Wave* [19]. This is truly notable because the date precedes relativity by so many years. Phipps [20] has queried whether Maxwell was aware of this work by Hertz and, if he was, why it didn't provoke him to re-examine his equations himself. However, it is possible, even likely, that Maxwell was aware of this work because it is known that he visited America and discussed the possibility of carrying out experiments using an interferometer to check on the possible influence of higher order terms in his theory. It is thought by some that this is what provoked Michelson to set up and perform his now famous experiment. If this speculation is true, the second part of Phipps' query remains as to why Maxwell didn't re-examine his electromagnetic equations. Of course, it is possible that he did but failed to complete a derivation in a moving medium. However, it is probably more important to note that, if Maxwell did know of Hertz's work, then others would have also and it is surprising, therefore, that special relativity came about as it did. Indeed, following Thornhill's reasoning, it may be felt surprising that special relativity, as known today, ever surfaced.

In yet another article [21], Thornhill showed that the equations governing general small amplitude wave motions to first order in the general unsteady flow of any general fluid also reduce to the same wave equation with constant thermodynamic wave speed in the case of a fluid at rest. The said wave equation was shown to hold in a unique frame of reference and is not, therefore, invariant under Galilean transformation. However, it emerged that it will transform under Galilean transformation into a form which is invariant for all other frames of reference. The wave surfaces of Maxwell's equations are then as for sound waves in any uniform fluid at rest. Again it follows that Maxwell's equations will hold only in a unique frame of reference and should not remain invariant when transformed into any other frame of reference. In particular, he showed that the envelope of all wave surfaces passing through any point at any time is, for the wave equation and, therefore, for Maxwell's equations also

$$c^2 dt^2 = dx^2 + dy^2 + dz^2, \quad (i)$$

where c is the constant thermodynamic wave speed. As he pointed out, this is a differential equation and the immediate task should be to solve it; this he does. It is obvious that this equation is

$$ds^2 = c^2 dt^2 - dx^2 - dy^2 - dz^2$$

with $ds = 0$. Thornhill's claim is then that this is where one mistake occurred, and has continued to occur. His contention is that there is no requirement for Maxwell's equations to remain invariant under transformation and that the above expression for ds^2 has meaning in the present context only when $ds = 0$. He suggests that Minkowski erred in apparently failing to recognise that equation (i) above is merely the differential equation of the envelope of the wave surfaces. A further point to be noted at this juncture is that Maxwell's equations, as normally considered, are derived for a medium at rest. It is conceivable that, if those equations had been derived for a moving medium originally, the controversies surrounding special relativity might never have arisen because that particular development might never have been required.

The above situation concerning Maxwell's equations and sound waves then raises the question of whether, or not, mathematics is required to tolerate the same equation being transformed in different ways for different applications. As Thornhill puts it, "does mathematics allow the wave equation to conform to Galilean transformation when it is applied to sound waves, to Lorentz transformation when it is applied to electromagnetic waves, and to either or both of these transformations when it is considered purely as a mathematical equation, or does mathematics insist that the Galilean transformation is unique and must apply equally to all equations so that the same equation must always be transformed by the same Galilean transformation, no matter to what it is applied, or whether it is applied to anything at all?"

It is recognised that the abandonment of special relativity and a return to Newtonian mechanics would result in a backlog of problems requiring conventional solutions. However, the claim is that such problems would lead eventually to the methods of unsteady gas dynamics and the theory of characteristics, such has already occurred in some instances. Thornhill himself has already tackled the problem of the kinetic theory of electromagnetic radiation and derived Planck's formula for the energy distribution in a black body radiation field from the kinetic theory of a gas with Maxwellian statistics [22]. It is in this article that he shows that, if there is an aether, the speed of light is proportional to the square root of the temperature. In this latter paper, and in a companion one [23], he argues persuasively against another reason for denying the existence of an aether. This asserts that the Maxwell equations indicate that electromagnetic waves are transverse and so, any aether, if it exists, must behave like an elastic solid. Thornhill points out that Maxwell's equations show that the oscillating electric and magnetic fields are transverse to the direction of wave propagation and say nothing about condensational oscillations of any medium in which the waves propagate. The deduction that electromagnetic waves are transverse might be felt an alternative way of claiming the non-existence of an aether. However, if an aether does exist, then, since electric field, magnetic field and motion are mutually perpendicular for plane waves, the deduction from Maxwell's equations would be that the condensational oscillations of the aether are longitudinal, in analogy with sound waves in a fluid.

Further, as has been pointed out by Thornhill [24], the reason Lorentz 'invariance' gives so many correct results is because one consequence of the Prandtl boundary layer theory is that the viscosity of the aether ensures that the local aether moves with all observers and all observers who move with the local aether have the same unique local wave-hyperconoid given by the differential equation

$$(dx/dt)^2 + (dy/dt)^2 + (dz/dt)^2 = c^2. \quad (ii)$$

This follows since the general wave-hyperconoid

$$(dx/dt - u)^2 + (dy/dt - v)^2 + (dz/dt - w)^2 = c^2$$

is invariant under Galilean transformation and, locally, $u = v = w = 0$ for all observers in their rest frames. Again, as noted already, the invariance of (ii) between all observers is established by using Galilean transformation, Newtonian mechanics and the aether concept.

Hence, it would appear that there are genuine points of concern over the total validity of the special theory of relativity. However, it must not be forgotten that another major accepted consequence of the theory was that energy and mass are related via

$$E = mc^2.$$

However, is this actually true?

One man who, over a period of time has produced much interesting and relevant material is Harold Aspden. Early in his later writing [25], he reveals some very interesting facts which, while probably well-known to some, will be far less well-known to the vast majority. He points out that physics, particularly electrodynamics, made tremendous and very rapid progress in the later years of the nineteenth century. One of the highpoints of this had to be the discovery of the electron by J.J. Thomson in 1897. This, of course, is well-known but what is less well-known is that this was followed, in 1901, by Kaufmann's discovery [26] that the electron's mass increased with speed. In fact, Kaufmann actually measured variation in the charge/mass ratio with increase in speed. The immediately obvious point concerning this piece of information is that it clearly predates Einstein's 1905 paper introducing his special relativity. It is also worth noting, because it is often either forgotten or deliberately ignored, that the explanation for this variation with speed had been provided by Thomson and others before the advent of Einstein's special relativity. Aspden has obviously delved very deeply into the scientific history of the now famous formula linking energy and mass and this is to the benefit of all, whether or not individuals agree with his conclusions. He notes that, as far as the formula $E = mc^2$ is concerned, definite reference was implied in a book of 1904, - *The Recent Development of Physical Science* by W.C.D. Whetham - where there was reference also to a suggestion made by Jeans to the effect that the energy of radioactive atoms might be "supplied by the actual destruction of matter". In other words, in an article of 1904 published in *Nature* (vol.70, page 101), Jeans directed everyone's attention to the store of energy which was available by the annihilation of matter, "by positively and negatively charged protons and electrons falling into and annihilating one another, thus setting free the whole of their intrinsic radiation". Jeans further noted that, initially, he felt he was advocating something new but actually found that Newton had anticipated something similar two centuries earlier, as is recorded in Query 30 of the 1704 edition of *Optics*. However, returning to the question of the equation $E = mc^2$, as Aspden notes, while specific reference to it does not appear in Whetham's book, all the necessary background physics is well presented in mathematical terms. No doubt, Thomson had arrived at his result by assuming the energy of the magnetic field due to the motion of a charge e at a speed v to be $e^2 v^2 / 3ac^2$ and thinking of this as equalling the kinetic energy $mv^2/2$. The equality of these two expressions results in:

$$mc^2 = 2e^2/3a,$$

where the expression on the right-hand side is the energy Thomson recognised as that of an electron with its charge contained within a sphere of radius a . Hence the implied equivalence of mass and energy is deduced.

Again, it should be noted that J. J. Thomson himself referred to the relation $E = mc^2$ in a series of lectures he delivered at Yale University in 1903. These lectures also appeared as a book [27] published initially in 1904. Hence, it is undoubtedly the case that this most famous of physics' relationships was both known and used well before the advent of Einstein's special theory of relativity. Indeed, more recently, J. P. Wesley [28] has noted that this relation is an experimentally verifiable fact and has shown that, by accepting that, he has been able to deduce other relations normally accepted as being linked solely with the special theory of relativity. Possibly the most important example is the following:

Wesley diverges from traditional Newtonian mechanics as a result of his noting that, since mass/energy equivalence is an established fact, if this applies to any

form of energy, it follows that there must be a mass equivalent for kinetic energy. This fact has to be included, therefore, in traditional Newtonian mechanics as a modification. Consider a body at rest whose measured mass is m . Suppose this same body then moves and when in motion, possesses a kinetic energy T then, the mass equivalent is T/c^2 and, therefore, the total momentum of the body is given by

$$\mathbf{p} = (m + T/c^2)\mathbf{v}$$

From Newton's Second Law, it follows that the force acting, \mathbf{P} , is given by

$$\mathbf{P} = \frac{d}{dt} \left(m + T/c^2 \right) \mathbf{v}$$

Since the rate of working of the force equals the rate of increase of the kinetic energy, it follows that

$$\frac{dT}{dt} = \mathbf{v} \cdot \frac{d\mathbf{P}}{dt} = \mathbf{v} \cdot \frac{d}{dt} \left(m + T/c^2 \right) \mathbf{v}$$

Next note that, if $\gamma = \left(1 - v^2/c^2 \right)^{-1/2}$,

$$\frac{d\gamma}{dt} = \frac{\gamma^3}{c^2} \mathbf{v} \cdot \frac{d\mathbf{v}}{dt}$$

and so

$$\begin{aligned} \frac{dT}{dt} &= \mathbf{v} \cdot \frac{d}{dt} \left(m + T/c^2 \right) \mathbf{v} \\ &= \left(m + T/c^2 \right) \mathbf{v} \cdot \frac{d\mathbf{v}}{dt} + (\mathbf{v} \cdot \mathbf{v}) \frac{1}{c^2} \frac{dT}{dt} \\ &= \left(m + T/c^2 \right) \frac{c^2}{\gamma^3} \frac{d\gamma}{dt} + \frac{v^2}{c^2} \frac{dT}{dt} \end{aligned}$$

Rearranging leads to

$$\frac{dT}{dt} = (mc^2 + T) \frac{1}{\gamma} \frac{d\gamma}{dt}$$

or

$$\frac{1}{(mc^2 + T)} \frac{dT}{dt} = \frac{1}{\gamma} \frac{d\gamma}{dt}$$

Integrating both sides with respect to t and noting that $T = 0$ when $v = 0$ leads to

$$T = mc^2(\gamma - 1),$$

a result normally associated with the Special Theory of Relativity.

Another person to obtain results normally associated with special relativity but without recourse to the postulates and methods of that theory is Mandelker who, in his 1954 book, *Matter Energy Mechanics* [29], derives the usual special relativity formula for the change in mass with speed without recourse to the methods and techniques of special relativity. This follows on Wesley's derivation of the expression for kinetic energy again without recourse to the methods of special relativity. However, is this derivation by Mandelker correct?

Newton's second law should properly be written as he himself intended

$$\mathbf{F} = \frac{d}{dt} (m\mathbf{v}) = m \frac{d\mathbf{v}}{dt} + \mathbf{v} \frac{dm}{dt}.$$

The propensity for writing and speaking of this law in the form force equals mass multiplied by acceleration and which assumes the mass constant, is possibly the cause of much trouble in physics over all the years since Newton.

An element of work done, dW , is given by

$$dW = F \cdot ds = m \frac{dv}{dt} \cdot ds + \frac{dm}{dt} v \cdot ds$$

Then, if energy and mass are linked via

$$E = mc^2$$

as is verifiable experimentally, by conservation of energy

$$dW = dE$$

or

$$m \frac{dv}{dt} \cdot ds + \frac{dm}{dt} v \cdot ds = c^2 dm$$

This may be rewritten

$$mvdv = (c^2 - v^2)dm$$

or

$$\frac{v dv}{c^2 - v^2} = \frac{dm}{m}$$

which may be integrated to give

$$\log m = -\frac{1}{2} \log(c^2 - v^2) + \log A$$

where A is a constant of integration.

If $m = m_0$ when $v = 0$, then A is seen given by

$$\log m_0 + \frac{1}{2} \log c^2$$

and substituting back and rearranging leads to

$$\log \frac{m}{m_0} = \frac{1}{2} \log \frac{c^2}{c^2 - v^2}$$

or

$$m = \frac{m_0}{\sqrt{1 - v^2/c^2}}$$

the familiar expression normally associated with special relativity.

All the above is achieved without recourse to the traditional notions of special relativity and without use having to be made of the almost totally mathematical approach involving use of the Lorentz transformation equations. This is important because many of the puzzles associated with traditional special relativity may be traced back to the Lorentz transformation equations and it is these puzzles, many of which are really mathematical in fundamental nature rather than physical, which caused Herbert Dingle so much trouble. After many years promoting special relativity, Dingle [30] raised several worries and objections; most notably possibly that concerning the seeming non-symmetry of the problem of the so-called ‘clock’ or ‘twin paradox’. Whatever a person’s personal views may be, it is undoubtedly true that the history of this dispute (fully documented in the given reference) hardly indicates a satisfactory resolution of a genuine problem. Here, after all, was a major query being raised by one who had been a very genuine supporter of the special theory of relativity as put forward by Einstein and, once again, a person well-known and well-established in academic circles. Dingle experienced real concerns over the validity of the theory and, as well as those, he recognised that there were in existence *two* special theories of relativity, one attributable to Lorentz and the other to Einstein. The difference between the two, as he pointed out, was a big one; the first retained the concept of an aether, the second did not.

As far as the special theory is concerned, it is undoubtedly true that controversy has simmered just beneath the surface from the very early days. The general theory, however, seemed to offer the only solution to problems which had been taxing theoreticians for some considerable time. Doubts were expressed but, as has so often been the case where Einstein's theories of relativity are involved, the concerns of the doubters were regularly dismissed. Again, though, as in the case of special relativity, not all the facts are made readily available to modern day audiences. In Newtonian mechanics, although not specifically mentioned usually, the effects of gravity are assumed to propagate at infinite speed. This follows from Newton's original concept of action-at-a-distance. More recently, the thought has developed that, in reality, gravitation propagates at the speed of light. One example that originally caused problems was the value of the observed advance of the perihelion of the planet Mercury. Newton's theory explains an advance of the perihelion but not of the observed magnitude. It is proclaimed nowadays that Einstein's general theory of relativity was the first to explain the advance correctly. It is true that it does predict the correct value for the advance but, as Aspden¹³ reveals, Einstein wasn't the first to offer a satisfactory explanation. This honour falls to a German schoolteacher, Paul Gerber, who presented a theoretical argument giving the precise value of the anomalous advance of the perihelion of Mercury in an article entitled *The Space and Time Propagation of Gravitation* and published in 1898 [31]. Gerber actually derived exactly the same formula for the advance as that given by Einstein in 1916 and, in fact, had assumed that the effects of gravity propagated with the speed of light, in common with ideas of today. Aspden comments that Gerber may have made mistakes in his argument but implies that the basic argument was correct and all that was needed was for someone to tidy it up. Instead, this work was, and still is, virtually unknown. This is surprising because the article addressed a major problem of the time, appeared in a highly regarded journal and the fact that it appeared in German would have posed less of a problem to international audiences than it might now.

The arguments surrounding the advance of the perihelion of Mercury and other phenomena supposedly explained by the general theory of relativity and only by that theory have continued apace ever since the theory first saw the light of day. Most suggested alternative explanations have been dismissed, often with a sad shake of the head as if to suggest some degree of sympathy for someone who could be so deluded as to think they could even contemplate offering an alternative. Nevertheless, in more recent years, alternative ways of explaining the shift of the perihelion of Mercury and the bending of light rays have emerged. One of the most recent is that due to Lavenda [32]. He set out to explain the time delay in radar echoes from planets, the bending of light rays, and the shift of the perihelion of Mercury via Fermat's principle and the phase of Bessel functions. It is undoubtedly true that he has succeeded in explaining these three phenomena by this means. However, he met fierce opposition when it came to publishing this work. Why? Nowhere does he claim to be attempting to usurp the position of general relativity; he merely wishes to point out that some results, at least, may be obtained by means other than use of the general theory of relativity. As he himself says, "Sometimes new insight can be gained by looking at old results from a new perspective." This highly perceptive suggestion by Lavenda might usefully be noted by all who oppose the publication of anything that even appears to question either special or general relativity, or indeed any who oppose publication of anything purely because it fails to conform to some arbitrary element of 'conventional wisdom'. The alternative suggests an amazingly blinkered view, often by some of the publicly acknowledged giants of the scientific world. The only way forward in any

pursuit of knowledge is to admit all possibilities. Once you close one door, you instantaneously rule out one avenue of approach and, therefore, possible advance. Intellectual giant though Newton undoubtedly was, everyone is quite happy to query details of his theories, and rightly so. Hence, why is questioning of Einstein's theories regarded by so many as totally unacceptable? This is a question to which no-one probably knows the true answer. Nevertheless it is a question which needs to be raised and one of which the public at large should be aware. To emphasise a point raised above, alternative approaches do exist which lead to the solution of problems which may also be solved using the methods of general relativity and, as Lavenda has said, examining these alternatives could lead to new insights.

For mathematicians, the general theory of relativity has always been regarded as a thing of real beauty. This is a position which any non-mathematician may find extremely difficult to comprehend but it is, nevertheless, very true. It must always be remembered that mathematics is a subject which may be studied on at least two very different, but equally important, levels. It may be studied as a purely academic subject in its own right. In this approach, the mathematics is all important and, to the practitioner, can be, and often is, extremely beautiful. It must be noted also that, academically, this approach to mathematics is fully justified; it is a highly worthwhile academic pursuit. However, the second major view of mathematics is as the language of physics. In this context, mathematics may still be seen as extremely beautiful but here it is, and indeed must be, subservient to the physics in importance. Once mathematics is used as the language of physics, it is being used as a tool in an attempt to describe physical situations. It is no longer truly important in its own right. Now, it is the physics of the situation under consideration which is all important and must provide the driving force for any work which ensues. Again, the mathematics is being used in this case to help model a physical situation and it must be remembered always that that is all that is being attempted – to produce a model of a physical situation. It is highly unlikely that any such model will be an exact representation of physical reality; it will be merely an approximation. How good that approximation proves to be is determined by what follows from the theory. Does it, for example, make valid predictions about the physical situation which originally occasioned the investigation? If it does, the accuracy of these predictions will prove a useful guide to the worth of the theory. However, where great care must be taken is in ensuring that the physical situation under consideration isn't, in any way, forced to 'fit' this theory; it is vital to avoid the accusation that observations are interpreted with the predictions of the theory in mind.

The general theory of relativity is one of those topics which rely heavily on very beautiful mathematics, to the extent that the physics of the situation can even tend to be obscured by that very mathematical beauty. Mathematics is a beautiful, rewarding subject in its own right and, academically, no justification is needed to support its study. However, as mentioned above, where study of physics is concerned, mathematics is simply a tool to be used by the physicist in aiding the resolution of a physical problem. In these circumstances, it is the physics which is all important. A theory cannot be adopted to the exclusion of all others simply because the mathematics is beautiful. As far as general relativity is concerned, as has been stated on several occasions, the only results which can be truly trusted are those with a Newtonian analogy. It must be remembered also that, in practice, the results of the theory are used only rarely where descriptions of the physical world are involved; the results are used far more frequently to speculate about the physical world, especially its origins. One must wonder about the worth of speculating about the physical world

and its origins on the basis of a purely abstract mathematical theory – however beautiful the mathematics may be. Some of these speculations, which dominate much present day thinking, involve the imposition of a physical meaning to a mathematical singularity. Both the notions of the ‘Big Bang’ and of relativistic black holes fall into this category.

Santilli's Iso-Gravitation:

There is a modern interpretation of gravitation which has attempted to address the clear theoretical inconsistencies in Einstein's work, and that is Santilli's Iso-Gravitation (SIG). Experimental inconsistencies which plague Einstein's Relativities and subsequent attempts at grand unification with quantum aspects have thereby been treated, and a possible solution offered. The said inconsistencies regarding unification are:

I. The physical consistency of electroweak interactions on a flat Minkowski space cannot be salvaged when joined to a theory on the curved Riemannian space because the insufficiencies of the latter carry over to the former;

II. Within a grand unification, the covariance of Einstein's gravitation carries over to electroweak interactions, by therefore destroying their gauge invariance and, consequently, the very structure of electroweak interactions;

III. Electroweak interactions represent both particles and antiparticles, while Einstein gravitation solely represent matter, thus rendering any grand unification technically impossible and catastrophically inconsistent if attempted. [33] (p. 64)

From the above referenced source and page, we see the solution is based on isomathematics, tied to conditions:

"... possess an invariance similar to that of the Poincare symmetry in special relativity so as to predict the same numerical values under the same conditions at different times. The best known way to achieve an invariant theory of gravitation is via the use of Lie's theory. But the latter theory solely applies to linear systems. The necessary non-linearity of gravitation then precludes any realistic possibility of achieving an invariance via the use of 20th century mathematics. The above occurrence forced the author to construct the isotopies (intended as axiom-preserving) of 20th century applied mathematics ... today known as isomathematics ... " [33] See also [34].

It will, therefore, be useful to articulate a general summation of the history and basic principles of iso-mathematics and SIG.

Since his early days as a student in his native Italy, Ruggero Santilli has been deeply concerned with the large number of inconsistencies present in modern day science. From the outset he recognised that, in order to make real progress, it would be necessary to develop new forms of mathematics. After many years research, he succeeded in developing three new forms – isomathematics, genomathematics and hypermathematics. In essence, in each of these the commonly accepted unit is replaced by increasingly more complicated units. This seemingly little modification does, however, lead to a vast amount of literature in which all the necessary ramifications are explored in detail. Hence, in each new form, there are new numbers and new rules for all common mathematical manipulations. Once all this was in place, attention was turned to re-examining numerous problems in physics, chemistry and, although scientifically more complicated and needing use of hypermathematics, even biology. To truly understand Santilli's solutions in each of these fields, it is necessary first to master the techniques involved in this new mathematics.

While admiring Einstein's contributions to modern science, he recognised some of the problems associated with his work. For example, he noted that the original assumptions refer to conditions, such as the constancy of the speed of light, in a vacuum. This actual assumption caused him great concern because, as he noted, the speed of light is known to depend on the medium in which it propagates with the speed in a vacuum c_0 being related to that in the medium by

$$c = c_0/n,$$

where n is the familiar index of refraction. Hence, whether or not c is less than or greater than c_0 depends on whether n is greater than or less than unity, and both situations can occur in nature. These concerns necessitated examining from a slightly different viewpoint the results of Einstein's theory of special relativity. It should be remembered always though that Santilli considers special relativity exact under the conditions stated by Einstein himself; that is, (i) for point particles and electromagnetic waves, (ii) propagation in a vacuum, (iii) when referred to an inertial reference frame. If any one of these conditions is violated then, in Santilli's view, the theory becomes inapplicable, but not violated because it was never constructed to deal with the new conditions. It is in this latter case that the need arises for the new theory developed by Santilli himself.

Again he noticed various inconsistencies in Einstein's celebrated general theory of relativity, noting particularly that several arose due to the introduction of the so-called Newtonian approximation. For example, this approximation results in the introduction of a mass into what was initially assumed to be an *empty* space. He was concerned also with powerful evidence suggesting a lack of curvature of space and/or space-time. Due to the fact that he also acknowledged Einstein's general theory of relativity as being, in reality, a theory of gravitation, led to his development of his own so-called iso-gravitation which, as its name implies, draws heavily on the isomathematics referred to above. It should be noted also that the new theories of isogravitation and also genogravitation and hypergravitation apply for both interior and exterior problems and are also special cases of his iso- geno- and hyper-relativity.

Isomathematics is formed by an isotopic lifting of the conventional associative product between generic quantities into an iso-product [33, 35]. In this way, problems that have remained unsolvable under the older formalism based in the mathematics and differential calculus of Newton-Leibniz might be fruitfully addressed. Lie's theory can be freshly conceived to articulate non-linear, non-local and non-Hamiltonian systems (that is, variationally nonself-adjoint systems not representable with a Hamiltonian) [33, 36]. To achieve fundamental time evolution invariance Santilli created Iso-Differential calculus [37]. A comprehensive compilation of these and other vital mathematical derivations and formalism are available here: [38, 39, 40].

IsoMechanics was then created by the isotopic lifting of Newton's equations allowing the representation of extended bodies and then, the iso-action principle permitting the representation of optimal control theory in determination of wing geometry within a fluid dynamic model; followed by the Schrodinger-Santilli isoequations of hadronic mechanics and the Heisenberg-Santilli isoequations to create a *completion* of existing quantum theory. [33] (pp. 64-65.)

Iso-Gravitation was formulated while maintaining Einstein's field equations including their primary verifications, although formulated upon a new geometry over new fields with null curvature. [33] (p.66) Minkowski-Santilli IsoSpace [41,42] was derived allowing isotopies of Minkowski space which preserve the original flatness despite the dependence of the isometric on local coordinates. Lorentz-Santilli

isosymmetry was then derived to be locally isomorphic to the original symmetry as is crucial for achieving compatibility of isogravitation with 20th century theories and for attempting a consistent grand unification of gravitation and electroweak interactions. [33] (p. 67) Further development ensued, including analysis of complex isotopies of rotational symmetries, spin, topology preserving deformations of the sphere and the first proof of the universal invariance of all possible non-singular Riemannian line elements [33] then, the isotopies of the spinorial covering of the Poincare symmetry and others, which were in turn confirmed by independent papers [43,44]. In this way, the pathway leading to the essential equations and axioms of functional IsoGravitation applied to interior and exterior problems, anti-matter and eventual grand unification of quantum and gravitational aspects has indeed been developed, articulated and subsequently verified.

Conclusion.

The rich formalism of Einstein's relativistic science is over 100 years old. Not surprisingly, the model has been stretched past its original intended applications in the many years since its conception. History yields a treasure trove of alternative systems and models, and new insights such as those found in Santilli's Iso-Gravitational theory could well help science to progress past its entrenched doctrines. The paradoxical aspects of relativistic interpretations of physical processes are troubling. It may be possible to achieve the same valid results, and perhaps also, results of greater or equal accuracy free of paradox, by using alternative models and systems of calculation. Should science seek to advance past its obvious current limits, it must permit the introduction and exploration of alternative paradigms to Einstein's relativity. Only in this way will our race and the scientific achievement which supports it flourish.

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The informational magnecule: the role of aqueous coherence and information in biological dynamics and morphology. *

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Introduction:

Water is a highly complex and unique molecule which is basic to life as we understand it. However, at the very outset it is important to note that, as far as standard textbook chemistry is concerned, all theory is totally reliant on electrostatics and avoids all mention of electrodynamics and the consequent radiation field. It is this crucial point which contributes to the inability to recognize phenomena which are dependent on that field. In Hadronic science liquid water itself by way of its H bridges is understood as a magnecular structure, with a Curie temperature of 100 degrees C (Santilli, 2005, 2008, 2012 and others). Interestingly and importantly, Santilli has pointed out in a private communication that much of his theory of magnecules could be derived via quantum electrodynamics instead of by the methods he espoused in his book *Foundations of Hadronic Chemistry* (2001). We will first articulate some of the special properties of water as they imply functional effects related to informational processes, em fields, and aqueous dynamics within biology.

Water has many unique properties and is experimentally derivable as the primary interface with biological systems. Water state, pH, hydrogen bonding, and water magnetic 'memory' are affected by electromagnetism (Fesenko & Gluvstein 1995; Yamashita et al., 2003; Dunning-Davies 2012; Zhao et al., 2015). Extremely Low Frequency Electromagnetic Fields (ELF-EMF) affect water via alteration of the lower energy part of the stretching absorption band ($\sim 3250\text{ cm}^{-1}$) relating to coherent fully hydrogen bonded populations (De Ninno & Castellano 2011). There is a great deal of evidence from experimental physics, chemistry and biology supporting the notion of water as a primary mediator of biological effects induced via electromagnetic means into living systems. Pollen germination, tobacco plant resistance to pathogens, seed hydration and germination, techniques such as photoluminescence spectroscopy used to determine the activity of pulsed fields on the "bubble/water interface," magnetic field effect simulation, and other experiments abound (Betti et al., 2011; Trebbi et al., 2007; Amyan 2004, 2004a, 2006; Vallée et al., 2005, 2005a; Chang & Weng 2006, 2008; Pang & Deng 2008). It seems clear from this vantage, that water may well be the primary mnemonic interface for electromagnetic/photonic quantum informational transfer from active compounds into biological systems. This effect takes place at room temperatures.

Quantum *entangled processes* and *informational exchange* are now known to be dynamic contributors in biological systems at room temperatures (Cai et al. 2010; Cifra et al. 2010; Rosi et al. 2011; Prasad et al. 2014) and by way of empirically rigorous Time Dependent Density Theory models, have been demonstrated as primary contributors to the evolution of life itself from photosynthetic prebiotic kernel systems in the Isua Greenstone Belt in Greenland some 3.7 - 3.85 billion years

past (Tamulis et al. 2016; Norman and Tamulis 2016). There is further longstanding evidence of the delicate connectivity between photonic expression and biological processes. What is now known as the coherent biophoton field (please think of the life's work of Fritz Popp), was first discovered by Alexander Gurwitsch while working with onion roots in 1922 as “mitogenetic radiation” in the UV range, exemplifying his concept of “morphogenetic fields.” In Popp (1999) we read: “...a single photon may suffice to trigger about 10^9 reactions per second since the average reaction time is of the order of 10^{-9} seconds and provided—in addition—that it is directed in a way that it delivers the right activation energy as well as the right momentum at the right time to the right place. This means that a surprisingly low photon intensity may suffice to trigger all the chemical reactions in a cell.” Electromagnetic fields can be mathematically defined as informationally interactive with biological systems (Brizhik et al. 2003; Brizhik and Foletti 2014). Based upon this evidence, we conclude that given the correct conditions (at room temperatures) *photons can be informationally encoded and via quantum processes can and do affect biological systems.*

As we propose that (molecular) *information alone* can affect biological morphofunctional outcomes through aqueous memory, we must detail the history and mathematical evidence supporting the proposed notion of memory capacity in water.

History, mathematics and general theory in support of aqueous memory and coherent biological informational distribution.

Historical Background:

People have speculated for some time over whether substances, such as water, actually have a memory. However, it was in 1988 that a truly staggering article appeared in the journal *Nature* purporting to report the experimental observation of this property assumed by many to be merely an attribute of animals, particularly humans. The article in question (Davenas 1988) by a team, headed by Dr. Jacques Benveniste, claimed to have observed that extremely dilute biological agents were still capable of triggering relevant biological systems. In fact, they even claimed this to be so in the absence of actual physical molecules of the agents concerned. Some of the experiments had been reproduced in laboratories other than Benveniste's and members of these laboratories co-signed the article. However, this article provoked a flurry of comment and resulted in the experiments being rerun under the 'scientific' eyes of a fraud detector, a journalist and a magician. Presumably by 'a journalist' was meant the editor of *Nature*, but that person was by training a physicist and might have been expected to have had some elementary knowledge of information theory and that it had been applied to physical systems. Although a relatively old subject in its own right at that time, information theory had been coming into physics via such books as that of Brillouin (1962). It might have been thought by some that this fact would have introduced a more cautious note into some of the condemnation of Benveniste's work.

The article itself appeared in the issue of the journal for the 30th June 1988 and the ensuing furor was such that the then editor of *Nature* summed up his

reading of the situation and called a halt to further correspondence in the issue of 27th October 1988, after allowing Dr. Benveniste a chance to answer his critics. What really caused the furor? The answer is best summed up by the 'Editorial Reservation' which appeared with the original article. This said that “readers of this article may share the incredulity of the many referees who have commented on several versions of it during the past several months. The essence of the result is that an aqueous solution of an antibody retains its ability to evoke a biological response even when diluted to such an extent that there is negligible chance of there being a single molecule in any sample. There is no physical basis for such an activity.” In the later commentary, attention was drawn to the fact that one of the concerns of the editor of *Nature* was that the publication of the paper was “certain to excite the interest of the homeopathic community”. Given this, therefore, it is surprising the article ever appeared in print, but appear it did even though it was stated there was no physical basis to explain the claimed phenomena.

It is this final statement which is now called into question with the appearance of an article purporting to give the biophysical basis of the Benveniste experiments (Widom et al., 2010). From this vantage, the general mechanism of Quantum Information Medicine may be implied.

Theoretical background:

The basis of information theory is now well-established. Following the approach of Brillouin (1962), if P denotes the number of states in a system, then the information memory capacity (denoted by I) in 'bits' is defined to be

$$I = \ln P, \quad (1)$$

where, if a problem is considered with N different independent selections, each corresponding to a binary choice (0 or 1), the total number of possibilities is

$$P = 2^N \quad (2)$$

and so the information is:

$$I = N \ln 2. \quad (3)$$

Alternatively, the entropy function of statistical thermodynamics is given by

$$S = k \ln P, \quad (4)$$

where k is Boltzmann's constant.

It follows that, for the above expression for P ,

$$S = k \ln(2^N) = kN \ln 2 \quad (5)$$

Further, it may be noted that the first and second laws of thermodynamics may be combined into the equation

$$dU = TdS + d'W, \quad (6)$$

where dU denotes the internal energy, T the absolute temperature and $d'W$ the work done on or by the system. In terms of memory capacity, this becomes

$$dU = (kN T \ln 2) dN + d'W \quad (7)$$

and it is seen immediately that the energy required to add one bit of memory to the system is given by

$$kT \ln 2 = \frac{\partial U}{\partial N} \quad (8)$$

where the partial derivative is evaluated with the work term held constant.

It might be noted that heat capacity is necessarily a positive quantity (Lavenda & Dunning-Davies 1990) and, therefore, this last equation leads to the realisation (Widom et al., 2010) that a program written using $\square N$ bits of system memory dissipates energy of at least $[kN T \ln 2] \square N$. As noted previously, this constitutes an irreversible bound on a classical computation imposed by the second law of thermodynamics, although great care should always be exercised when applying results of classical thermodynamics in either statistical mechanics or information theory as it is not clear that the functions termed *entropy* in each of those three disciplines are always identical (Sands, 2016 and references cited there).

This brief introduction to some of the basic ideas of information theory and the link with statistical thermodynamics provides one part of the basis for the promotion of the idea that water possesses memory. The second part derives from a detailed study of some of the properties of water itself.

Properties of water:

Water is such a commonly available and apparently straightforward liquid that most take for granted and the popular picture, derived from standard chemistry, of it being composed of an oxygen atom attached to two hydrogen atoms belies a quite detailed, complex structure. Standard textbook chemistry has an enviable history of genuine scientific success but it is actually confined by a simple scheme of charges interacting via static Coulomb forces; that is, it is totally reliant on

electrostatics and omits all mention of electrodynamics and the consequent radiation field. It is this basic neglect which is responsible for the inability to recognise phenomena which are, in fact, dependent on that radiation field. This is doubly unfortunate since physicists and engineers are only too aware of this cause and effect since it is due to this dynamical effect that so many modern-day appliances work; for example, the electric light on which we all depend and the wifi connections which are assuming increasing importance in our lives. It has been speculated that a goodish percentage of effects in condensed matter physics make use of the radiation field in one way or another but it still doesn't seem to have found a place in much of basic chemistry.

This paper [(Widom et al., 2010) and references cited there] draws attention to the fact that water has been shown to contain electric dipole ordered domains due to a condensation of photons interacting with molecular dipole moments. These ordered domains yield an unusually high heat of vaporisation of water per molecule and this has been shown to imply a high degree of memory storage capacity. In a similar manner, it has been shown that the partial entropy per molecule of an ionic species dissolved in an aqueous electrolyte implies a large number of bits of information per ion. This number is, in fact, so high as to lead to the expectation of such ions being attached to an ordered water domain. This state of affairs allows for semi-permeable membranes which may either permit or forbid the passage of an ion through a small gap. This would be expected to depend in part on the state of order in the ion attachment. Such a situation, based on information or, equivalently, entropy, indicates a program for biological cells analogous to polymer DNA based programs. It is ion flows through membranes in nerve cells which allow human memory storage in nerve cell networks in the human brain. These possess roughly the same magnitude for biological information capacity density and it well surpasses the comparable figure for commercial computer memory devices.

It should be noted also that the magnetic properties of water are again of great interest. In fact, a coherent ordered domain in water shows almost perfect diamagnetism, although the total diamagnetism in water is weak. This follows due to the magnetic flux tubes being capable of permeating normal water regions just as they can permeate type two superconductors via their normal regions. Trapped magnetic flux tubes may also carry information and give some directionality to what would otherwise be isotropic pure water.

The domains in water also exhibit a rotating electric dipole moment. If an electric field is applied, strings of electric dipole aligned water domains are formed and many such strings form a dipolar field bundle of strings. If the field is applied by employing a voltage between two electrodes then the bundle will start at one electrode and continue to the other. These strings will have an effect on the entropy and, therefore, on the information capacity of the water memory. Further, according to the two fluid model of water structure, an ion could flow with virtually no friction through the bundle of strings from one electrode to the other.

Finally, it should be noted that, if the bundles of these strings are orthogonal to an applied magnetic field, ionic transport resonance effects can occur between the

time varying part of the magnetic field and the cyclotron frequency associated with the uniform part of that field.

Implications:

It follows that the ordering of water through coherent domains yields sufficient structure for truly significant memory capacity. This view receives support from statistical thermodynamics and information theory. It is seen that ordered water domain polarized string bundles affect ionic motion and this can act as switches in networks of nerve cells. Many of these actions should be measurable by employing magnetic resonance imaging techniques.

What are the consequences of all this? To answer the objection: "*There appears to be no active chemical producing the effect,*" we need but remember the possibility of dynamic effects having a part to play, a point well illustrated by the case of a magnetic recording tape. In the investigation (Widom et al., 2010) it was found that, using electromagnetic theory, the existence of electromagnetic domains in water was confirmed. These are actually small ferro-electric structures within which electric fields are trapped. Hence, water is ferro-electric and it is this which is fundamentally responsible for many intriguing properties of water, including its memory. This general theoretic approach appears to be indicative of the likely mechanism responsible for the proposed mnemic effects within the idea of *Quantum Information Medicine*.

Nobel Laureate Dr. L. Montagnier and associates have suggested that quantum electromagnetic informational effects sustain many disease processes (Montagnier et al., 2011). These quantum processes involve the idea of a *Coherence Domain*, (CD). Please think of a CD as a dynamic aqueous structure, which uses the special properties of water, such as its electron dynamics and organized response to electromagnetic fields, to receive electromagnetically encoded information at a low frequency, and sum the resultant excitations, so as to foster the redistribution of that information at frequencies which may affect biological systems. A CD is a pool of quasi-free electrons, functioning as a semi-conductor, where coherent excitation creates a spectrum of coherent excited levels from resultant coherent quasi-free electron vortices, the magnetic dipoles of which are aligned with external/terrestrial magnetic fields. Coherent vortices have no internal friction and hence a long lifespan, so additive excitations sum to a vortex whose rotational frequency is the sum of the frequencies of the component vortices. The CD is thereby able to transform ambient noise, namely an ensemble of a large number of low frequency excitations, into a unique high frequency excitation (Del Giudice et al., 2013). "When the oscillation frequency of the CD matches the oscillation frequency of some non aqueous molecular species present on the CD boundaries, these "guest" molecules become members of the CD and are able to catch the whole stored energy, which becomes activation energy of the guest molecules; consequently, the CD gets discharged and a new cycle of oscillation could start" (Montagnier et al., 2011). Here, it appears we may have the mechanism whereby the correct frequencies (Brizhik 2003) for biological interactivity are achieved and distributed.

"The CD is a self-produced cavity for the em field because of the well known Anderson-Higgs-Kibble mechanism . . . which implies that the photon of the

trapped em field acquires an imaginary mass, becoming therefore unable to leave the CD. It is just this self-trapping of the em field that guarantees that the CD energy has a finite lower bound. Because of this self-trapping the frequency of the CD em field becomes much smaller than the frequency of the free field having the same wavelength. . . . In the case of liquid water, the CD . . . includes an ensemble of almost free electrons which are able to accept externally supplied energy and transform it into coherent excitations (vortices) whose entropy is much lower than the entropy of the incoming energy” (Montagnier et al., 2011).

In biological systems almost all water is within a fraction of a micron or less from a surface or molecular backbone and so is: *interfacial water*, which behaves in a quantum way, where the Coulomb law of electrostatics does not apply. In these circumstances, like charges attract. Biology itself depends on this, so as to allow the accumulation of tissues from negatively charged cell bodies (Del Giudice et al., 2013). Further depth will be afforded this conclusion in the Hadronic analysis section of this paper.

In (Heinze et al., 2013; de Riedmatten, 2013) we can see a simplified artificial example of what happens when encoded photons are trapped. Those trapped photons and their encoding are converted into collective coherent electron excitations within the medium: *spin waves*. Stored thus, the encoded information can then be retrieved. Please think of this same process as taking place within the more dynamic coherence domains of aqueous systems, which also act to further sum energy and frequency in order to distribute their stored information at appropriate target energies and frequencies to affect biological systems.

Experimental evidence:

Now that the basic aspects of the working theory have been articulated, we will turn to those replicable experiments which evidence the effects that the above mentioned theory describes. Although the unfortunate falsehoods of human history have left Benveniste’s good name in shambles, his work itself is not rightly defined through such a-priori subjective devaluation, for science is or is not demonstrably, empirically correct: scientific truth being in all cases an objective proposition. We have collected replicable experiments demonstrative of just the sort of effects Benveniste had envisioned. Those experiments will be presented in highly condensed form here, then, a deeper underlying quantum/hadronic interpretation will be advanced.

It was claimed that Benveniste’s work was false and could not be repeated. As referenced above, this appears to be an incorrect assertion. Although orthodox science shuts its eyes to the fact, the following experiments are now part of the valid scientific record (Norman, et al. 2016). We will select a small representative sample of the important work which has been conducted, and very briefly condense the results and conclusions.

1. In (Foletti et al. 2012) *Experimental Finding on the Electromagnetic Information Transfer of Specific Molecular Signals Mediated Through the Aqueous System on Two Human Cellular Models*, a 7Hz carrier frequency modulated at 3 kHz is encoded with molecular information electromagnetically derived from retinoic acid, a known

cell differentiation agent. The same expected effects of the actual molecule were evidenced from only the information with which it is associated, as demonstrated upon LAN-5 neuroblastoma and NT2/D1 stem teratocarcinoma cells in both the cell growth and morphology of cells seeded and cultured in aqueous informationally encoded preparations.

“Methods: Retinoic acid, a well-known chemical differentiating agent, was placed at room temperature in the input coil connected to an oscillator (VEGA select 719), while culture medium for human neuroblastoma cell (LAN-5) and NT2/D1 stem teratocarcinoma human cells was placed into the output coil and exposed to signals for 1 hour. At the end the oscillator was switched off and LAN-5 neuroblastoma and NT2/D1 stem teratocarcinoma cells were seeded, respectively, into the medium conditioned as reported into an incubator under controlled conditions. After 5 days of incubations, cells were examined by different strategies such as morphological and biochemical parameters.

Results: It was demonstrated that the electromagnetic signals coming from the retinoic acid molecule could be recorded and stored by the aqueous system of the cell culture medium. Cells seeded in the electronically conditioned medium received physical information generating a statistically significant decrease in metabolic activity and changes in phenotypical structure with protrusion typical of differentiated neuronal cells.

Conclusions: These experimental results provide some evidence that water could be tuned in a resonant manner by the Electro Magnetic Information Transfer procedure appropriately carried through a carrier frequency provided by the oscillator in a manner that seems related to the chemical structure of the source molecule as, in this case, retinoic acid.”

2. In (Foletti et al. 2014) *Electromagnetic information delivery as a new tool in translational medicine*, we see a 7Hz carrier frequency modulated at 3 kHz was encoded with molecular information electromagnetically derived from retinoic acid, a known cell differentiation agent. The results: “LAN-5 neuroblastoma cell line was grown up for 4 days in standard medium (CTR) or in the presence of shielded retinoic acid signal (Shielded RA-ECM); Retinoic Acid molecule was used as positive control (RA). Cell proliferation was then analyzed by direct cell count. The results showed that LAN-5 cultured with the shielded electronically conditioned medium didn’t present any changes in the proliferation rate compared to control.

Electromagnetic signals from Retinoic Acid do not affect cell viability

. . . reduction in cell proliferation rate is correlated with the electromagnetic information system, while it did not correlate with an increase in cell death. LAN-5 neuroblastoma cell line was grown up for 4 days in standard medium (CTR) or in the presence of Retinoic Acid signals (RA-ECM) while Retinoic Acid molecule was used as a positive control (RA). Cellular mortality was analyzed by Trypan blue exclusion test . . . The results showed a sustained increase of cellular mortality in Retinoic Acid treated cells as compared to control ones. Moreover the cells cultured in the electronically conditioned medium, receiving physical electro-magnetic information from RA, displayed no differences in cellular mortality compared to control” and “Interestingly, cells grown in the presence of the electro-magnetic signal from RA (RA-ECM), showed a statistically significant decrease of cell growth, similarly to RA treatment, but no changes in cellular mortality . . . These findings suggest that the electromagnetic information system is able to induce the decrease of cell growth

without affecting cell viability.”

[Please do note the *presence* of active informational field effects demonstrably akin to the known biological activity of the source molecule, and the *absence* of associated chemical toxicity—the latter quite unlike the chemical molecule from which the information was derived.]

3. In (Foletti et al. 2011) “*Differentiation of human LAN-5 neuroblastoma cells induced by extremely low frequency electronically transmitted retinoic acid*,” we see the same highly replicable results, this time using the field directly:

"METHODS: Retinoic acid was placed at room temperature on one coil attached to an oscillator (VEGA select 719), while LAN-5 neuroblastoma cells were placed on another coil and incubated under controlled condition. The oscillator was then turned on for 12 hours a day for 5 days, after which cells were counted and morphology studied by contrast microscopy.

RESULTS: The effect of the differentiating agent added to the cell culture by physical means generates a decrease in cell growth, metabolic activity, and the protrusion of a neuritelike structure typical of the differentiated cells.

CONCLUSIONS: These preliminary results suggest that retinoic acid molecules emit signals that can be transferred to LAN-5 neuroblastoma cells by artificial physical means in a manner that seems related to the chemical structure of the source molecules."

Just as important as these studies clearly demonstrating vital effects upon malignant cells, are others of equal reliability and replicability which demonstrate effective informational influence upon various types of infectious pathogens by way of extracted antibiotic molecular *information alone*. How potent is the effect? It works on many common, problematic infectious bacteriological pathogens, and also on the modern scourge of stubborn treatment resistant MRSA!

4. In (Heredia-Rojas et al. 2015) Antimicrobial Effect Of Vancomycin Electro-Transferred Water Against *Methicillin-Resistant Staphylococcus Aureus* Variant, we may watch as MRSA is curtailed:

“Material and Methods: MRSA cultures were treated with vancomycin electro-transferred water samples, vancomycin (4.0 and 8.0 µg/mL), sham electro-transferred (water to water) and non-transferred water samples (medium alone). Growth inhibition was evaluated in liquid and solid culture medium, spectrophotometrically and by CFU determination respectively.

Results: The obtained data showed that by transferring vancomycin (4.0 and 8.0 µg/mL) information to water samples, the growth of cultured MRSA was significantly ($p < 0.05$) inhibited (up to 35%), compared with those cultures treated with electro-transferred water to water or cultured in medium alone (0% growth inhibition).

Conclusion: This in vitro study suggests that water samples that are electronically transferred with vibration sustained information of vancomycin are capable of inhibiting growth of axenically cultured *methicillin resistant S. aureus*.”

5. In (Heredia-Rojas et al, 2011) *Entamoeba histolytica* and *Trichomonas vaginalis*: Trophozoite growth inhibition by metronidazole electro-transferred water, we see the same yet again, now working to ameliorate the proliferation of *Entamoeba histolytica* and *Trichomonas vaginalis*.

“This paper demonstrates that by transferring metronidazole information to water samples by an electronic amplifier (BRT device), the growth of axenically cultured trophozoites of *Entamoeba histolytica* and *Trichomonas vaginalis* is significantly inhibited, compared with those cultures treated with non and sham electro-transferred water samples. A positive control of metronidazole, a well known cytotoxic drug against parasites, was used as a reference.”

“In conclusion, our in vitro study suggests that water samples that are electronically-transferred with vibrational information of metronidazole are capable of inhibiting trophozoite growth of axenically cultured *E. histolytica* and *T. vaginalis*.”

6. In (Heredia-Rojas et al, 2012) “Antimicrobial effect of amphotericin B electronically activated water against *Candida albicans*,” we see the same informational effects demonstrated yet again upon a different pathogen.

“It was demonstrated that by transferring amphotericin B ($125\text{ }\mu\text{g}\cdot\text{ml}^{-1}$) information to water samples by an electronic amplifier (BRT device), the growth of cultured *Candida albicans* was significantly ($P<0.05$) inhibited (46% growth inhibition), compared with those cultures treated with sham electro-activated water samples (0% growth inhibition), and a positive control of amphotericin B ($125\text{ }\mu\text{g}\cdot\text{ml}^{-1}$; 80% growth inhibition). Evidence for a measurable biological effect by electro-activated water samples that somehow acquires, or at least mimics, the antifungal property of amphotericin B has been demonstrated in the present study.”

We invite the reader to examine closely each study referenced above in detail. Please recall that we have selected to represent here but a small representative sample of a larger body of work. [See: (Norman et al., 2016 and the references therein; Endler et al. 1995; Thomas et al., 2000).] Please examine the many various methods of evaluation used in the condensed studies above, including accurate measures such as reverse transcription PCR, contrast microscopy and others. Over and over the same effect is demonstrated. Benveniste was correct. The ugly accusations which ruined his career and good reputation may be left aside as false.

Magnecular analysis and the H bridge: polarized toroidal orbits.

It may be possible to apply a magnecular analysis and gain even deeper insight into the phenomena and effects we have demonstrated. Toward that end we will first articulate some of the particular specifications of magnecules.

“... magnegas has a variable energy content, a variable specific weight, and a variable Avogadro number.” (Santilli 2005 p. 101)

“Alternatively, the magnecular structure can be also interpreted as an unusual form of “semi-liquid” in the sense that the magnecular bond is much closer to the so called “H-bridges” of the liquid state of water. The increase of pressure evidently brings magnegas progressively closer to the liquid state, which continuous process can only occur for a variable Avogadro number.” (Santilli 2005 p. 101)

“Magnecules have anomalous average atomic weights in the sense that they are bigger

than that of any molecular constituent” (Santilli 2005 p. 23)

“Santilli magneclules in gases, liquids, and solids consist of stable clusters composed of conventional molecules, and/or dimers, and/or individual atoms bonded together by opposing magnetic polarities of toroidal polarizations of the orbits of at least the peripheral atomic electrons when exposed to sufficiently strong external magnetic fields, as well as the polarization of the intrinsic magnetic moments of nuclei and electrons.” (Santilli 2005 p. 21)

“Magneclules can break down into fragments under sufficiently energetic collisions, with subsequent recombination with other fragments and/or conventional molecules, resulting in variations in time of spectrographic peaks (called time mutations of magneclular weights)” (Santilli 2005 p. 22)

“Substances with magneclular structure have anomalous physical characteristics, such as anomalous specific density, viscosity, surface tension, etc., as compared to the characteristics of the conventional molecular constituents” (Santilli 2005 p. 23).

“Magneclules can accrue or lose during collision individual atoms, dimers or molecules” (Santilli 2005 p. 22)

“Magneclules release in thermochemical reactions more energy than that released by the same reactions among unpolarized molecular constituents” (Santilli 2005 p. 23)

“. . . the test at PCFL provided the first experimental evidence of mutation in time of the atomic weight of magneclules. In fact, the peak . . . is macroscopically different . . . This difference provides evidence that, when colliding, magneclules can break down into ordinary molecules, atoms, and fragments of magneclusters, which then recombine with other molecules, atoms, and/or magneclules to form new clusters.” (Santilli 2005 p. 82)

We propose that the coherent Exclusion Zone (EZ) water along hydrophilic surfaces that is so essential for biological processes is demonstrative of a particular type of magneclular structure. Unlike in the case of Hydrogen accretion in gasses which requires large magnetic fields along the lines of 10 to the 12 Gauss (Santilli, 2012, p. 3), the dynamism within the existent aqueous system of aqueous magneclular creation may be observed with low em field strength, and, the EZ coherent zone itself may be created, extended and fed, by relatively low levels of IR radiation (Pollack 2013, 2013a). The instantiation of molecular information into the aqueous medium may be accomplished through the encoding of a low energy 7 Hz carrier frequency to supply the small perturbations to be summed in coherent CD processes which yield a fairly long lived and stable vortical structure, and then, the distributed information functions ‘epigenetically’ if you will, meaning that it affects how genes are expressed creating manifest morphology, functional development and manifest proliferation, yet does not affect genetic encoding itself (Borghini et al., 2012). All this activity, including chemically derived em encoded informational distribution acting as a sort of epigenetic informational allocation, happens by way of physical dynamics which can be expressed within the framework of Hadronic theory and QED. Del Giudice (2012) states: “According to Quantum Electro Dynamics (QED) these fields are able to attract co-resonating molecules giving rise to selective chemical attractions

governed by specific chemical codes.” In close analogy to the way magneules seem to alter the expressed combustive properties of specific fuels, so does this informational epigenetic effect create alteration in the expressed result of biological energies and forms. In this case, the new particular magneular species represented in coherent exclusion zone water is of the form H_3O_2 , according to the experimental evidence gathered by Dr. Gerald Pollack (2013; 2013a and others). Here we see a new, larger, composite non-valence structuralization created by way of H bonds. This appears to be an informational magneule with dynamic distributional functionality. Its collective *viscosity is divergent* from the ‘parent’ water molecule by a factor of as much as ten (Karbowski and Persinger, 2015, p. 6), and its properties and size change under conditions of IR exposure, under particular em and magnetic fields as referenced above and/or, in some instances ‘spontaneously’ over time (Persinger, 2015). However, the informational content and expression which stems from the near frictionless coherent CD process, are remarkably stable (Del Giudice et al., 2013; Montagnier et al., 2011). Another anomalous aspect: the refractive index, and hence one might infer the density of EZ water, is ten percent higher than bulk water (Pollack, 2013). As to the effects of pressure Dr. Pollack states: “EZ water has a higher density than bulk water. If you take H_2O and you put it under pressure, it should give you H_3O_2 because the EZ structure is denser than the H_2O . We did the experiments and we found, indeed, that’s the case. If you put H_2O under pressure, you get more EZ water.” (Mercola 2013) (Please note the similarity to above referenced magneular processes).

Clearly, time reversal does not play a role in biological systems. No human or biological cell gets younger with time, any more than one might expect the droplets sprayed from a perfume bottle might somehow re-coalesce back into the container from which they originated. However, there MUST be a full spectrum of temporal exchange beyond the limits of relativity evidenced in biological systems (Santilli, 2008 p. 517). Think of the Wheeler delayed choice experiment, which has turned out so as to demonstrate temporal influence extending into the past (Manning et al., 2015), and also Predictive Anticipatory Activity (Mossbridge et al. 2014), which demonstrates human, biological, physiological evidence of the clear influence and presence of future events represented *before their temporal actualization*, as visible effectors in the present. We may therefore define the magneule in question as a hypermagneule (Santilli, 2005 p. 23; 2008 p. 511). We will invite the reader to consider the work of Montagnier to see the clearest example of biological structure created through encoded low strength EM within the context of aqueous informational mnemonic capability (Montagnier, et al. 2011; 2014). DNA itself may be formed up from raw PCR ingredients with no trace of a physical DNA template! Only encoded EM is needed to affect the aqueous mnemonic system, and so, we understand the processes which sustain disease themselves and those of health as well are deeply connected to informational dynamics and distribution stemming from magneular aqueous processes. (Please keep in mind also that the DNA double helical structure itself is largely due to H bonding between base pairs).

After years of detailed research and experimental examination the coherent fraction of exclusion zone water to which Del Giudice refers has been derived and articulated by Dr. Pollack as being of the structure H_3O_2 . The H bonded water structuralization of H_3O_2 had a molar mass of 35.02262 ± 0.00081 g/mol. Do keep in mind the familiar fact that H_2O has a molar mass of 18.01528 ± 0.00044 g/mol. These facts permits the

following analysis:

1. In Del Giudice (2013) we read: “Consequently at each T there is a coherent fraction $F_c(T)$ of molecules and a non-coherent fraction $F_{nc}(T)$ whose sum is 1. Molecules cross over continuously between the two fractions leaving constant the total number of coherent and non-coherent molecules.”
2. Dr. Pollack has clearly demonstrated the increase and shrinking of the exclusion zone layer in response to conditions including infrared exposure.
3. Furthermore, Del Giudice (2013) states (see original article for embedded references): “Water close to surfaces should therefore exhibit a much larger coherent fraction than bulk water. Its coherent inner structure should remain stable in time, allowing, contrary to bulk water where a continuous cross-over between the two fractions occurs, a direct observation of the consequences of the presence of coherence. The depth of the coherent layer close to a surface is governed, according to [7], by the strength of the electric field emitted by the surface, which correlates coherently the CD electric dipoles. The depth of the layer could therefore reach values as high as hundreds of microns, much larger than the depths of a few molecular layers predicted by conventional theories based on H-bonding [9].”
4. Between the spontaneous bulk water’s coherent non-coherent cross-over and the many various dynamic influences and effects upon exclusion zone size, we may conclude that *the entire aqueous system is variable over time as to its mass per mole*.
5. Temporal variability in molar mass (Avogadro number) is a hallmark of magnequar structure.
6. It appears that the hydrophilic/bulk aqueous bio-system corresponds to the pure gaseous species of magnequar by way of variability in the Avogadro number.

Condensation of findings:

- a. Biological aqueous systems demonstrate variance in their Avogadro number.
- b. Water structure may vary its H bonds ‘spontaneously’ or as a function of specific known field effects to yield anomalous changes in viscosity.
- c. Coherent encoded water affects biological energetic expression and morpho-functionality.
- d. Unique/anomalous spectral peaks, some of which indicate the presence of the aqueous informational magnequar’s hypothesized coherence domains, are demonstrated by water affected/structured by fields (Persinger 2015; Murugan et al., 2015; Karbowski and Persinger, 2015; and references cited above).
- e. Water loses its internal magnetic properties at 100 degrees C. indicating the presence of a Curie Temperature.

f. Water (H_2O) becomes structured into H_3O_2 via intermolecular variation in H bonds forming a different, heavier mass per mole. Liquid H_2O itself is given its special characteristics such as high vaporization temperature by way of intermolecular H bridges, which may well be nothing but pieces of polarized electromagnetic structure (see below).

g. The electromagnetically encoded information distributed via H bond dependent water structure and resultant coherent dynamics onto biological systems affects systemic energetic expression, proliferation and form as an 'epigenetic effect.'

h. The refractive index, and hence the implied density of EZ water, is ten percent higher than bulk water (Pollack, 2013). In another anomalous instance, the viscosity of coherent EZ water may be up to 10 times that of H_2O (Karbowski and Persinger, 2015, p. 6).

Ergo, Liquid Water, and Biological Aqueous Systems in particular may therefore be defined as: *magnecules*.

With a few more facts, the future implications will become clear.

From Dr. Pollack's (2013) book *The Fourth Phase of Water*: "EZ charge separation closely resembles the initial step of photosynthesis, which entails the splitting of water next to some hydrophilic surface. This resemblance may be auspicious: if that first step works as effectively as it does in photosynthesis, then some kind of water-based harvesting of light energy may have a promising future. Designs built around water might one day replace current photovoltaic designs." (p. 336).

Santilli (2005) writes:

"Recall that quantum chemistry was unable to achieve an exact and invariant representation of the main characteristics of the water molecule from unadulterated first principles despite efforts over the past century. In fact, a historical 2% has been missing in the representation of the water binding energy, while the representation of its electric and magnetic moments was embarrassingly wrong even in the signs." (Santilli 2005, p. 142).

A new approach is required. Hadronic mechanics is that approach. Dr. Santilli has also derived a novel underlying quantitative explanation for H bonds which is explicable entirely within the known confines of QED (Santilli, 2005, 2008, 2012 and others). As is known, liquid water may be ascribed its unique characteristics such as high vaporization temperature to the part played by H bridges. In place of the familiar description of H bond formation involving uneven molecular charge distribution and proton exchange, Dr. Santilli offers up a quantitatively specific model based in the forming up of H bonds and intermolecular adherence via the primary attraction of actual *polarized* toroidal electron orbits (as distinct from the orbitals, which are abstract mathematical objects rather than physical objects). (Santilli 2005, p. 31; 2012).

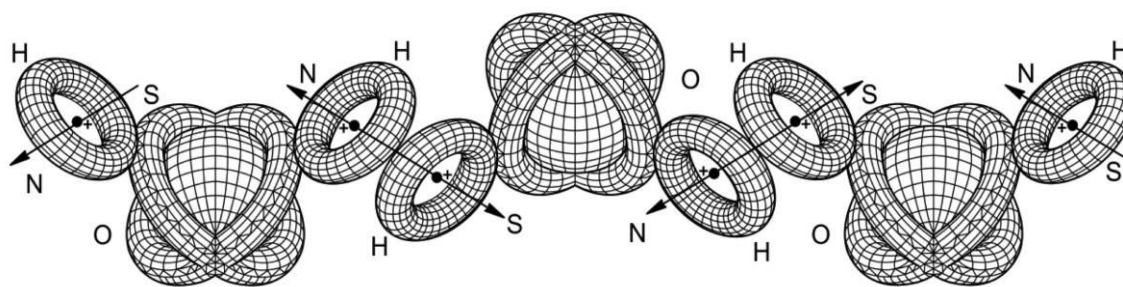


Figure 1. One of the possible magnecular bonds of H-atoms in the liquid state of water. Pictorial representation of liquid water as hypothesized in Santilli's polarized toroidal orbit model of the H bridge. Figure used with permission of Dr. Santilli.

Due to the fact that within aqueous informational systems we are dealing with a ferro-electric structure with mnemonic properties, we may not be surprised to discover the internal magnetic organization of the system is disrupted by increased temperature just as with a magnet, and so, the *Curie temperature* is that of the boiling point.

It is now possible to hypothesize from the theory of Santilli (Santilli, 2005, 2008, 2012 and others): Toroidal polarized (primarily) electron orbits induced/affected to specific geometric form and subsequent dynamics through external IR, ELF and also other molecular based fields, affect coherent hydrophilic surface water structure to induce hydrogen bonds yielding a magnecular species of the form H_3O_2 . That charge separation, which may well be the primary basis of photosynthesis itself, is therefore likely to be defined as a magnecular phenomenon. Life requires more than valence bonds. Life may also depend on the molecular species Santilli has named the *Magnecule*.

Possible implications and discussion points:

1. Should the effects evidenced in the above cited and condensed experiments be brought to practical fruition, the result could be of substantial importance. It is clear that information costs little and may be electromagnetically derived from molecular structure. Once stored within computer memory and geographically distributed as binary information converted at the receiving end into encoded em, it could help many at little cost, lowering drug prices by substituting cheap information for expensive drugs, and perhaps also reducing treatment toxicity. It appears at this early stage that the effects are akin to the molecule from which the information is derived, and may be nontoxic, unlike the toxic source molecule. As fields are not restrained by the Blood-Brain Barrier, molecules like dopamine and 5-HT could possibly be encoded and used in treatments, perhaps affecting a reduction in manifest symptoms of Parkinson's and OCD respectively. Chronic pain may be treated without recourse to addictive drugs and perhaps, addiction may also be ameliorated without recourse to drugs (Norman et al., 2016).
2. As aqueous informational memory is ferro-electric, perhaps as one creates a better recording using blank magnetic tape, the Curie temperature could be used to entirely replace the internal magnetic properties of water with those of an externally encoded field, using pressure to keep water in a liquid state while applying said field, or, by creating condensation of gas from temperatures over 100 degrees C cooled to encourage the emergent liquid state under the application of a suitable informational

field.

3. Could Santilli's theory provide insight past the effects of 'like likes like' phenomena, and see into their cause? Could it thereby explain the quantitative mechanics which bind the organization of negatively charged water droplets into clouds, and the negatively charged conglomerative adherence of bodily cells and tissues? Are clouds and biological systemic forms intra-conglomerative magnecules?
4. Could the basic aqueous charge separation upon which photosynthesis is based be used to harvest radiant/solar energy? Could the increased viscosity evidenced by water left in the dark be interpreted as an energetic instantiation (Persinger, 2015; Karbowski and Persinger, 2015) and if so, could the effect be used to harvest vacuum energy?
5. Are aqueous systems and therefore biological systems, magnecular? Are coherent aqueous magnecular processes those upon which photosynthesis and life itself are dependent?
6. As the coherent fraction in aqueous hydrophilic systems is of a magnecular form (H_3O_2), do magnecular processes mediate coherence, and so, coherent informational aspects? If so, in what way?
7. Montagnier has demonstrated the CDs within water may be encoded so as to coherently sum and distribute information and create rightly sequenced DNA from raw ingredients sans any chemical template. Will science acknowledge the truth of this, and place the aqueous informational magnecule rightly at the center of disease processes and medical diagnosis and then, look to these dynamics in order to advance medical treatment past its current dependence upon dangerous, costly modes of radiation and drug therapies?

Conclusion:

At this juncture in human knowledge, science has a choice; it may either acknowledge the limitations of relativistic and quantum theories as they relate to aqueous and biological systems, or it may not. If science chooses to stay the course and now, as before, run headlong after theories based upon a flawed axiomatic basis, little will change. However, should the pursuit of scientific knowledge be unfettered from its errors and begin to consider the possible, human misery may soon be transformed. It appears to us that the evolution of life itself is based on magnecular processes. The fact of liquid water is the fact of the magnecule. Within this molecular species is the hope for clean energy, clean burning fuels and, as this paper points out, the potential for non-toxic medical practice *based on information* and its dynamic magnecular distribution through aqueous systems as they affect biological systems. In defining a quantitative functional basis of the H bridge, Santilli may have placed a vital brick in the edifice of human knowledge. The deepest mystery in science is that of the dynamic relation between hypermagnecules and the aqueous/biological systems they define. In this mystery, our better future rests. Clean energy, human health and inexpensive, freely available nontoxic medical practice are to be found in the answer to an unacknowledged question, *What is the magnecule?*

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An Open Letter Regarding Cancer

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Jeremy Dunning-Davies

Abstract:

This brief document is intended to bring a potentially important approach to cancer and other diseases to the reader's attention. It may well be the case that unfortunate circumstances within the sciences have kept hidden an important approach to disease. We hope to bring this information to the fore, and suggest that cancer and other diseases may share a common yet unacknowledged mechanism of pathological replication. If this is so, inexpensive and safe modes of therapy may be researched and then brought to fruition. It is our intention to alert others who are in a position to advance the work, so as to augment needful progress.

Introduction:

Our research has indicated a disturbing and potentially earthshaking possibility which must be investigated: *Cancer and a host of other diseases may be curable using non-invasive methodology.* This seemingly impossible statement may be true, and warrants investigation. We will briefly articulate some small part of the history and provide current substantiation which will make clear that the approach is valid and functional. There is a historical pattern which can be observed and must be recognized and overcome if the situation is to be rectified. It is our hope that an independent laboratory with open minded scientists who are not beholden to corporate interests may find reason to look into this idea and develop the human potential which has remained concealed for too long.

Modern methods to combat diseases such as cancer are based on the medical models which science has accepted. Those medical models generally do not acknowledge the role of electromagnetic fields and the informational physics with which said fields are associated. Highly complex and intricate treatments are created, often with toxic risks, and inch by inch, difficult and incremental scientific progress is won. It may be possible to alter the model through which disease is understood and find a single locus around which stubborn diseases such as cancer might be approached, and cured. To do this, we must acknowledge not just medicine, but history and physics as well.

Perhaps you have heard a 'rumor,' a 'myth,' which seems to indicate that fields can be tuned to corresponding cellular frequencies so as to affect and destroy ONLY disease related organisms, while being harmless to healthy tissues allowing the cure of disease without toxic damage. One is sure to be attacked as a fool for even mentioning the possibility, and one risks one's reputation to say such a thing aloud.

As open mention of this approach itself is forbidden, we will begin with some proof. Do review the science of Anthony Holland:

[https://www.researchgate.net/profile/Anthony_Holland2/publications

<http://www.wakingtimes.com/2016/02/05/breakthrough-discovery-shows-that-resonant-frequencies-can-kill-cancer-cells/>

<https://www.gatewaycr.org/gateway-blog/posts/2015/october/shattering-cancer-with-resonant-frequencies/>

<http://novobiotronics.com/Cancer1.html>

<http://novobiotronics.com/CancerResults3.html>

<http://novobiotronics.com/CancerResults4.html>

<http://novobiotronics.com/CancerResults5.html>

<http://novobiotronics.com/CancerResults6.html>

and many others, please see older material for many examples of frequency specific effects].

Observe how only cells targeted at a specific frequency die. Observe how the frequency once obtained, isolates the deadly effects specifically to the organisms targeted. As you can see, this is not myth or fiction. Using frequency to target specific pathogenic organisms is effective. However, there is more to consider. Now that we have demonstrated that the effect is viable, and the 'myth' is no myth at all, we will spell out some of the history, tie it to the present circumstance and offer up specific, if speculative, ideas on how to quickly and cheaply advance toward a cure. Perhaps massive expenditure and profit are not needed to cure disease, and we need but take a different approach which spans both physics and biology. Anthony Holland's approach is promising, but further information is required.

The Science of Rife and its Suppression:

Anthony Holland is attacking the cancer cells themselves to affect cure. We believe a slightly different approach is needed. To find that it will be helpful to understand some of the history which has led to the present situation. As will become clear in the section which follows afterward, the notion of pleomorphism need not be taken in the strict sense of the term, and can be usefully defined in a new and specific way. Those readers who wish to see the upshot, may skip this section and read the ones which follow, particularly the section titled "The Upshot."

Reputation is almost akin to truth itself in science. Science is no different from any other human enterprise, and it is affected by human frailty and hubris. There is a paradigm known as pleomorphism which has been rejected. Disease processes are sustained by way of transformations in biological structures such as cell types which are, therefore, themselves *processes*. Pleomorphism is defined as: The assumption of various distinct forms by a single organism or species. (Dorland's *Illustrated Medical Dictionary*). However, orthodox theory is monomorphic, and does not acknowledge this long observed notion of transformative biological processes.

Many deduced pleomorphism to be valid long ago. Pierre Bechamp was one of them. Louis Pasteur had staked his reputation on the converse view. Bechamp deduced after years of detailed study, that bacteria could change form. Rod like structures for instance, could become spheroidal but, even further, he noted that the size of these organisms could also vary and devolve into smaller organisms, which were unseen, that he called *microzymas*. This point is crucial. However, Pasteur's reputation was great and Bechamp, whose work was later proven correct, was soundly crushed and his ideas excluded from accepted practice. The paradigm science laboured under for much of the 20th century was thereby hobbled. Thomas Rivers of the Rockefeller Institute derived technical scientific distinction regarding the reproduction of a virus which, although false, cemented his lauded place in the discipline of virology. He introduced the notion that a virus requires *a natural cell* in which to reproduce. His aggressive personality and great monetary resources made him impossible to disagree with, although he was wrong. Dr. Arthur Kendall was unable to defeat Rivers's powerful reputation and formidable personality, but did prove himself scientifically correct by culturing virus strains in an artificial "K Medium" of his own design, and he provided assistance to Royal Rife. Rife, would demonstrate the correctness of the rejected pleomorphic paradigm, and prove over and over that *filter-passing organisms*, meaning very tiny pathogens which are able to pass through filters and may cause full blown disease such as cancer, could be derived from cancer tumors. Rife, would soon discover the impossibly small "invisible" cause of cancer, and allow its direct observation *in a living state* with a new type of microscope, which is still unequalled today, and also uncover the lethal frequencies to apply using a specific new instrument to devitalize the tiny bug which kills man. For this, he would be personally ruined and his work suppressed, at unimaginable human cost.

The apparent cure for cancer and its suppression are an American tragedy which is ongoing. There is a pattern which can be observed repeatedly. Once Kendall and Rife filtered and saw the tiny pleomorphic form of typhus, and proved that this could be done, Milbank Johnson, a prominent and influential physician, USC professor of physiology and clinical medicine and Chairman of the Special Research Committee arranged a gathering of thirty top scientists on November 20th 1931 to announce the fact, as was reported by the Los Angeles Times on November 22nd 1931. On December 27th of 1931, The Los Angeles Times reported that Rife had demonstrated his microscope to over 250 scientists. Soon Kendall was asked to speak before the Association of American Physicians on May 3rd and 4th 1932. It was here, that Rivers and his supporter Zinsser, whose *Bacteriology* is still used in an updated version today, struck. The attack was verbose and unscientific yet effective in discrediting the correct work of Kendall and Rife, which contradicted their own views. Dr. William Welch an esteemed authority in bacteriology rose to Kendall's defence stating "Kendall's observation marks a distinct advance in medicine," and in August of 1932 *Science* magazine itself published a report on Rife's microscope stating, "There can be no question of the filterable turquoise blue bodies described by Kendall. . . examination under the Rife microscope of specimens...leaves no doubt of the accurate visualization..." but the damage was done. Rivers and Zinsser had the weight of reputation and power. Here, in a first peripheral way, we see the same ever increasing pattern which will be applied again and again: incorrect science, power, reputation and money destroy good men, tarnish their reputations, corrupt good science and suppress the truth."

In 1932 Rife found the cancer virus. In 1934, he would cure cancer in humans using his frequency instrument. Rife began using Kendall's K Medium in 1931 to attempt the isolation of the cancer virus from breast tumors. The medium and microscope in this case were not enough but a fortunate accident whereby he irradiated a sample inadvertently proved to be a decisive advantage, allowing the virus to be visualized. The incredibly small and virtually invisible structure had a breadth of one twentieth of a micron, and showed up under the microscope as purple/red in color. The experiment was then repeated 104 times, and thus confirmed. Four distinct forms were observed, distinct forms of the same organism. That organism, the filter passing "BX" as he called it, could reliably produce cancer in laboratory animals, as was repeated 300 times. This same organism could be transformed, depending upon the conditions and media used, into different structures found in cancer patients, a fungus, or as was later shown into bacillus coli! Pleomorphism was correct. Next he painstakingly determined the Mortal Oscillatory Rate to which the BX was attuned, and used the frequency instrument to destroy the BX. He then inoculated no less than 400 animals with filtered BX preparations, created tumors and cured those animals *over 400 times*, before attempting the first human case. Rife, was a careful and meticulous scientist.

In 1934, Dr. Milbank Johnson again gave steadfast support and was instrumental in opening the clinic in La Jolla where cancer would be first cured in the human animal. To minimize the accumulation of toxins from the dead pathogens, it was soon learned the treatment was best used for only three minutes and given at three day intervals. Of the 16 "hopeless" cases, 14 were cured in three months. No rise in body temperature or discomfort was reported. Dr. Alvin Foord oversaw the project as chief pathologist. Chief Surgeon Whalen Morrison, George C. Dock MD, George Fisher MD, Dr. Kendall, Dr. Zite, professor of pathology at Chicago University, and Rufus B. Von Klein Schmidt President of the University of Southern California were on staff, and, Dr. Couche and Karl Meyer PhD, head of the department of bacteriological research at the Hooper Foundation, were present. Dr. Koops of the Metabolic Clinic in La Jolla signed all 14 reports and knew of the tests from his personal observation. In 1934, Royal Raymond Rife had cured cancer.

This was not an isolated fluke. Other clinics were soon opened, and more people were cured. Dr. Couche opened a clinic and although surviving records are scant, it is clear that three patients were cured of cancer. Dr. Johnson opened a clinic of his own to reports of more success treating various conditions. Later in 1939, Dr. Richard Hamer of the Paradise Valley Sanatorium rented a frequency instrument, and proved himself adept in its use. A very organized and careful practitioner, he often treated as many as 40 patients a day, and achieved stunning results in his National City clinic, clearing up and curing a great many conditions. Between 1934 and 1939 a great deal of hope was brought to fruition, and unfortunately...someone noticed.

The suppression and destruction of Royal Raymond Rife—reputation, greed and our scientific dark age.

The case of an 82 year old man successfully treated by Dr. Hamer reached the powerful head of the AMA in Chicago: Morris Fishbein. The single dominant force in the AMA at that time, he was belligerent, ruthless and it is to be plainly noted that he

never practiced medicine as an MD for even a single day in his life past his residency. His was a smothering and potent personality, revealing him as a political animal of the first order.

In 1939 Fishbein sent a fateful message through the California branch of the AMA seeking to buy into Rife's work and his new company, Beam Ray. Rife refused. This was the start of the end. In analyzing this supreme error, we can learn much. Rife worked with Hoyland, a self-interested and arrogant man who thought himself above his partners. He and Fishbein gathered forces. Hoyland was provided high priced lawyers. Hoyland would own Beam Ray, and Fishbein could then buy in. To refuse Fishbein, was a tragic error. When the devil knocks there is little choice but to let him in, lest he burn the house to the ground.

Rife was a patient, genteel and kind man, an intellectual, engineer and scientist who was about to enter an ugly bully's world of money, brutal assault, cruelty and blatant injustice: the American legal system. Cancer he had cured, but politics? This would soon metastasize and consume him. The opposing lawyer cut into him and attacked him. Rife was unprepared, and although the case was settled in due course in Rife's favor, the experience destroyed him on a human level...his nerves gave way. He was so deeply affected, that a doctor he trusted advised he take up strong drink, at once. This began his deterioration into alcoholism, and depression. Beam Ray would be ruined, Rife shattered and the cure for cancer snuffed out. What Fishbein could not own, he would destroy. That was that!

In a strange pair of "coincidences" the only other lab making substantial progress in the field, that of J. C. Burnett, a \$250,000 lab in 1929 dollars with \$500,000 invested in research and the many careful records within it, were all burned to the ground as its owner visited Rife later that year. Rife's staunch supporter Dr. Milbank Johnson would die under suspicious circumstances a few years later, perhaps poisoned according to federal inspectors, all directly before it appeared he was to announce an important breakthrough in the cure of cancer in 1944, after which his records and those of his Special Research Committee mysteriously..."vanished." Throughout this period, and afterward in the case of Rife's new partner John Crane, records and equipment were illegally seized and destroyed, and doctors intimidated into giving up the search. Dr. Couche continued the work anyway, and had his membership revoked by the AMA. Publication of one article escaped the censorship and can be seen here, as represented in the Smithsonian Annual Report, of 1944.

<http://www.rife.org/magazine/smithsonian.html>

Soon after its publication the report's author Dr. Raymond Seidel was shot at, a bullet slamming through his windshield as he was driving.

In the Smithsonian Annual Report of 1944 we read:

". . . disease organisms such as those of tuberculosis, cancer, sarcoma, streptococcus, typhoid, staphylococcus, leprosy, hoof and mouth disease, and others may be observed to succumb when exposed to certain lethal frequencies peculiar to each individual organism . . ."

Dr. Royal Lee of the Lee Foundation for Nutritional Research in Milwaukee spent time with Royal Rife and commented as follows:

"No medical journal was ever permitted to report on Rife's work. This

one by the Franklin Institute [reprinted in the Smithsonian report] slipped by the censors, since this organization is not medical but supports general scientific activities. But that mistake was soon rectified, it appears, as there is still no general knowledge of Rife's epoch-making discoveries. Again, the iron curtain of Fishbein is effective. . . . We can give a list of various subjects on which this censorship is rigorously applied. Only the treatment of disease with synthetic drugs is carefully reported. Botanicals are played down, food as remedies are almost as taboo as Rife's work. . . the official definition of a medical remedy for disease. . . excludes automatically any vitamin, nutritional mineral or enzyme. . ."

Was there a cover up? Do examine this video presentation of Rife's laboratory. Observe the massive investment and many pieces of advanced custom equipment Rife created. Observe his highly advanced work and surgical technique. Was there a cover up? Ask yourself, what happened to all of this? It appears to have vanished...without a trace.

<https://www.youtube.com/watch?v=fynOk-Yldts>

Cancer has been cured since 1934, and no one knows it. Fishbein has won. When it is understood how quickly radiation machines were sold to hospitals, often with deadly result, the scope of the loss of proper testing, commercial availability and distribution of Rife's work becomes clear. Painless, three minute treatments with no side effects. Cancer has been cured. No one knows. *Is this true?* Surely, for humanity's sake, the truth surrounding all this must come out!

The current situation and other previous substantiation.

Not surprisingly, the evidence of these facts "inexplicably" keeps showing up over and over in new work, and its imprint can be located also in history. Rife has of course, been publicly humiliated, misrepresented, ignored and discredited, although he was correct. His work is called a "myth." But the fact will not rest, for it is the fact. These..."mysteries"...abound. The cowardly suppressive reactions to them are also in evidence.

Rous had long ago discovered a cancer virus for which he would all too belatedly receive a Nobel Prize. In 1948 Dr. Virginia Livingston-Wheeler began studying tumors in which she then found the same organism. She came across the work of Dr. Eleanor Alexander-Jackson who demonstrated that tubercle bacillus went through many changes, (as Kendall, Rosenow and Rife had shown already in the 30s, a fact which had been forgotten or, more probably, deliberately ignored).

Livingston-Wheeler found the extraordinary pleomorphism intriguing and wondered if cancer behaved pleomorphically. Her paper which confirmed the fact was published in 1948 in *The New York Microscopical Society Bulletin*. It concluded as follows:

“In conclusion it may be stated that a definite mycobacterium is observed in many kinds of tumors. Its presence within the tumor cells as well as within the blood of the patients suffering with the disease can be demonstrated.” Livingston-Wheeler and Alexander-Jackson had demonstrated that Rous had found a virus which was *in actuality a pleomorphic bacterium*.

Livingston-Wheeler’s assertions of pleomorphism were confirmed in 1950 by Dr. James Hillman of RCA labs in Princeton NJ. via electron microscopy, whose observations gave confirmation of the filtered form.

Dr. Irene Diller of the Institute for Cancer Research in Philadelphia had isolated fungus from cancerous growths in animals. Here again, was the work of Rife and Gruner, which demonstrated the changeability, the pleomorphic alterations and transformations between the BX, and a fungus. In December of 1950, *The American Journal of Medical Sciences* published Livingston-Wheeler’s paper detailing how cancer cultures taken from humans and also from animals caused cancer in animal tests. Then, new cultures proved that cancer could be caused by a form of bacterium! The hurtful dismissal of this claim by Rivers and the rest, had been shown...wrong. Naturally, her discovery had all but no influence upon the situation. The cancer industry and orthodox scientific establishment had its own plans.

In 1953 Dr. Diller published her own discovery of confirmation of the transformation between fungus, and the cancer microbe: *Studies of Fungoid Forms Found in Malignancy*. *The Washington Post* Sep. 9, 1953 reported from Rome of their findings and ideas that: “An American research group today pictured cancer as an infectious disease. . . . ‘Cancer does not consist of a localized tumor alone.’ Instead, they pictured it as a generalized disease caused by an organism in the human bloodstream.”

When the scientists returned home to their lab, they discovered that Dr. Rhodes of Memorial Sloan Kettering Cancer Center had shut down their work and stopped funds for the Rutgers-Presbyterian Hospital lab. The lab was shut down! Like Rife, Alexander-Jackson and Livingston-Wheeler found that their work was now...nothing. Efforts to produce a vaccine, were simply not acceptable. Surgery, radiation, chemotherapy, these ideas, *only these*, have merit and deserve funding. Inexpensive cure was not in the cards. A new approach was not acceptable. Money. Reputation. This is modern medical practice and research. This...is tragedy.

In 1983, Livingston-Wheeler wrote in her book, *The Conquest of Cancer*:

“Because of the suppressive actions of the American Cancer Society, the American Medical Association and the Food and Drug Administration, our people have not had the advantage of the European research.

This work has been ignored because certain powerful individuals backed by large monetary grants can become the dictators of research and suppress all work that does not promote their interest or that may present a threat to their prestige.”

She demonstrated that cancer is not as accepted orthodox science proposes. In the New York Academy of Sciences report from October 30 1970 we read:

"Microorganisms of various sorts have been observed and isolated from

animal and human tumors, involving viruses, bacteria, and fungi. There is, however, one specific type of highly pleomorphic microorganism that has been observed and isolated consistently by us from human and animal malignancies of every obtainable variety for the past twenty years. . . that organism has remained an unclassified mystery, due in part to its remarkable pleomorphism and its stimulation of other microorganisms. Its various phases may resemble viruses, micrococci, diptheroids, bacilli, and fungi."

Today a music professor turned cancer researcher named Anthony Holland is shattering cancer cells with targeted frequencies. He was inspired by the work of Rife. His approach is aimed at the cancer cells themselves. Will he succeed? Will the cells cause toxic shock in the body to be shattered? Does the source pathogen, the pleomorphic BX need to be targeted? Let us look to this fine man and see if he can find for us the answers.

Now Luc Montagnier, the scientist who had won a Nobel Prize for his discovery of the AIDS virus, has found some strange effects whereby filtered and presumably sterile preparations appear to reconstitute disease related organisms in cultures, and hypothesized with good supporting evidence the existence of aqueous nanostructures of a mysterious sort, offering us also in other work a glimpse into the quantum aspects of what possibly appears to be the mechanics of pleomorphic transformations. Naturally, he is accused of poor lab technique and contamination in his experiments. Do you believe this Nobel Prize winner cannot prepare a proper experiment? What is happening here? Why not look into the mysterious aqueous nanostructures, so akin to the BX or perhaps some quantum informational part of pleomorphic processes? Instead, his reputation is tarnished and insults abound. However, if he is right, many diseases, not just cancer but perhaps Alzheimer's, Parkinson's, Multiple Sclerosis, Rheumatoid Arthritis and a great many more may be treatable, or even curable. Does this seem familiar? Can you see it? We must discover if this is true.

It should be remembered also that dismissal of the pioneering work of Rife is not confined solely to America. On the web page of Cancer Research UK, reference is found to Rife and his work but most of the statements contained therein are erroneous. Firstly, and possibly most importantly, Rife's work and all his results were based on the use of his *own* microscope and his *own* Frequency Instrument – not on the so-called Rife Ray machines on sale today. Again it should be noted that all the talk on this site refers to the Rife machine destroying cancer cells but, in truth, the original claim of Rife was that his machine enabled him to destroy the microbe which caused the production of cancer cells and, having destroyed the microbe, the cells eventually returned to their original healthy state. They also claim that the Rife approach has not been through the usual process of scientific testing and in a sense this is true but, as shown above, such a statement is nowhere near the real truth. Rife's approach was meticulously tested and was open to further, more public testing but this was maliciously denied and the supporting evidence suppressed so that his work is now largely forgotten.

In 2007, in the book *Exploding a Myth*, the whole question of the existence and influence of these same destructive influences operating in the discipline of physics was explored through several examples. The restrictions placed on true open minded original thought were noted and it was pointed out that, while such

problems in pure physics might not concern many people, if such restrictions did occur in physics then they would occur in other branches of science and, if the branch involved was medicine, then it was putting peoples' lives at stake. It is tragic to reflect that the facts outlined above indicate the correctness of that earlier prophesy.

Recent ideas seem to indicate that it might be possible for drugs, so toxic and profitable, to be replaced with safe quantum information. Is there any real value in this idea? Can the multitude of horrible diseases be cured by spotting the common pleomorphic mechanics of their replication, and addressing the problem with inexpensive painless treatments? Can we redo today what Rife apparently accomplished so long ago? These are the questions of the future.

Our research has unearthed a distinct and disturbing possibility:

"Cancer has been cured since 1934."

For the sake of humanity we ask aloud:

Is this true?

This section above owes a clear and substantial debt to Barry Lynes' excellent book: *The Cancer Cure That Worked*.

From Nobel Prize to the future of medicine: the Courage of Luc Montagnier:

Are Montagnier's experiments contaminated? Just as Rife, he is attacked and smeared with insults.

Montagnier has demonstrated the informational aspects which sustain disease. It seems from our analysis that the cure for many diseases, from cancer to Alzheimer's and a great many more, may be found here. Just as in the case of Rife, the effect of this vital discovery was to isolate Montagnier from the funds and means he needs to advance, while he is heaped with scorn, ridicule and rude insult. Montagnier's revolutionary work is criticized on two counts:

1. It is said not to be repeatable in any other lab.
2. It is said to be a false result due to contamination.

Montagnier answered these criticisms in such a certain and clear way as to leave the matter beyond dispute. He had invited an independent film crew from the media to record the experiment and watch each detail. [Montagnier Video](#). He extracted the electromagnetic signature of a particular piece of DNA and sent that as binary information over the internet in excess of 1000 kilometres then had another *independent lab* in Italy receive the information and instantiate it into water memory via a simple electromagnetic process. Electromagnetic informational transfer is also the same way the bodily system works, in our understanding. The stunning result is clear and undeniable: he was exactly correct. The information once added to the test tube of pure water over 1000 kilometres distant, reproduced via water memory the exact encoding within DNA which was then synthesized via PCR, even though there

was no DNA template in the water! Information alone with no physical DNA to copy, once placed via an EM field into water memory created a piece of DNA and reproduced the encoding with an accuracy of 98 percent from raw PCR ingredients! Electromagnetic fields can be informationally encoded and those fields affect aqueous systems, which receive the encoded information and interact with chemicals and biological structures to create the form specified. Biology is based in physics, and physics is based in information. The film crew's presence assures us there was no trickery, the second independent lab doing the PCR synthesis from water over 1000 kilometres distant assures us of the experiment's verification at another facility, and most importantly *precludes any possibility of contamination*. Of course, the proof made no difference. Scientific orthodoxy simply turned up the insults. Now you may know with certainty that, however well educated, those who discount Montagnier are shallow.

If science were to look here, what might happen? Imagine it. If this work were funded and closely investigated, we may soon have solved the riddle of the informational instruction set which creates DNA to sustain disease processes or health. That means two things:

1. A disease may be diagnosed in moments with a non-invasive scan.
2. A field may be applied to alter faulty encoding with correct patterning.

This is the *eventual potential*. Any disease which demonstrates resonance should be treatable and diagnosed in this way. As with the science of Rife, a resonant approach to disease and health is indicated. Here is found the common process basis of many diseases! There is a simple process nexus which may allow the informational alteration of fundamental disease dynamics without recourse to drugs, high priced treatments, or invasive techniques. In Electromagnetic Signals Are Produced by Aqueous Nanostructures Derived from Bacterial DNA Sequences Montagnier and his collaborators state, "we have detected the same EMS in the plasma and in the DNA extracted from the plasma of patients suffering from Alzheimer, Parkinson disease, multiple Sclerosis and Rheumatoid Arthritis. . . . Moreover, EMS can be detected also from RNA viruses, such as HIV, influenza virus A, Hepatitis C Virus." [In this latter case after 20 nM filtration]. As I have stated, a great many diseases share the same mechanism of reproduction, and so may all be treatable and diagnosable in one simple way. Field effects, as Rife found long ago, may well hold the future of medical practice. Imagine a hand-held device which scans, finds resonant aspects of specific disease and after diagnosis, instantiates healthy patterning into the bodily system via an informationally encoded field, without the use of drugs. This could be our future.

The Upshot:

The result of all of this is clear: ***specific research must be conducted using filtered preparations created from disease organisms such as cancer.*** That way the *source pathogen* may be attacked, and toxic shock will not kill the patients. Those preparations, must be exposed to radiation as in Rife's experimental protocols, or dilution and em field analysis so as to extract an em signature as with Montagnier. In the former case, the organisms must be cultured in an artificial medium to isolate photonic expression. It seems from the work of Montagnier that the mechanics of what appear to be 'pleomorphic' transformations, are those of quantum information affecting biological morphology and structure through aqueous systems. [Here is some further evidence of that effect: <http://dx.doi.org/10.4236/wjns.2016.63024>]

Unfortunately, Rife's microscope was key to the method, and none is available. Reading informs us that the microscope and the frequency instrument use the same principle. One must discover how to obtain the correct frequency for the correct pathogen without it. Of course one can 'shotgun', but there may be a better method. We speculate:

- a. A filtered preparation is created from cancer or some other disease.
- b. It is perhaps irradiated, and cultured in an artificial medium, so as to isolate the biophotonic expression of the pathogen.
- c. The frequency of the biophotons is obtained.
- d. Rife's microscope used heterodyne and resultant beat frequency to bring living specimens stained in UV light into the visible range.
- e. A frequency is derived to combine with the biophoton frequency, and create within the organism a beat frequency to destabilize its phase and internal coherence.

It is of course unknown if this speculation is valid. Naturally, we have a great many ideas to offer which may advance the science. Please feel free to contact us. We will share all information freely, and hope to advance the work in whatever way is available to us. There is a great deal of information, so, if you have facilities to create filtered preparations, let us make contact and advance this work. None of us as individuals or our 'reputations' means very much compared to the possibility of a real cure. Let us do the uncommon thing and *work together*, in order to bring the better future of our race to light.

Thank you.

Rich Norman and Jeremy Dunning-Davies.

Suggested Reading:

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ISBN: 978-0-9845693-7-3

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The question of psychological science.

Psychological science is itself a question. Is psychology science, and if so, is it hard science? The current psychological paradigm is itself a question. One must wonder: Does a particular etiologically grounded psychological paradigm exist; of what use is it; what exactly is it and how do we know?

I unwittingly stumbled upon the answer to these questions by way of direct examination. As Freud understood within himself ^φ and his patients as well, hysteria is often the underlying kernel of the transference neuroses,^Γ a shadow underlying the disorders at a fundamental level. Under conditions of low-functioning repression such as those of early childhood it is common enough to find hysteria as anxiety hysteria or phobia (please think of the familiar case of little Hans). Conversion hysteria which again demands comparatively little of the repressive facility by splitting up the task of symptom formation between punitive (repressive) and wishful impulses ^Λ may also be tied to childhood, and so not surprisingly, those later conditions based in high functioning repression such as OCD with its typical emphasis on infantile transferences, has at its core, a shadow of hysteria. This is often the route into the impenetrable labyrinth of symptomatology presented in OCD, the hysterical symptom may gain us entry into the intransigent condition to be solved, please think of the conversion symptoms pertaining to his bowels in the familiar case of Wolf Man, whose stubborn case of OCD was made treatable and accessible through the addressing of its infantile underpinnings as manifest in this piece of hysterical affliction:

“At last I recognized the importance of the intestinal trouble for my purposes; it represented the small trait of hysteria which is regularly to be found at the root of an obsessional neurosis.” ^Θ

Hysteria extends back in history as one of the defining illnesses of man, yet, it has been all but disbanded as a coherent etiologically grounded illness in modern psychology.^Σ Hysterical manifestations however, just as Freud understood, are the key to unraveling the neuroses. A new artificial condition has emerged in the advent of SSRI therapy prescribed for conditions such as OCD and depression. Should dosages be sufficient and treatment of extended duration, these compounds upon withdraw assure the conversion of whatever illness is being treated into an hysterical illness, perhaps an hysterical hallucinatory psychosis or lesser neurosis (see: possible link between drugs and violence). These artificial SSRI withdraw induced psychoses signify the breaching of a 5-HT dependent repression, and, allow us a clear view into what should be unconscious processes, fantasy and content which are now plainly

^φ see letters to Fliess, Freud Complete works, vol. 1, p. 259, 268.

^Γ vol 14. Complete works, Freud, pp. 180-185 and others

^Λ *ibid.*, see also below: Native Psychoanalysis of an obsessive/hysterical symptom presentation and subsequent cure by way of revealing the primary determinant in obsessive nosogenesis /*Native Psychoanalysis*, and, the familiar case of Wolf man.

^Θ Freud, from the history of an infantile neurosis, 1918, section 7, anal eroticism and the castration complex.

^Σ Feinstein, A. (2011). Conversion disorder: Advances in our understanding.

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manifest, and so, reveal the actual etiological basis of the conditions.

Modern psychological theory is a patchwork of many conflicting theories with bits and pieces of neuroscience sewn together into a haphazard assemblage, while stressing an excessive pathological taxonomy and attendant medication. Although a theory such as psychoanalysis may boast instrumental efficacy as demonstration of being a functional science, the claim of '*hard science*' eludes psychology as it has not settled upon one correct interpretation of its paradigm, and so, lacks a quantitatively defined etiological basis.

It is the aim of this text to provide those aspects.

Toward that end we will provide:

A basic functional articulation of the transference (and its relation to hysteria) as may be utilized in cases of low repressive functioning, in order to access unconscious content, observe the causal basis of pathology and more rapidly cure neuroses using a technique entitled: *Native Psychoanalysis*. Next, the role of epigenetic scripting and an evident genetically based phylogeny forming up unconscious content is discussed in the context of a simple model of the transference, directed alpha-function and a new human paradigm, that of *sublimation by integration*. SSRI drug withdraw, repression, 5-HT and hysteria within the context of the predominant psychological/pharmacological paradigm are then discussed in detail. Next, we will demonstrate the actual etiological basis and relation to hysteria within the modern paradigm of Cognitive Behavioral Therapy. Then, we may put our knowledge to work and utilize the new paradigmatic understanding of human perceptual ontology and the transference in new ways: ***Re-polarization*** is used to alter the past itself, change memories of abuse and heal the primary wound within man: *super-ego*. Then, we present a more complete and detailed model of the new paradigm for psychology and human personality: *sublimation by integration*. Lastly, the transference defined thus may be articulated quantitatively and typologically to place hard scientific grounding beneath a proper unconscious psychology of the neuroses. In this way an etiologically based, instrumentally demonstrable, quantitatively articulated unconscious psychological paradigm will be defined.

That which is unconscious is that which by definition can not be observed. Those contents of the hidden repressed unconscious realm, are there in the repressed unconscious as they are inevitably painful for the ego to own. Perhaps the original ideation has been paired with a reaction and repressed altering its valence to that of a negative quality from positive, or, perhaps the ideational content is painful of its own accord, but in either case, repressed content is painful, ego dystonic. Hence, the energies and drives which psychoanalytic theory ascribes to the hidden end of pathogenesis, are inaccessible, and must be inferred, constructed, or interpreted from the repetition compulsion displayed within the transference neurosis. The fact then, remains elusive, and the skeptic might ask: "How on earth do you know that these inferences which in some cases appear to end the neurosis are really the cause at all, and then, are you sure these ugly denizens of the unconscious deep, really exist at all? Really, is there any but insult to this theory, admittedly instrumental in some cases,

yes, but is it actually true?"

Indeed, the very nature of the unconscious demands we deny its painful existence, and this fact has plagued psychoanalysis from the very start. No one would believe it for a minute! Their sanity itself appears to depend upon this very resistance. The fact is, there is no real agreed upon psychological paradigm, and there is no good reason on aesthetic grounds, to choose a psychoanalytic model.

The insult which is a psychoanalytic interpretation, appears by its very truth, as it is painful, to demand we look elsewhere, and do so at once! However, the situation at long last is resolved. Repression is 5-HT dependent (see: possible link between drugs and violence), and upon withdrawal an artificial hallucinatory hysterical psychosis sans distortions and compromise formations is created, allowing direct observation of unconscious content, which at that juncture is of course no longer unconscious. The reason that people with low 5-HT so often kill themselves is now clear: they observe direct undistorted unconscious content, pure psychological pain. Now, the mystery is solved and we know which paradigm is correct in describing the actual aspects which form up the transference creating human reality.

When I first discovered these facts, they enabled me to clear a window of resistance away in myself and observe what should be unconscious content at will. This technique is named: *Native Psychoanalysis*. At first I believed this would allow a speedy self-analysis and cure of OCD and stubborn neurosis in all cases, as I had accomplished in my own, however, this was not the fact. The technique requires low functioning repression such as that induced by SSRI withdrawal, or that which is characteristic of hysteria, in order to be effective. The following short essays were written after the technique's initial inception. Questions of the actual existence of unconscious fantasy and the nature of unconscious content within the transference are no longer mysterious. Now we know. We may simply—*Look*.

These first essays and brief paper were written as a hands-on functional introduction to Native Psychoanalysis, so as to allow the ordinary reader to utilize the technique to cure their own neurosis without the aid of a therapist.

**Nine Short Essays and *Native Psychoanalysis*—a Non-Elliptical Technique:
Necessary Background Information Basic to Native Psychoanalysis**

—Richard Lawrence Norman

Background information: How to read Freud, and what this archive is good for.

To understand this site you MUST understand all of this background information. This information is presented in an unusual fashion, and will emphasize that which is functionally necessary, and often omitted. I have learned much of this psychology and psychoanalytic theory through direct observation, and only late, discovered the Freud. I had learned much *of* Freud, but had not read him myself. This is supreme error. If you are serious about this, you must read all of the Freud, in the original, in order... period. If you do you will discover the following:

The experience was astounding—the myriad of superb and superior textbooks explaining the ideas and concepts which are Freud's idea: *Psychoanalysis*, were wrong. I could not believe it! Each and every one was a lie, and quite useless for this lie, in particular: a lie of omission. You could not use this information. It had been sanitized. This archive will be different, but also, exactly the same. The fine books written by the best scholars which condensed the Freudian theory all left out the most essential parts, the parts which are utterly necessary for the theory to work, and it is these ideas which I will articulate without reserve or apology. These ideas are now discarded, and no longer believed. They are however, exactly correct, as I will demonstrate. The method I will use to disclose the background Freudian theory, may seem haphazard, but it is not. It is traditional to detail the information from a chronological standpoint, outlining Freud's progressing thoughts and models. I have a more direct and functional approach in mind. I need to create in my reader the capacity for self-psychoanalysis, and this is a task best accomplished from the other perspective, to see and feel, to understand by example the real mechanics of the situation as a complete picture of mental organization, a rapid learning process which does not rest until the idea is all too clear. Plain meaning is the result for one who is willing to demonstrate, rather than articulate.

It is essential to SHOW the ideas in action. And so, I will give examples before terms are defined, and the reader will be the better for it, as the term will then mean something other than a dry concept once explained. This is how I learned this information, and as a result, I learned it very quickly and more thoroughly than any university could have informed me. I was ill, and needed the information. I saw it working, and so, learned it rapidly. This is how I will show you. For this reason, this archive will be just as much a lie as the sanitized versions of Freud which are out there, even if more useful. This is incomplete—structured for utility, and *not thorough in its chronology*. Read the original! It is not difficult, and no other text is needed to understand the twenty-three volumes, which read easily. Use no other text, no "*Freud for Morons*" is needed...you are not a moron, and Freud writes well. Remember: to read out of order is defense... never do it.

Of course, these last two "commandments" are far from realistic, and few of you will shy away from secondary source material and fewer still will purchase the twenty-three volumes of Freud plus the index, and read them in order, so, I will suggest: Do not begin with *The Interpretation of Dreams*. This book is downright

amazing, but "spun out" in its style of composition. The amount of information one must hold in mind over such a length is difficult, and chapter seven alone, although sheer genius, requires many readings to comprehend. Please consider beginning with *The Three Essays on Sexuality* (Freud, 1905). If the version listed in the references is too much money, you can probably find an older translation for pennies under the title, *Three Contributions to the Theory of Sex*, D105, Dutton paperback. This is a brief, inexpensive and serious book which will introduce you to the business end of developmental Freudian theory. Much need be said about symbolism, symptoms and dreams, but the course will be easier to tread if the more abstract information is gathered in the proper time.

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Why the Freudian "viewpoint"?

The best way to illustrate the answer to the question, "Why the Freudian viewpoint?" is with a parable (Norman, 2009). Although this was written with philosophers in mind, the discipline of psychology, complete with its modern pluralistic politically correct inhabitants is an even better fit. So enjoy this pointed story, for every parable which is not a confusion, is but a story with a point:

The Puerile Fish

There is a forbidding place where some philosophers go, both the brave and the fearful may travel here, to the Lake of Knowledge. The lake is large, and the shore rocky and flat with nothing for miles, but rocks and books. A group of young philosophers went to the lake, to see if they could find inspiration, truth, or knowledge. Who knows what else might live under some old rock or book, perhaps a beautiful lizard would help them. When they arrived it was a terrible surprise. The journey was far too long, the terrain unforgiving and they were worn ragged and half sick when the lake appeared, so large and flat with a chill wind, a frozen curse of a wind which cut them to pieces, as it made the lake's surface shimmer. They held each other closely and gathered their strength, to approach the water and look. Soon they had all decided the same thing. This is where the action had to be, so they shielded and warmed themselves with pages torn from the many books, each leaf on the next to form a blanket now wrapped tightly around to block the wind. Some pages held down with stones and some leaved into the next, they huddled together, each under their blanket, and warmed themselves, safe under the pages. They warmed each other in conversation. "I have found a truth about the universe, and another about myself and knit them together. I like the re-spiritualization of God into self, and believe the Buddha nature most beautiful, must be true!" The rest agree, "Yes, you are most surely correct, and no one is more beautiful than you now. Surely you are adorned with a quilt of the most profound and beautiful truth!" He continued, "I also enjoy the certainty of rationalism, and have knitted these two together to form a warm and fine truth," and all agreed this was a handsome union of these two ideas, which was most warm and satisfying indeed! Each day they became warmer and enjoyed their reflection on the waters of the lake, and their quilts grew. Often they remarked about how beautiful their reflection became when they could steal it from the wind, as it rippled the water. When all was still and quiet, the vision they beheld was clear, and they were sure they had seen what they came for, the truth, and they would curse the wind for stealing it back. This bleak landscape offered them much, but lacked one thing. There was no food, and all were getting weak.

As their hunger grew, one among them began to find the smell of himself and his unwashed compatriots more than he could bear. He became so nauseous, he walked out into the wind alone, and found a place for himself a few hundred yards down the shore from his fellow philosophers. He was disgusted, and took one of his stones, wrapped a page from a book around it, and threw it into his reflection on the water. It sank right through the image, and he knew it was a reflection and not the truth. Then another unexpected thing greeted his eye from

the depths of the lake. He saw a fish. Old and ugly, covered in warts and sores, its pan eyes looked up at him with a familiar glaze, as if the fish had also been dazzled, its gaze also fixed upon the reflection of light off the surface of the water. When he saw its familiar eyes he was horrified and blushed, but he soon regained himself and looked closely. The fish spun around after one of its own droppings and gobbled it up, then another and a pause. It looked at him as surprised to see him, as he was it! Its mouth opened, a bubble came out and floated up to the surface. He put his head down and listened as it popped. He heard the fish speak out of this putrid bubble, a voice could be heard! "I'm right." He couldn't believe this impossible talking fish had said what it did, so he squinted and looked, then more bubbles and the words, "I'm right. Always. I'm always right." He could stand it no longer, his hunger was too great, and even if this fish was able to talk, so old and putrid with sores and filthy breath, he could not resist, and his arm shot into the cold water, his hand closed around the fish and he pulled it out from the water and swallowed it whole before he could think. He saw its hideous body and strange familiar eyes and ate it anyway much to his initial disgust, and he almost vomited it up, but his hunger would not be refused and he swallowed hard and the deed was done. Now he felt better, stronger, and his blood began to run again with food in his belly. His fellow philosophers had seen the entire affair and moved somewhat farther up the shore.

Clearly he was a dangerous man.

The next day a sun beam fell through the lazy net of clouds and reached the lake. A rare mist formed, and out of this strange vapor stepped the God of the Lake of Knowledge, the Knowledge God. Gaunt, tall, tight-lipped and pale, he looked unwell and slowly moved toward the large gathering of philosophers. His reputation preceded him. It was said he spoke little, and asked only questions since he seeks knowledge, and a question mark is a hook for thoughts. As he approached the group, his sickly appearance was underscored by a churning sloshing grumble from his entrails. "Are you OK?" asked one of the weak, hungry philosophers, to which he responded, "I am hungry." All were amazed to hear something other than a question cross his lips, and so a palpable relief came over the crowd when he asked one of them, "What is your philosophy?" "I have adopted a phenomenology like Husserl's, and a spirituality of the universe and self which permeates the world as Dharma. I have made a beautiful quilt and all agree it is true. I am happy to be able to answer all of your questions. I am a complete philosopher indeed." All the others agreed she was and managed a collective weak anemic smile, safe in each other's arms. Another stepped forward and the god asked him, "What is your philosophy?" "I have found four pleasing truths which keep the wind away, and answer every question." Before he could read the Knowledge God the first few pages of his philosophical blanket, the nauseous rumbling of the god's stomach interrupted the discourse, and he shuffled quickly away, sick from their odor. He soon found the lone philosopher, who sat rosy cheeked and well beside the cold water. The Knowledge God asked his question and you could see his pallor improve to hear the answer, his godly shoulders rose and relaxed and he smiled. When the Knowledge God asked the lone philosopher, "What is your philosophy?" the reply was short and direct. He answered tersely, "I eat fish!"

So, dear reader, I do hope the meaning is clear: the Freudian "viewpoint" has not been chosen as a function of whether that "perspective" is appealing, or

chosen as a function of if it may or may not engender the approval of others, or even if it fits in with one's own aesthetic sense of "taste" and propriety, oh no! It is *Necessity* which has demanded this "choice" of "viewpoint." The reason I am hedging, and using quotation marks around the words "viewpoint" or "perspective" are a clue as to my meaning as well—The Freudian "viewpoint" is not a subjective viewpoint, it is not a choice. (Who would *choose* such a thing?) It is: *an is!* There is no choice or subjective decision in such matters, one simply looks and sees (Norman, 2009; 2010; 2011; 2011a). If the "view" one "chooses" is incorrect, the illness remains. Period. If one constructs or finds, *and then accepts* the pathogenic memory/ideation which is affecting behavior into consciousness, and the specific ideation is rightly gathered and spelled out, the symptoms vanish, and in the case of a retrieved memory, they vanish— *instantly!* No drugs are needed. Even the most severe neurosis can be positively influenced. As only the exact right answer will work, the Freudian "viewpoint" is not a viewpoint at all, but an actual truth, an instrumentally valid, derivable scientific fact—truth. I ask your indulgence, as these statements will soon be justified and demonstrated. I am aware that saying such things in this day and age is... improbable, but I am an unlikely sort of man. I do not coddle my audience in order to retain them. I believe these things for good reason. I arrive at these bold and arrogant statements by way of very particular and certain methods, methods which are *only now available*, that validate by direct observation, much of Freudian meta-psychology. Only this works. This is not a choice, not an aesthetic decision, but a necessary reflection of our mental construction, most right and unpleasant. We have this "viewpoint" because it is objectively valid. It works, again and again. If you are really ill, the pretty picture is not enough. Either truth...or drugs. That is our choice—and no other. (Please read the short essays "The Engine of Creation" and then, "The General Relation Between Unconscious Ideation and Conscious Symptomatology" to find this *new substantiating factor* spelled out).

One does not get to choose the details of one's existing mental construction and illness. It is best to look plainly, and become well quickly. "*Truth is oft insult to beauty.*" In the plainest language: When the time came to cure myself of a lifelong and severe obsessional neurosis, all manner of pretty guesswork at the hidden contents which were creating the illness were of no use. Only the one actual truth, a specific and detailed truth most ugly and right, only this one thing was curative. Our subjective problems, have specific and objective solutions. This text is written with an eye to finding these elusive and ugly truths quickly, and so, ending the problem and beginning anew. The same energies which power a neurotic symptom power our thought processes and definitions of all reality. Let us look plainly and redistribute those energies to beautiful result. What is an unconscious burden and a sickness today, may become the heights of intellectual achievement and pleasure tomorrow. Eat the fish! This is the promise which awaits the broadest soul, the soul which can look easily upon itself...to look, to know, and not to judge. Such is our hope. Psychoanalysis unearths the hidden elements which cause sickness, and disbands its form, so as to use those once hidden energies in healthy ways. These things *are*, so we look, and may become again.

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The Engine of Creation: SSRI withdrawal and emergent unconscious content—Necessity U.

Although the end of the journey finds a happy result, the road over which I found Psychoanalysis was a rocky one. This is the speediest road, if the more dangerous route. It reverses the usual order of events, which leave the student of psychology at a serious disadvantage. My university was the "University of Necessity," or "Necessity U" as I call it. It does not admit knowledge by matter of "degree," one either passes, that is lives, or one fails. I have passed, and learned most quickly.

Perhaps you can travel this road with fewer bruises for my efforts?

In the usual situation, the student learns by understanding a large complex compound conceptual construction, e.g., "In many instances of manic depressive illness, an unconscious structure is observed which indicates an ambivalent parental object relation expressed via regression to the oral-sadistic-cannibalistic level of pre-genital organization." The hapless student holds these many ideas in his mind, and these dry concepts, which are so free from any real emotional impression, are then understood through the creaking apparatus of our logical facility. After years of study and clinical observation, and decades of thought and inference observing and inferring the hidden operations of the mind, he understands. This approach goes from logic to understanding.

The reverse approach is taken by the military in basic training. One teaches best to demonstrate—to show. One speaks little of leverage, the concept so difficult to understand, one knocks the cadette soundly on their rear by using their body as a lever. The lesson is learned quickly. This approach goes from emotion and identification to understanding.

Before I continue the example, I will inform the reader as to the relationship between SSRI drugs, a new and efficacious addition to the medical pharmacological arsenal, and repression. Please remember the Freudian axiom that symptom formation is a product of the return of the repressed (Freud, 1896, p.170). SSRI drugs reinforce repression, and quell mental illness (Norman, 2009; 2010; 2011; 2011a). Once withdrawn or once tolerance develops, the effect is reversed, and unconscious content is released into consciousness free from the distortions and transformations which maintain amnesia and some function of repressive isolation even in delusion (Freud, 1911, pp. 1-82; 1924, p. 151), which in SSRI withdrawal from high doses over long periods, is soundly defeated. Once I had withdrawn from as much as 120 mg per day of Prozac taken for 15 years, the lid was removed from my unconscious, and all sorts of symptoms resulted. The sort of illness one expresses and its attendant symptoms are in large part a function of repressive dynamism, or, lack thereof (Freud, 1915 pp. 181-185; Norman, 2011; 2011a). As repressive function varied, the illness changed, providing a multitude of experience with various illnesses, each different illness emerging in turn to attempt to reinstate or reenforce repression, which was so very diminished due to SSRI withdrawal. Our symptoms are a measure of defense, and each in turn attempts to maintain the failing repressive system in SSRI withdrawal, but, to no avail.

Now we may continue with the example: Our graduate student has the

unenviable task of understanding the meaning of this idea which is accessible to him only after years of inference and study: "In many instances of manic depressive illness, an unconscious structure is observed which indicates an ambivalent parental object relation expressed via regression to the oral-sadistic-cannibalistic level of pre-genital organization." I have learned the idea in a different fashion, as a cadette learns, from direct observation:

I have had a fine piece of writing criticized in a foolish way by an old friend. As I walk, a piece of uncensored unconscious content tears into my mind's eye: I see his face and hear the words of criticism... and I am as a spring, my body is but a tube with a head and a mouth, now hurdling through the air, my jaws wide and snapping with furious hatred, snapping open and closed—I tear the flesh from his face, ripping off chunks of flesh: spitting them out onto the ground, swallowing and spitting, jaws opening and snapping closed hundreds of times each few seconds, ripping the flesh away in chunks, spitting it out into the dirt and swallowing. That night I read this concept in an old book: "In many instances of manic depressive illness, an unconscious structure is observed which indicates an ambivalent parental object relation expressed via regression to the oral-sadistic-cannibalistic level of pre-genital organization." I understood it instantly, with no need for explanation, whatsoever.

Here is my first lesson from Necessity U. Excerpt from: *This New Day—Self-Creation: The Wisdom of an Idiot* (Norman, 2009):

The engine of creation

Most people complain they feel sad. The self-creationist writes or rants, cries and then feels better by lunch. Instead of withholding, develop the habit of releasing. Pain writes, sadness sings and despair dances till it can try again. All things move ceaselessly in the creative mind. There is no empty resting when one feels freely. Self-creation transforms our eternal unrest from a misery into an engine, the turning of which fills our emptiness as it brings us to a higher possibility. When you hear your sadness do not be content in your gloom, answer it. All pain is a question to which creation is an answer.

So what pain is it which drives man to create? What is this engine of restlessness which we might harness? Where is the question kept? Where does this pain dwell, and how might we find it? You may boldly and foolishly insist, "Show me this engine of creation so I might most directly know it myself." I have had the lid removed from the engine and watched its ceaseless turning but as you will see that is to dare madness, and is ill-advised.

Freud called it the unconscious; the Greeks and the Romans knew it as the underworld. Where do we place those truths which are too painful, too ugly, those which must remain hidden as the dead? Where are the fantasies we think, but can not bear to know we think? Where are the thoughts we can not escape, and can not hear? All that which you are but can not know, can not own, resides there. It is ego's tool, keeping the air free of what is unhealthy for ego to breathe. Unless ego needs to be sexual and embrace the sexual role, sexuality can be a disturbing

intrusion into daily life. To serve the smooth functioning of personality great forces are repressed and held in the engine out of view. The great bulk of the undeniable, continuous, super-sexual tide which lies at the base of man, his greatest fuel, his supreme energy which is used and sublimated or consumes him in fire, serves man or spoils him, becomes beauty or obsessive lust, is hidden here unless ego summons it. The unconscious is ego's servant and will contain even this amount of energy unless ego summons it as an asset and not a disturbance. If we could not repress the great bulk of our primal sexuality, so it is but a dull roar in the teenager's ear he would be wholly possessed by it, his attention unavailable to develop the higher social functions. If unable to submerge much of our sexuality we would never develop the mental and social skills which along with biology, make us attractive sexual partners, good risks, winners in society who are chosen to reproduce. All of us that would make chaos for the ego is buried here. The murderer in the civilized man and the lust of the chaste reside here. All of self which the ego calls sickness, perversity, violence, sadism and hatred are tenants of this jail. The constant contractions of wishes never known and hurts too deep to know reside here. It houses the ego's undoing, and the ego proclaims it: "Sickness!" The horror in man parades grotesque and unrepentant, a raging triumphant prisoner whose voice is your own. It is a cauldron of steaming ceaseless dissatisfaction in eternal lament. All that can not be solved or expressed contorts and grimaces, and its motion is a turbulence, a wind which brings the divine as its putrid breath fills our sails. Might we take its sultry festering and spin slender glistening threads of gold to cast aloft, toward the sun, as spiders of the earth and air, as spinners of tender golden sails may we ascend in these hot winds and be energized from this turbulence? What of hope and creation lies in a curse like this engine? I shall tell you of it here and then discuss its operation as the source of the creative instinct, the "engine of creation."

After a fifteen year stint on as much as half again over the "maximum" 80 mg. dose of Prozac I was ready to quit and did. I can assure you consciousness is entirely dependent on a delicate specific balance in the physical world. If I hit you with an iron bar you will pass out since the balance is disturbed. Drugs make this principle evident as we put a pill in our body and get results in our mind. My mind suffered the lack of a chemical 5-HT from Prozac withdrawal.^α After a manageable one hundred day latency period, a critical level was reached and everything changed. The change was first manifested in a hyper-immaturity. Tantrums abounded. I eventually had the lid entirely removed from my unconscious and watched in relentless horror as the subterranean dynamism of my mind emerged. All that is irresolvable and unresolved tormented and afflicted me at all hours. Like living in a Bosch painting I myself had painted, the grotesque super-sexualized, hyper-violent world of Oedipal agony and torment I beheld was ceaseless and wholly putrid. An Oedipal horror is any truth which to gaze upon it knowing you have authored it yourself, would then make you want to tear out your own eyes. Primal ugliness that drives the hand and heart of man in both abomination and sublimation, were mine to observe for three endless months

^α 5-HT is short for 5-Hydroxytryptamine or serotonin. Rather than delve into the specifics of the pharmacology involved with the re-uptake of serotonin in the brain, etc. I refer you to the latest Goodman and Gilman's *Pharmacological Basis of Therapeutics* for a full discussion of how SSRI drugs affect the brain.

until my body righted itself. [∇]

My mind rewarded these three months by the "great sulfur lake" as I call it, with the refreshment of both my pain and insight. A flower is a beautiful thing but every gardener knows the most healthy and spectacular example has its roots in a pile of shit. Having seen the engine of creation my eyes were cleansed from my weeping. The tears of a writhing nausea have afforded me a new day.

To know the fetid horror which drives man, Beauty, Truth and Pain are again my companions, sitting around a fire in my mind eating sardines together. It is warm to have them back, but to know them is to know their breath stinks.

After taking a drug for fifteen years to avoid collapse under the weight of my ever increasing pain and ugly resentment, and then to eventually be swallowed by that ugliness and unheard pain, I suggest a better course. Best to hear your pain and acknowledge your resentment before it reaches such crushing hideous proportions. You are your pain. You are your resentment. They are parts of you. To hear them and know yourself may at first appear prohibitively painful and inconvenient, but the eventual whole scale collapse you avoid will be your own. This course is prudent and best. Rather than keep on marching it may be better to stop and listen. We might both renew creativity and avoid collapse. So I believe I have realized the moral to my ordeal by the great sulfur lake: be relentless in pursuit of your ugliness, and you will find that beauty is the sure result. Better this agony of your own design, than to wait and have your ugliness relentlessly perusing you.

It is too late for me. I cry out in the perverse hubris of self-grandiose humiliation, "I know everything!" Everything I should not! I have bitten the apple, and it has bitten back. I can not forget and I will not forget, so you see my boast is also my curse. I have seen the engine and I remember. The pride of a madman who refuses both madness and forgetting. I know everything! Every thought that no one should have thought, but I alone had conjured, revealed the wish still uglier which conceived it. I could ask this wish, "Why?" Do you know what is seductive, attractive and healing in your nightmares; why you wish to dream them? To have seen the engine, the sulfur lake and its hideous monsters each with my head atop its neck, and to have refused to forget, was my infinite moment of self-knowing. Orpheus looks back and **remembers, to claim his prize**, not to lose it. ^λ

I plainly know each fetid desire and the need which called it forth, all that I have cast and those secrets better kept dark now beckon me, dare me to rediscover them, invite me to look again. I can no longer hide. I know all that which I rightly refused to see. I have seen and it is too late. I am doomed to know why I rage, love, chafe, react and feel as I do. I know everything! I am the physician who correctly diagnoses his sick condition and have gained insight, but I am not yet

[∇] Although able to function again after three months, the process of rebalancing brain-chemistry is excruciatingly slow.

^λ A synopsis of the Greek myth of Orpheus: Orpheus, a musician, used his musical talent to charm Hades, the god of the underworld, so as to allow his dead wife to return with him if he did not look back at her as they journeyed back to earth. He yielded to temptation and looked and she was lost to him forever.

well. I am only honest. I know myself through many ordeals, all remembered by my stubborn unblinking nature and now honesty is not a choice for me. I am no longer a symbol to be unwound, I have become a smell with which I am most familiar. I know too much. Here I have become perversely proud so I unmask myself before you and say, the price of an honest, complete and unsparing knowledge of self is that it never relents. It never turns off and can make a hell of our lies both great and small. Improvement through creation is my salvation and with each wisdom and work I can not help but love my honesty more. She is after all my bride. My ego protests this sentiment and exclaims, "She is painfully ugly, and only an idiot would marry her!" Perhaps he is right.

This is no LSD trip, no afternoon or evening of self sport, alluring and light with promise of a glimpse which bends the eye up and over the wall to cheat the maze, where a hint of danger and darkness adds spice to sport as we chance a peak under truth's skirt. Instead here Truth has stripped and I have been laid bare before her ceaseless gaze. There is nothing alluring about the engine of creation. Super-sexualized, violent, infantile, grotesque, unrelenting and hideous are the monsters of our hurt, desire, failure, lust, rejection, impotence, rage, unmet need and frustration; so disturbing that they have been banished beyond our sight to reside forever unseen here in the engine. Everything there is there because it offends the light of day. Once the plain brown wrapper has been removed, one sees the forces which shape, direct and energize us, which remain necessarily hidden. Daddy keeps the drawer with the dirty magazines closed *because* this is the pornography of the mind.

Do not be misled by appearances. I say Oedipal horror and invoke the two traditional violations we find in the myth of Oedipus Rex: the accidental bedding of the unidentified mother and another unintentionally revealed wish in the accidental killing of the unidentified father. If his mother or father's identity were known to Oedipus he would surely not have bed or killed the respective parent. We can forgive him in this even if he can not forgive himself. This story and these crimes against nature are now an old familiar tale which has lost its sting. It has the feeling of the everyday about it, as if history has worn it out. My hidden truths are unworn by time and appear as they should, as true visceral horrors of the utmost repellent force. How could it be otherwise as they are by definition what is most unbearable for me, which is why they reside hidden here? These are living truths, not a dusty remnant, like this Oedipus whose accidents are a soothing tonic, a weak tepid tea which calms the nerves due to its lack of effect. Only you can imagine what is more terrible still! Think of it. What do you see? What? Tell me. I can not tell and will never know... In this I tease you playfully. You have been tricked! I made sure that I have shown too little of my own monster, and in your imagining on this Rorschach blot you can be sure it was you who was the painter, the author of the meaning. Perhaps here before you is a photograph, a projection however indistinct and ugly, a shrouded hint of your own live monster; your Oedipal horror.

This stark parade of ugliness was a great teacher, but not the only one. Each day in our dreams and undirected uncensored fantasies we have a window where we may see the unconscious, the engine revealed as it works. Look here to solve the riddle. Our imagery conceals a wish. Why do we fantasize the fantasies we do?

Why do we dream these dreams? Why do we need these thoughts? What do they provide? How do they serve us? Answer these questions and understand yourself, your riddle. What wound begs for this fever, this pornography so it might rest? The answer is you.

I make this strange but true statement because the unconscious contains these repressed energizers which are the unheard pipers of the invisible song to which we all dance. To see them and know their tune is to know why you feel compelled to be what you are. This all sounds well and good so you might still insist that you want to see for yourself. There is nothing wrong with the occasional peek under truth's skirt. She doesn't seem to mind and it is we who often blush to know her. But be warned: do not follow me and poison yourself to pursue her. She is merciless and has no pity in her eyes for a fool. Once she has raped you sanity may become unbearable, and madness a relief. Do not go here! Ask why as I have asked, but ask your dreams, fantasies and curious choices, do not seek the engine directly. As I stared at the workings, the putrid, lurid, violent, unending convulsions of unresolved want, hurt and need, I began to find myself enormously taxed, overwhelmed by the effort to remain detached: to remain sane. I felt an ever-increasing gravity, an irresistible and profound magnetism exerted its force to pull me into the sights and struggles before me. The effort to remain detached was omnipresent. Month after month the engine wore into me with no peaceful moment granted, no breath spared its siren song, its call to madness. I was compelled not only to watch but to become the madness. The more tightly I held on the more exhausted I became, and the more sweet, hopeful and seductive the invitation to release. Surrender called out to me with loving tenderness, inviting me to let go, to forgo my grip on suffering, to be free from trying, free; a leaf in hell's storm. So I say to you most sincerely, *do not go here, where sanity becomes unbearable and madness a relief.*

I will admit one thing I have bought through knowing the engine and owning my humiliation. The engine may not stop turning but in seeing the filthy hand on the crank I now have a choice. I have earned a spoonful of dignity in that I may now choose to resist it, as well as use its turning. When I found and knew the creatures inhabiting the lake, I saw my reasons. Why I am drawn to honesty, why I am angry and react to what I do. *Why I am* is in great part a reflection of those monsters and their unending convulsions. I am their opposite and reflect them in mirror negative, or perhaps we embrace and I become them. Now that I know them I can choose to define myself as I wish, and may at last be without relation to them and choose another course. Now that I am no longer within the engine and subject to its gravity can I understand myself well enough to use my irresolvable nature, my eternal restlessness without surrendering to it, and create the higher from the lower? Can I know myself and then create something new, more than just self-understanding--true self-creation? To let the dirty hand turn the engine to further this aim is my highest ambition. This is the dignity, hope and conceit permitted the idiot with courage enough to know himself and remember.

The unconscious, this hidden engine of creation, is a storehouse for those parts of self which are too disturbing and disruptive to be with us in our daily lives. Creatures of the ego's discord, these parts of self have been splintered off and

banished to the unconscious. They are repressed so they don't disrupt our daily personality with their presence. These parts of self are so toxic to the ego that they are submerged here, in this underworld, as if they did not exist, as if they were dead.

Their mere presence is enough to bring the ego to its knees, so we who are in the light need this illusion of unknowing: the self we can not see. This act of self-preservation has left us a mystery, an imbalance. It is in the withholding, the hiding of self that the imbalance is created which drives creativity, drives the engine. We seek to know the unknowable, to reclaim ourselves and in this urge to know ourselves again, we seek what is hidden, what is forbidden: completion and wholeness. Imbalance seeks equilibrium. Imbalances in pressure drive many engines. Pressures are released and energy is harvested as equilibrium is restored. This is the underlying principle behind the engine in your car and likewise this engine, the engine of creation, will always seek equilibrium as well; to know what is hidden, to release what is trapped, reclaim its energy and complete ourselves. This is the motion which drives the engine of creation.

Let us seek a shadow, a spark, an outline and capture a slice compelled, infused with a pinprick of knowing. May we create and gaze upon what was lost and welcome it back into ourselves again. This is as it should be. In seeing the engine directly I have exceeded these bounds. There is little wonder I, a musician, began this book after having seen it. I was overlaid with new energy and had a thousand gifts dripping from my tongue, a thousand new understandings of every strange wholeness. How could I resist now so whole, too whole, bruised by every truth piled too high, too fast. This copious overflowing of the creative comes at a cost to self and ego. These things are hidden for a reason, and I see why it may be an insult to know. To see yourself and the world stripped naked of mystery may be an insult to the viewer. Am I still a philosopher if I say, "Enough!" or even, "Too much!"? But it is too late now. I am worn and bruised, and will say that in the case of this engine I have reservations about the truth, about wanting it, all of it. Am I still a philosopher if I say, "It is a personal violence, an assault to know oneself too deeply, too suddenly"?

The creative urge is born in our incompleteness. Psychologically it has become necessary to remove part of self from view and in this act of survival we are made separate from, and ignorant of, part of self which we will always seek to know, to rediscover, reinvent or reinterpret, and with which we will always long to reunite. The creative urge is the expression of this longing in the act of creation, its works and sacrifice. As one creates he becomes further energized as he discovers himself, and then full with life and longing, he seeks to fill his cup again. He is refreshed and revitalized to know himself in his creativity, which finds its engine in his necessarily incomplete nature.

Creativity is the province of this unconscious engine which holds what we seek away from our eyes. We who create wish to express self and make it visible, and however incomplete or transfigured the outcome, we seek to unearth the engine, express and see what is submerged and become whole. In this fragmented illusory reflection we see evidence of the hidden self, and so we know more. We can not bear to look upon the engine directly but it offers us these chipped uneven shards of

iridescent opal and we might glance upon ourselves in the hidden places through our works and creation. We can not only bear to see them, but might marvel to know them, every wonderful thing bathed in filth and light. We create and know a little more... yes we can bear that, a hope we may seek to nurture and love. We stare at the diamond face of our creation knowing it is a splinter of our other face, a face buried deep within the engine we may hope never to clearly see.

I have seen the creatures which inhabit my engine and will reveal none of their particulars to you! It is bad enough that I should know me. In seeing, remembering then understanding all of it, I have noticed the engine remains wholly unaffected by my insights. It is entirely uncalmed. My creativity and knowledge grew as never before, but not even a single monster blinked. To see my feelings is not to solve them, so my task will always be woefully incomplete. Such is the nature of the irresolvable. At this I chuckle, uncomfortable and nervous to know that whatever of my hidden self I reclaim, I will be forever incomplete. There will always be more to know. I catch myself holding too tightly to my truth, and find that I must remember to exhale. I relax and for a moment I believe it, and am glad that the mystery will never be solved since then it will remain compelling, and I will always be full in creation, the engine forever turning.

Before I close this section, an important note on myth and model:

Let us stop and be sure we do not confuse truth for poetry, or myth and model for reality. In talking about the underworld, the engine, the unconscious or any other mythical unreal place or thing, I have undoubtedly led some of you short of the real truth--the fact. Let us consider that since these places and things do not actually exist, they are but a mythology, a model, a way to explain how these events and particulars feel to experience and how they interrelate which is useful in mythology and model. We can hold memory and feeling away from consciousness, we can repress, and this separation of self from self is the real kernel in the models and myths under discussion here. A model is a story, a myth which is useful because its parts work. It shows us their relationships, and gives us a working handle on our experience and how to understand it. Even if it is not a precise representative truth, a good model is both a useful instruction manual and accessible describer of experience, which however abstract in the story it tells, is useful because it has the fundamental relationships right. Let us not mistake perception for reality. When the mind's ability to repress is removed we feel as if we are in a different place, an underworld of strange ugly torment, and a myth is created. As I believe Freud would agree since he never achieved a satisfactory neural mapping of personality, a model like his is useful because it speaks of our experiences and how to understand them, not as a physical road map to a place or a thing: a box marked "unconscious," an "underworld," or an "engine." Much of what lies at the bottom of these ideas is not a place or a thing, but our ability to separate ourselves from ourselves; the mind's ability to repress. It is here that the imbalance begins which will always seek its own undoing, to reclaim what must be hidden, achieve equilibrium and complete the puzzle. It is in our need to

repress that the creative mystery and its "engine" are born.^Δ

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^Δ Do not mistake this essay for a repudiation of the appropriate, top quality medical care I sought and was grateful to receive. However, a point of diminishing returns is reached and these tools have limits and consequences. In the end pharmacology proves a poor replacement for good thinking.

The General Relation Between Unconscious Ideation and Conscious Symptomatology

To begin to understand the picture of how something which is "unconscious," that is, hidden from view and unavailable to detect, can be an active contributor to neurosis, that is, create a visible symptom of illness, we must understand a bit about unconscious processes and content. I will provide a great deal more detail on this topic later, and will for now, sketch out only the most basic picture, and provide an example of a highly transparent self-analysis which demonstrates the proposition. The single reason I include any information in this text is because it is effective. I have probably used it on myself and it has worked if you see it here, or, I have deduced a principle from many many examples, and have inferred a new approach based on direct observation. I detest guesswork. The plethora of theories in use today make for a monstrous confusion, a politically correct nonplus ultra, a confusion as Frankenstein's Bride, an arm from one theory and a foot from another (Tuckett, 2011). The healthy student has not seen, and believes them all, and then none, then, both at once. To see the resultant theoretical mess: Ah! This hodgepodge theory—She is ugly and cripple for her unsure steps, a confused worker with two left feet! A strange thing most clumsy, mottled and unsure, she stumbles on shaky legs, and will never be able to dance.

The truth is a simplicity by comparison. Today, psychoanalysts, in the main, do not believe the basic Freudian theory—why would they? It is so unpleasant. From the start, only one thing was needful— let us forget this ugly thing! Unfortunately for all good taste, the original ideas are, in the main, exactly true. The denial of these things, even if deeply misguided, is in a sense right, and utterly predictable. The unconscious serves among other purposes, a defensive function. Everything we must not see about ourselves, is "housed" there. Of course I do not mean that literally, as the unconscious is a concept, and not an isomorphism, although its neural correlates can be demonstrated, as intrasystemic patterns of dynamic neural activity spanning particular anatomical systemic substructures (Norman, 2013). This defensive purpose of the unconscious makes the denial of these principles intelligible to us, if not palatable. These ideas are the exact ones which every resistance is mustered against in healthy personality! No wonder all seek to deny exactly THESE facts! So, let us look and not blink!

First, even if in the briefest and most incomplete form, one must grasp the idea of the transference. (This topic will be explored in depth and detail from a multitude of angles throughout the "pages" of this text, even if now we must be content with this scant description). The role of the transference in psychoanalysis as a therapeutic system is covered later, so for now, I will be referring to the way the transference affects experience outside of therapy proper, or, what I term: Native Transference. (As we define all our world and experiences via transference from past mnemonic and emotive unconscious content, Native Transference may or may not be pathological, although I generally use the term to refer to a pathological transference). Our unconscious ideations, the ideas and memories we are not aware of, have great power and affective energy at their disposal. They do not obey logical rules, but instead follow the rules of the unconscious.

The primary process and other descriptive rules of unconscious operation,

which are associative and non-linear are: "The cathectic intensities [in the *Ucs.*] are much more mobile. By the process of *displacement* one idea may surrender to another its whole quota of cathexis; by the process of *condensation* it may appropriate the whole cathexis of several other ideas. I have proposed to regard these two processes as distinguishing marks of the so-called *primary psychical process*." . . . "exemption from mutual contradiction, primary process (mobility of cathexes), timelessness, and replacement of external by psychical reality" (Freud, 1915e, p. 186-187).

To follow the thread of the transference: The transference uses the temporally undiminished energy and associative powers of the unconscious to develop enough energy, which in psychoanalysis is called cathexis, so as to affect conscious processes. We define all of our conscious perceptions via affective assignment (Norman, 2013) mediated via limbic (emotional) sources. These limbic sources influence reality testing, and help to categorize our experiences and expectations as they differ from actual outcomes in reality (Stickgold, 2001, p. 1056). Our past experiences and their emotional associations provide the mnemonic sources for current experiential definition: E.g., one person may love his pet mouse, another may find it disgusting. The mouse is the same, a neutral perceptual substrate, the affective definition assigned to it from past experience is in variance. We are not currently aware of the many many past thoughts, feelings and experiences which are associatively connected and summed to define reality, which is therefore, defined via transference from *unconscious sources*. The effect of the transference as it functions pathologically, is like a magnet below a table, which turns a magnet on the table's surface. In this analogy, the magnet on the tabletop which we can see, represents consciousness. It seems to spin of its own accord as if by magic! But we know this is not so. It is the unseen magnet, the *unconscious yet active*, affective ideational representation in our analogy, which is responsible for the mysterious activity we observe (Freud, 1912, p. 261). This is a rough approximation of the transference in symptom creation. The Freudian axiom states: *The neuroses are, so to say, the negative of perversions* (Freud, 1905, p.165). Look plainly at the meaning: The neurotic keeps his desires, many of which are split off pieces of his sexuality not yet bound together as one unity, unconscious, and hence is not aware of them. A split off piece of sexuality, a developmental piece which has not become part of our unity, and may become the sexual aim in itself, is called a "perversion" (Freud, 1910, p. 45). The neurotic has hidden in his unconscious, the active conscious fantasies associated with those society calls "perverts" (Freud, 1905). Or in the clearest terms: A perversion is the "active unconscious positive," the active causal energetic element in the unconscious responsible for neurotic symptoms.

This unpleasant and entirely true idea has quite predictably, been worn away, and it seems as if unconscious fantasy, these pathogenic replacement gratifications as they are called, *are but an abstract concept*, although be it a useful one (Talvitie & Ihanus, 2005). Unconscious fantasy can, however, be directly demonstrated (Norman, 2011; 2011a; 2013), and this, is the avenue through which we may cure neurosis. The symptoms are powered by unconscious perverse, or otherwise painful elements.

One uncovers the repressed idea or memory, and the painful debilitating

symptoms of long or short standing—vanish instantly. Truth is not a matter of good taste. The road to more fundamental change is two-fold, in part a repetition of many such removals of repressions, and also, a targeted assault on the nexus of the problem. A surface outline of this idea will be found in the five Prometheus articles.^τ

I will pause at this juncture to answer what the more skeptical and astute reader may well be thinking: "You say that unconscious ideation which affects the transference can be demonstrated. This seems impossible, and, contradicts the valuable work of many better educated men who have come before you, such as the esteemed doctors Talvitie & Ihanus, whose work you discard at a glance. What is the new proof which has you so sure that these ideas, which are so elusive, can at last be made into sure facts." Indeed, such a question is the right one, and we read in Talvitie & Ihanus (2005) ". . . nobody has ever seen an unconscious idea, and no research tool reveals unconscious fantasies . . . In the present context, it is also important to note that it is not thought that implicit representations can be made explicit—the unconscious cannot be made conscious. . . Although the repressed cannot be made conscious, we can acquire knowledge about the functioning of different kinds of neural systems of the brain—just as we can acquire knowledge about the functioning of our heart."

It is my distinct pleasure to be in a position to right these misconceptions with facts that are only now available to observe. Repressed unconscious contents *can* be directly accessed and observed, including the active replacement gratification fantasies which comprise the pathogenic aspect of unconscious fantasy. Today, a new class of drugs is available which alters the balance of the repressive system: SSRI drugs. I will go into great detail in future articles about the precise relationship between SSRI drugs, their effects upon repression in treatment and withdrawal, the transformations of the pathology which result from long-term use after withdrawal, and an unexpected advantage gained...but for now will simply state: repression is 5-HT (5-Hydroxytryptamine) dependent. [I will refer you to the latest edition of Goodman and Gilman's *The Pharmacological Basis of Therapeutics* for a complete description of the neurochemistry involved in the effects of SSRI therapy.]

This means, that repression itself is defeated in withdrawal from high doses of SSRI drugs after long-term use. Both aspects of repression are circumvented, both compromise formation symbolism and amnesia, and so, with mental defense in complete collapse, unconscious content in its most harmful and undistorted form is directly vented into consciousness without mediation. This new state of affairs takes the lid off of unconscious processes and content, and in the resultant neurosis/psychosis, reveals a distinctly Freudian picture and dynamic. Please read *The Engine of Creation* article for a "snapshot" of the experience written soon afterward. (At the time I only had a cursory knowledge of Freudian theory, and have since come to a complete understanding of the reactive Oedipal elements—see *Who Fired Prometheus Pt. 4* for one aspect). It is this experience which led to the

^τ Norman, R. (2013). Who Fired Prometheus? The historical genesis and ontology of super-ego and the castration complex: The destructuralization and repair of modern personality—An essay in five parts. *The Journal of Unconscious Psychology and Self-Psychoanalysis*. www.thejournalofunconsciouspsychology.com or go to https://www.researchgate.net/profile/Rich_Norman/publications

idea of "non-contradictory analysis," and in turn, I have reverse engineered the lack of resistance/repression to gain direct access to unconscious content, find the method of Native Psychoanalysis (Norman, 2011; 2011a), and theorize a quantitative method of unconscious typological identification and general diagnosis: *The Quantitative Unconscious* (Norman, 2013). So to answer the last objection: The research tool to quantitatively assess these unconscious processes and content is also at hand.

I will soon outline a new concept "the open emotional posture," used in the following example, and detail a non-elliptical method of unconscious access, but for now please read this example of a typical obsessive symptom and its disbandment via Native Psychoanalysis, and observe the role of the transference, and, the attachment points where the symptom finds means of exchanging its energetic expression. In every case, a neurotic symptom is powered by an unconscious ideation as it attempts to return to consciousness and is met by resistance. The symptom is a compromise between a partial expression of the repressed energies, and a hiding, a distorting of the energetic unconscious wish which then remains repressed. A similarity of some sort must offer itself up, an attachment point, for the unconscious wish to find symbolic expression, and thereby transfer its energies. As one makes the real unconscious ideation in its original form conscious, the neurotic symptom is defeated. Please note also, the highly characteristic obsessive displacement of affect from the hidden unconscious source, onto a trivial piece of experience. From my *The Tangible Self*:

[Square brackets indicate modifications to the original text. The word decaethet is used in a way separate from its usual meaning, which is to remove an object cathexis, i.e., "I no longer love her." Here, I mean the term decaethet to mean: release a portion of energy, in this case, to power a symptom.]

Much of mental health is an unfamiliar habit. My neurosis had taught me a lifelong habit, the male habit, the habit of always withholding one's feelings. What is of the body, becomes symbol for the mind. It is automatic, habitual for me to revert to the ingrained behavior and try to repress my thoughts, but now it never works, and symptoms result. Likewise, I am always "falling apart and coming together" as the result of new failed repressions—reclaiming further repressed material. In each case once the symptom is solved the result is the same: more energy—more libido. It seems health is just a more honest regrouping of what was already present. The subject of the reintegration of ego-contrary repressed libidinal components into the ego will be discussed later.

The symptom: I am expecting a book back from the printer and am struck by a sense of moral shame and dread. I have been trying not to notice it but it is clear now. I saw one of the terms I had used in a novel way in a preexisting text, and it was a term which was already part of the standing vernacular of psychology, and indeed, it was used in the way I had intended. I often find things I have discovered in the vacuum of my ignorance are although newly discovered, long ago noted in an old text of which I am unaware, so this is a small familiar example of a discouraging and also heartening event common in my psychological researches. It's nice I got it right, but it's a shame my original idea is already known! I became neurotic over the trivial episode, and an instance of Native Transference ensued. I kept vacillating between two lines of thought. I remembered coming up with the

idea before reading the text, I was walking, all good ideas come only to the active body, and then I thought of it. I remember thinking of it and laughing because my friend Laurie would surely like it, she is a bright one, and a fine judge of intellect. Laughter! An innocent moment of happiness, this creative moment! That was the one train of thought which was expressed in my thoughts as, "An innocent moment of happiness." The other contrary current went: "I must have already read the text somewhere before, the coincidence is too striking, you are a thief! A plagiarist!" I will add here that I regard plagiarism and theft as two of the supreme expressions of man's worst nature—"the bad" personified. Now I observe the fact that the term was rightly used and part of the common psychological vernacular, not subject to any restrictions of usage, but common, used the same way hundreds of times in other texts as I now knew with certainty. I had used it properly and there was no conflict. The logic was of no use. The obsession continued. The signature of overreaction, vacillation and clinging to a non-rational logic—these are the key signs of Native Transference in this sort of obsession. As we will see the form of the moral debate itself holds the key to what is in the unconscious. Back and forth, doing and undoing, I am good it was a moment of innocent happiness—I am lying I am bad, a plagiarist and a thief. Back and forth, over and over, imagining the moment of innocent creative discovery, then the punitive reproach, I am innocent in happiness, I am a thief and a plagiarist, I am innocent, I am bad. Over and over, back and forth as is the form of obsessive moral debate—over and over, back and forth. Hmmmm...wonder what we'll find?

So I finally realize that I have forgotten my habit! I have returned to my habitual emotionally repressed posture. That is why I am symptomatic. I sit on the porch swing in my yard and resume the Open Emotional Posture. I can feel the connection, a small sensation is available, a mental sensation of a sexual feeling as the debate goes through its cycle. Soon the real infantile component which has been symbolized and partially decathected in the symptom becomes available. Once the debate, the obsession clears out, repression fails. The obsession was there to institute repression of and partly decathect this memory: I am suddenly being touched. An actual sensation of contact more intense and sensitive than any current experience, an old experience from when the body was still very sensitive, my arms are at my sides but the hand on my genitals is my own! I feel the actual tactile stimulation of a masturbation, which once interrupted and discouraged by my nurse (this is inferred from an associated screen memory) was put under repression—the actual physical stimulation was banished under repression and now emerges just as it was experienced—entirely undiminished, preserved in every way. Here we have the true heart at the kernel of the myths of the incubus and succubus: repressed sexual experiences returning to consciousness, undoubtedly both shamed masturbations and molestations from childhood are the small true kernel in these myths. The spiritual explanation jumps to mind! How could it be? I am being touched—by invisible hands! So the structure of the moral character of the debate is really a transference, a displacement of an infantile equivalent. The form of obsessive moral debate, back and forth, is the form of masturbation, it is from this that it gets its symbolic attachment to the symptom. The two moral currents, each produce in their conscious occurrence, a part of the masturbatory process. Here the repressed experience becomes symbolized by the expression of the guilt which suppresses it. Here libido defeats repression by making the agency of repression itself, the guilty anxiety itself, symbol and expresser of the repressed libidinal

constituent. Like a dream where the form of the dream is itself the symbol, however many valid current triggering and associative causes are determined in an obsessive symptom, there is likely to be an infantile masturbatory experience [or some unconscious affective equivalent of a typically perverse, (sometimes traumatic), ego-dystonic or painful character] at work as the main hidden energizer of the symptom and the major energetic contributor to the transference which creates it.

When the repressed memory was recovered the usual result of first, shock, then amazement and laughter coincide with the disappearance of the symptom. Each time a memory like this is recovered, the libidinal energy causes an almost manic escalation in mood and the mind begins to spin as if energized by a huge influx of current. Thought is libidinally powered. Once a repressed libidinal component is brought to consciousness in conjunction with proper Non-contradictory Analysis [a method to remove the tension between wish and act], the entire experience of perception, thought and reality, the visual, intellectual, emotional and aesthetic alike, all respond as if the essence of youth and joyous restless happiness has fallen into the present, as if a bucket of youth had been poured over one's head. Know it: The road to beauty is available to those willing to look upon the ugly places. What remains ugly, once we can look?

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Objectivity and efficacy: The issue of truth in therapeutic practice and metapsychological theory— From unconscious fantasy to constructions. Pt. 1.

I will make the lesson I have learned so many times regarding unconscious content clear from the start, and state in the most condensed and precise form:

Accuracy = Efficacy.

This most unpopular view has served me well in ridding myself and some few others, of all sorts of symptoms—eliminating entire pathogenic structures so as to reclaim their energies. In those cases where a true overcoming of the illness is a valid prospect, the absence of strict adherence to this proposition: Accuracy = Efficacy, yields the certain elongation and failure of the therapeutic process. Briefly put: it is tempting to believe that the murk and resistance we **MUST** rightly pierce, obscures not "a truth," so unattractive and hideous, but, "a maybe," a shifting pile of sand, an ineffable substrate, or, unnamable dread (Brown, 2011, p. 73, 134). These are wishes, wishes not to see this thing we must see. In every case without exception, unconscious content is invariably specific. To deduce the wrong unconscious aspect, is to fail to gain a single step forward. The result is always the same: failure to eliminate the problem for good. It will return, perhaps transformed, and torture you yet again. No exceptions: unconscious content is always specific. (The reader should please note the previous reference I will use many times to Dr. Brown's fine work, with which I agree and disagree, but always with the greatest respect.)

Today, the subjective viewpoint has been used to weaken, obscure, and by death of a thousand cuts, make Freudian theory ineffective. This is exactly as one would expect, as the very precepts and design of this theory move directly against the construction of personality in terms of its defenses. The result of the subjective pluralism characteristic of today's psychoanalysis is that the theory is not used properly (Tuckett, 2011). Indeed, the basic fundamental ideas of psychoanalysis have been purposively misunderstood to accommodate these confusions. In one example of the new psychoanalytic subjective "viewpoint" (Collins, 2011), printed in the top psychoanalytic journal, *The International Journal of Psychoanalysis*, we see severe and obvious theoretical distortions. In substitution for the difficult task of unearthing the biographical facts, we find the idea that we need not bother to be objectively correct! It also appears as if *the patient* (not in self-analysis) can accomplish the task of discovering what *the therapist* must deduce and present, such as a construction involving fetish and the phallic mother. (If this were so, the therapist would not be needed). To conclude, as doctor Collins does, that we are conducting an "authentic" piece of analysis to get it wrong, to lie to ourselves and others, as James Frey did with his disgraceful self-representation in *A Million Little Pieces*, to believe this fake has value, and even more so, that this approach will cure...this is error (Collins, 2011). Whatever the patient's relationship to the therapeutic situation and the countertransference, if the construction is in any way erroneous, it will fail. It is not a composite creation, it is a deductive near certainty, or a farce. To lie, is not as valuable as to get it right...period. *Truth is*. E.g., if you are suffering conversion hysteria such as that illustrated in Norman (2011a/2013; 2011) [see *Native Psychoanalysis: A Non-Elliptical Technique*, below, and Norman,

(2011)] and you guess the construction wrongly, you will suffer. Please see example number three in *The Tangible Self* (Norman, 2011). Every guess of whatever sort will fail, unless it is precisely accurate. If the correct construction is obtained, the deduction is validated in seconds or minutes, and the symptoms ease as quickly as that, sometimes taking longer to disappear completely, sometimes not. Later, memory retrieval may recover the actual memory, and in those cases, the construction will be validated to a tee. Truth = Relief. (Information will be provided later to allow the sure and reliable deductive separation of fantasy from actual recovered memory). In short: when treating a neurotic or psychotic symptom, the correct answer is the only one which has any validity or efficacy. Accuracy = Efficacy. If you deviate from this point in any way, the patient will remain sick, and in the case of a self-psychoanalysis: that patient is you! Simply reverse each main point relating to constructions in Collins (2011), and you will be sure to succeed. To be fair, Dr. Collins is most insightful and correct in every aspect of the analysis, except, the role of truth in autobiography and construction. Or in the words of Freud (1937) referring to the goal of a rightly founded construction: "What we are in search of is a picture of the patient's forgotten years that shall be alike trustworthy and in all essential respects complete" (Freud, 1937, p. 258).

Due to the reduction in repression which causes the artificial psychosis/neurosis from SSRI withdrawal, a permanent change in the function of the repressive system results, and, the condition of substantially reduced repression will become in some degree, permanent. I.e., a condition which presented as OCD will now, after SSRI withdrawal from extended treatment, even years later, show permanent change (repressive damage) and demonstrate a large admixture of overtly hysterical symptoms, to present predominantly as an hysteria. This is not entirely without advantage, as the symptoms, although perhaps quite prolific, can be easily understood, hysteria being more transparent than OCD. Likewise, the repressive damage leaves the entire system at a low enough level of function that it can be observed in operation, as the pathogenic unconscious elements which cause the conscious end of the transference are in part, available to direct observation. This is no small thing for us psychologists, for now, we can end the debate throughout the psychological community, so eloquently put by doctors Talvitie and Ihanus (2005).

As the symptom presents, each part of its presentation should be carefully noted. Nothing is from general systemic states of chaos or nonspecific imbalance, but instead, each piece of the strange seemingly inexplicable symptomatology will be revealed to be quite purposeful. Pieces of the unconscious fantasy or memory, will show through in an undistorted form, and when the memory is retrieved, or the fantasy made conscious later, it will conform to the symptomatic presentation precisely, and show some unusual characteristics which are quite consistent as well. The fantasy or memory, will often be temporally asynchronous compared to its original form (if it is a memory), and instead, will demonstrate an adjustment, often a slowing, so as to exactly coincide with the symptom. Please reread the example in: *The General Relation Between Unconscious Ideation and Conscious Symptomatology* within this text. The memory was slowed to exactly reflect the shifting symptomatic presentation, just as a magnet under a table would turn at the exact speed of a magnet on top of a table. One can observe, as a matter of

symptomatic examination correlated with directly observed unconscious content, to find a sure deduction: unconscious content, both memory and fantasy, is indeed, an active unconscious positive, working actively from the unconscious, replaying over and over, to cause many neurotic/psychotic symptoms. Unconscious fantasy is demonstrable, and not a mere conceptual nicety. One may simply watch it work, and end the useless debate. Certain symptoms of a deeply personal character have demonstrated the notion countless times, pieces of actual unconscious memory erupting through in synchronous observable accompaniment to the active symptoms, and in my *The Tangible Self*, you can read of a thought experiment which I have carried out many thousands of times, which allows the piercing of the repressive veil in mid-symptom via the OEP, so as to observe the state of unconscious activity, which will be more often than not, caught mid-stream, observed part-way in, as a deeply familiar piece of pathogenic fantasy is being represented. The deduction is plain enough: The fantasy was already running, and by doing so, causing the symptom. After a few thousand examples directly observed, even this skeptical author is sure: unconscious fantasy, memory and ideation, is active in the unconscious as a source of transference, moving at a tempo adjusted to form-fit the symptom, as the unconscious element asserts its pathogenic influence from unconscious sources.

Indeed: *The neurosis is the negative of the perversion.*

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Objectivity and efficacy: The issue of truth in therapeutic practice and metapsychological theory— From unconscious fantasy to constructions. Pt. 2.

Constructions are some of the most interesting and all but magical aspects of Freudian theory (Freud, 1937, pp. 257-269). Once you have accomplished it a few times, recovering a memory and eradicating a severe symptom will seem ordinary. (The alteration of the basic construction of personality to remove an illness at a foundational level is discussed later). It is clear to remove a symptom in this way, exactly what is going on as the transference structure is defeated. One can watch as the effect takes place, and it is a certain fact we observe as the symptoms vanish along with our knowledge of being separate from the memory (Norman, 2011; 2011a/2013). The art of drawing correct constructions by way of proper deduction and inference is even more fascinating, because we can accomplish the same curative effect, without any direct examination of the precise content we deduce. In accomplishing this bit of alchemy, we can be quite certain that we are indeed practicing science, as instrumental efficacy is assured (Boyd in Hempel (Ed.), 1983, p. 84). Only the exact correct deduction will work, and if the deduced unconscious aspect is precisely obtained by way of construction, the symptoms vanish! The construction must be accepted for the result to come to the fore, and in self-psychoanalysis, there are two possible cases.

1. The subject may be non-symptomatic, and the construction is then as in a typical psychoanalytic situation, often accepted, and therefore effective, only long after it is deduced.

2. The other situation is the reverse. The subject is symptomatic and quite desperate. In this case, the symptom itself is of great aid in arousing belief in the logical necessity of the construction, which is sometimes easy to see, but impossible to believe, as all resistance is set against it. In this instance the relief is almost as rapid as if the memory were recovered. The process must be approached ever so slowly, as the ego must be acclimated to the unpleasant truth which in its painful aspect is a source of great resistance (Norman, 2011, pp. 52-64). (I will provide specific examples of all these ideas in a later paper, titled: From symptom to construction: the derivation of unconscious nosogenesis). Often enough, one can recover the memory later, and check one's accuracy as to the construction which was curative, and in each case, it will be a precise fit. Accuracy = Efficacy.

So the main idea in creating an effective construction is one of logical deduction in light of knowledge of the Freudian theory and the life of the subject, with which you will be familiar, as this is a self-analysis. Please remember that a fantasy will often present with every bit as much force and compulsive belief in its reality as a real memory. This is because the fantasy or screen memory is indeed symbolic of a real thought, wish or event, the affect of which has been displaced (Freud, 1894, pp. 52-58; 1900; 1918, p. 33; Norman, 2011; 2011a/2013). The way one may distinguish between a fantasy and a real ideation is as follows: Fantasy presents as a plastic reactive event, an event which alters itself in many cases, so as to dynamically fit the changing mental picture. I.e., If the ego rejects a piece of the ideation it will be reformed, or if the ego accepts, the ideation is sometimes strengthened. A screen memory, which is a fantasy or memory representative of another event or events, which although unreal in itself, may contain much reality condensed into it, and therefore be quite useful and revealing to analyze—usually *does not present* from the first person perspective. A real memory will be more

vivid in most cases, and will invariably present from the first person, and, offer no reactive dynamic responsive flexibility—only a distinct first person impression. The two are impossible to confuse, although the presentation of both are subjectively experienced as real (Norman, 2011).^Φ

Once you have reached the limit of your reasoning and resistance, the ancillary technique involving linguistic and symptomatic determination below, will help you to find the rest of the picture, and allow you to use the language involved in symptomatic expression to deduce the remaining content in its likely order of symptomatic affective importance.

Collect language from all periods of life, each time there was an outbreak of severe proportion, energetic symptoms of every different sort. The language should be of two types: language that comes from the symptom itself, outbursts, hysterical, eruptive or obsessive phrases associated with an event or symptom and other actual specific manifestations of language which proceed directly from the symptom itself. The other source is a description of the feeling of the symptom.

The subject must: Describe the feeling state, be as exact as possible. Describe the physical state. Sometimes the form of the symptom, its look and physical presentation is the language, the language of the body. Be sure to describe the physical sensations of experiencing the symptom if there are any.

Now collect all the years of language and distill it into the examples which are the most highly charged, the most severe examples from each period. It may be that certain commonalities in language allow you to group multiple symptoms under the same language. Give this precedence as well. Now we have many years covered in a few very highly energized examples. These are examples of Native Transference with strong upward drive and close association to the repressed.

As the repetition compulsion is highly active in these samples, we can begin. Here is a theoretical model of the process: As you work the language through and attempt to remove the distortions with likely substitutions, omissions, puns, etc., and interpret other common means of concealment you will find trends, all of which may be valid, but one of which is more valuable. The language will yield levels of meaning where some interpretation of the likely unconscious content will hold good for all or nearly all of it. This is a primary determinant. A primary determinant is a fundamental shaper of personality—a huge factor which influences everything. Its energies are so potent that in the process of overdetermination/condensation it leaves its signature on almost all manifestations of illness. It powers all symptoms in one capacity or another.

I will make this distillation of the idea of valid unconscious inference and primary determinance: "The interpretation that fits the most language is the most accurate."

^Φ A rare screen memory which may fit these criteria, even if a first person presentation lacking in reactive quality, will not have sufficient energy to account for the symptom, and in this insufficiency, will reveal its purpose as a less dissonant surrogate for the real ideation which will possess the energy needed to account for the symptom. This is rare, and the distinctions outlined above usually hold true.

As you shuffle each case there will be an ugly pun or a single substitution or a symbol, perhaps hidden in the form of presentation or meaning so that one interpretation will fit all the language: That interpretation carries a high degree of probable accuracy. Use typical psychoanalytical thinking— substitutions, puns and elliptical additions along unconscious lines. Other additional trends in pun and interpretation will fit well for some points but not many. These are secondary determinants. These good fits for part of the language are contributors to those symptoms to which they donate their share of pathogenic cathexis. Although important for some aspects of personality and symptom formation, they are of less or no importance for others, and so, are less energetic contributors to the overall illness.

Lastly, you will observe symptoms which fit some of the language well, but, these symptoms and the language also bear the mark and exhibit the characteristic shape of the primary (or a secondary) determinant. These are tertiary determinants. So use the language and locate the primary determinants. Let those be the basis for the first construction. These are the surest to be right, the most accurate predictors of unconscious content are the primary representations in the language. After going after those, additional less primary elements may be interpreted and constructed as the interrelationships become clear, and the suppositions as to what is concealed therefore more certain.

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The factor of resistance: from poison to cure—reverse engineering SSRI withdrawal pathology and the repressive etiological transformations of the neuro-psychoses. Part 1.

It is often, and in many ways rightly, assumed that the case with the least resistance to cure, teaches us the least (Freud, 1918, p. 190). I propose the reverse: That the case with the least resistance to the uncovering of unconscious content, teaches us the most in its potential application as a guide in our quest to produce the same result, and uncover unconscious content in a more typical case, where resistance is intact. In order to accomplish this end, one must "reverse engineer" the neurosis/psychosis in question, and attempt to create exercises which will allow the subject, in a similar *and more limited fashion*, to clear away a *window of lowered resistance*, and having mimicked the disorder with lowered resistance in this one place, to reap the therapeutic, and also, the creative benefits of increased access and proximity to unconscious content.

In his 1915 paper on repression Freud wrote that, "*the essence of repression lies simply in turning something away, and keeping it at a distance, from the conscious*" [his italics] (Freud, 1915, p. 147).

I will here propose the notion, which is no random idea, but a sure and tested certainty observed countless times: Repression is 5-HT dependent (Norman, 2009; 2010; 2011; 2011a). This simple phrase has many specific and detailed implications of therapeutic and pathological import—some positive, some negative, and others of an utterly unexpected and helpful quality. In my long tract of SSRI therapy for obsessional neurosis, a treatment carried out with all the best and highest indications of clinical expertise and understanding, this efficacious treatment controlled the severe SYMPTOMS of the disorder with an appropriate dose of up to 120 mg. per day of Prozac (Fluoxetine). As all treatments with drugs do, the treatment had limitations and worked in specific ways. The disorder itself is not treated by the therapy. One is told a silly half-truth one wishes to believe: "Your condition is a *chemical imbalance*. This drug will correct the imbalance." Although the neurotic surely displays a neural electro-chemical imbalance of some sort, it is only the rare case which sees this physiological reason as any sort of *cause*, instead, the reader must understand the following: The brain is a *causally bi-directional* electro-chemical system, so, our thoughts are created within a physiological substrate—the nervous system, and in turn, we can see that our thoughts are but patterns of dynamic electro-chemistry, and the electro-chemistry of the nervous system is in turn, nothing but our thoughts. Therefore our thoughts can affect the electro-chemical configuration of processes which is the physiology of the brain, and vice versa. You see, the distinction between our body and mind is a false one, and, in fact, both are but representations of a unity, of the same exact thing. The division is one caused by the logical processes which dissect—not of reality, which is a unity.

So here, in SSRI therapy for obsessional neurosis, we affect the bi-directionally causal mental system by way of increasing 5-HT in the synaptic gap via inhibition of the re-uptake of the chemical, thereby increasing its levels in the neuronal system. Here we use chemistry to affect an "imbalance" which is nothing but the neurological representation of a lifetime's worth of incorrect and

inappropriate thinking, resulting in symptoms, all caused by a particular series of faults in the basic initial assembly of the mental architecture. The obsessive has hyper-energetic unconscious content which his hyper-developed repressive system, running at, I will guess, some "200 percent" of normal, can not contain.

The increase in 5-HT *even further* strengthens his repressive system, allowing the ever-increasing unconscious pathogenic energy to be contained by bolstering and reenforcing his overburdened repressive facility. The basic condition, the cause, is intact, and its ever-increasing effects must be contained with constant dosage adjustments as tolerance and life-events which further exacerbate the situation will surely demand.

Please remember, the mental system is bi-directional in its causality. This means we can often change a "chemical imbalance" with different thinking...the idea being a hollow trivial one, as the two ideas, thought and mental neuro-chemical dynamism are identical. This is not to be mistaken for the mistaken belief that drugs do not affect and permanently change the capacities of the mental system, for once again, the relation is causally bi-directional. Now we can begin to see our way into the problem. If the underlying mental construction which forms aberrant personality is left intact, it will always assert itself from under whatever chemical patch is laid upon the untreated wound. If the "chemical imbalance" is to be cured, its pathological effects and strain *cured*, rather than contained, the neuro-chemistry must be affected by way of addressing the cause: the malformed mental processes created in the formation and construction of personality. In brief: Only a psychoanalysis will do.

In the next part of this series, I will detail the precise way in which the reduction in repression from SSRI withdrawal transforms the illness, from one of an obsessive character, to one of an hysterical character, and then, determine the role of these symptomatic transformations, which surprisingly, include representatives not only of the transference neuroses, but the narcissistic neuroses too. I will make the purpose of these transformations clear within the context of mental defense, and then, outline the reverse engineering of the condition, so as to bring the reader close to a true understanding of the notion of Native Psychoanalysis.

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The factor of resistance: from poison to cure—reverse engineering SSRI withdrawal pathology and the repressive etiological transformations of the neuro-psychoses. Part 2.

The entire of mental illness, the neuroses and the psychoses, have much in common. One who looks at the various conditions with a psychoanalytic eye, sees a purposeful structure to the various states of "imbalance," which one and all, demonstrate a sort of *non-linear cognition*, a cognitive structure most elliptical and associative, serving through various symptomatic means, a single purpose: defense. The symptoms of delusion in the psychotic, as well as the rituals of the obsessive and the absences and innervations of the hysteric and all the rest, are but different approaches to the same function (Freud, 1894; 1896, pp. 174-175; 1905; 1911, pp.1-82; 1915, pp. 181-185; Norman 2011; 2011a). Within the deep repressions of the obsessive is a shadow of hysteria, and indeed, it is by grabbing onto a piece of hysteria that the analysis can best begin, e.g., the subject may present as an obsessive, but a piece of bodily innervation, perhaps a hysterically affected organ such as the bowel may offer itself, as the best analytical target, the most direct inroad to cure (Freud, 1918, pp. 264-265). The various neuroses and psychoses are in many ways so very similar, even as their symptomatic expressions may differ. In many cases, the factor which separates these distinct and various clinical presentations of illness, is a single one: Repression. As heightened repression is the hallmark of obsessional neurosis, in SSRI withdrawal from the high doses used to treat this illness, we may observe the various transformations which characterize the defensive structures and strategies endemic to each sort of disorder, spanning the breadth of the transference neuroses, and also, including some representatives from the narcissistic neuroses and others.

The transference neuroses are: Anxiety Hysteria (phobia), Conversion Hysteria (hysteria proper), and, Obsessional Neurosis (OCD). The transference neuroses are so named because they exhibit the sort of transference which makes them amenable to psychoanalytic treatment, a treatment which functions by exchanging the original neurosis of the patient for a substitute version called "the transference neurosis." This second version created within the confines of psychoanalytic treatment is useful because it is subject to interpretation and modification so as to divulge the road to cure (Freud, 1912, p. 111). This will be detailed in the paper which follows this series. These seemingly disparate manifestations of illnesses, so very divergent in their symptomatic presentations and often in their etiological development, are in fact, closely related, and one can be converted into another by altering the single repressive factor which separates them. It is very likely, in my opinion, that the "choice of neurosis," as it is known, has much to do with how environmental and other factors affect the outcome of the repressive facility in its development and relation to the overall architecture of defense in any one person.

As SSRI withdrawal commenced in earnest, a condition which was delayed because of the self-tapering properties of Fluoxetine, repression began to fail, resulting in the episode previously outlined in the *Engine of Creation* section of this discourse. In this, we see the emergence of a most unusual and distinctive sort of new artificially induced hysterical psychosis. The hallucinatory representation of undistorted unconscious *reactive* content, a massive libidinal

influx of dread quantitative proportion, all fixated in regressive anal-sadistic fantasy, was the ultimate example of the return of the repressed causing symptomatology of the worst sort. The psychotic portion of the withdrawal was over within a three to six month span, and now, the situation was permanently altered: repressive function was permanently reduced. My entire personality and symptomatic presentation had changed. The mechanisms upon which my obsessive manifest illness were dependent, no longer functioned, and now, I presented as an hysteric: A completely different personality. Once repression was defeated, and the unconscious became manifest in consciousness, a different approach was required to reinstate defense, one which was not in need of a developed repressive facility. The hyper-energetic unconscious contents had to be repressed, and in order to accomplish this, the illness adjusted itself to suit my decreased level of repressive functioning.

Whereas before, I had been a performer, one able to deal with enormous pressures and accomplish any task "under the gun," an ability which is entirely repression dependent, now, I manifested a clearly hysterical personality: All new "dangerous" tasks were the cause of unbearable and crippling anxiety, tasks which were upon analysis, discovered to be symbolic of sexual elements that were previously deeply repressed and hidden, each symbol now avoided, triggering anxiety in a condition known as "anxiety hysteria," or *phobia*, and, even more striking, was the development of conversion hysteria (hysteria proper): a bizarre condition where repression is maintained by "bodily innervation," the misdirecting of a symbolic representation endowed with two opposite, or "counter-valent" as I call them, wishes, which are each from a separate psychical agency, to a location in the body.

Imaging studies have revealed a tantalizing glimpse of this process (Feinstein, 2011), a psychoanalytic/neurological interpretation of which will be offered later. In my case, this was manifested as excruciating back pain which would reduce me to inactivity. As repression was so drastically reduced, the illness was converted from one of an obsessive character, which is highly repression dependent, to one of hysteria, which uses low levels of repression to maintain the unconscious aspect of the ideation, and provide necessary defense which is now drastically curtailed. In hysteria, be it anxiety hysteria or conversion hysteria, the use of repression, of the punitive, is minimized compared to obsessional neurosis, as the symptom is maintained as a function of the *tension between* the punitive repressive wish stemming from the super-ego (our conscience), and an opposite wish from the id, an unconscious wish (Freud, 1915, pp. 181-185). Sexuality, the bisexual current, is also distributed in bi-directional opposition in the case of hysteria so as to produce the same effect (Freud, 1905; 1908). In this way only half of the energetic symptomatic burden is allotted to the reduced facility of repression, and the wishes can be kept unconscious at half of the repressive expenditure.

Please note that for this reason, hysteria is a scientifically valid medical term, each sort having as a common underlying causal mechanism the tension between two opposite wishes, therefore, enabling instrumentally demonstrable curative symbolic interpretation, and, in the future, quantitative experimentation to uncover the intrasystemic neural signature of these specific psychical processes (Norman, 2013).

Here it should be noted that although a clear distinction is made in psychology between the narcissistic neuroses and the transference neuroses, and, each case is predetermined, predisposed, to one illness or mixture of illnesses or another, that once defense and repression are circumvented via the artificial means of SSRI withdrawal, no such distinction is evidenced, and the clear relationships between the purpose of the various constellations of symptoms becomes clear. Once the unconscious ideation was revealed or nearly revealed in an analysis, the symptoms would shift, sometimes to a transference neurosis, sometimes to a narcissistic one, like paranoia or another, such as symptomatic clusters associated with manic illness, etc. In each case, through different means, the purpose of the various clusters of symptoms, each associated with a different illness, was the same: to maintain repression and defend personality, ego, from the harmful repressed material. Once the symptoms were analyzed and the structure of the illness collapsed, another, of whatever variety, would quickly take its place. Later, I will detail a model which will allow paranoia to be analyzed as one of the transference neuroses.

Although difficult and intractable, it has much in common with obsession, and can be defeated via Native Psychoanalysis. Also, it should be noted, that the standard Freudian analysis of this disorder is *in the main correct*, but not entirely. Some *few cases* have virtually no homosexual contributing energetic factor, and in many cases a determinant from the heterosexual current is easily discerned, and can be demonstrated in these particular cases, to be the *primary* contributing energetic factor. The usual outcome finds a place for *both currents* in a complex and shifting interplay, although the primary pathogenic element is, in the main, as the original theory states. This new model which takes into account both sexual currents is now available in my *The Tangible Self*.

The point is within reach with one more bit of information. The thread has been drawn between the neuroses in their common purpose as a protective measure administered to maintain a repression or series of repressions (Freud, 1915, pp. 181-185). This same mechanism has also been demonstrated theoretically to apply to the psychoses (Freud, 1911, pp. 1-82). So there should be a demonstrable connection available between the psychoses and the neuroses allowing us to see them as closely akin, and, indeed there is. As an obsessive my unconscious ideas were deeply hidden and repressed. I observed these ideas directly in hysterical psychosis and its attendant state of hallucination. Then, the entire of my personality changed. This is evidenced in the way associative chains reminiscent of those used by Jung are altered in relation to their demonstrable proximity to unconscious content and the complexes. As an obsessive, such a chain of ideas was not very revealing, repression was working in great strength, and the ideas I would generate were most typical: Strong associations, like up and down, yes and no, were predominant. However, as unconscious content comes closer and closer to the surface and consciousness, its influence is more strongly felt, and the chains of spontaneous association change. Now the chains of association I generated showed gross malformation and evidence of Janet's "abaissement," which is a product of the presence of the "feeling toned" (ambivalent) complexes exerting their affective sway from the unconscious (Jung, 1972). Jung rightly noted how the associative chains of schizophrenics and those of hysterics were *nearly* identical (some

differences in timing may exist). In such a case, one needed ask a particular question to determine which of the two distinct illness the associative chain belonged to: Does the patient have a consistent personality and ego presentation or not? A yes indicates hysteria, a no, schizophrenia. In the absence of a clinical examination, only this answer can allow a sure judgment as to the illness which created the distorted chain of associations, so deeply influenced by the lack of repression. (It is for this reason that I propose that SSRI withdrawal *may* encourage the emergence of schizophrenia in those predisposed).

So we can see a clear and graded relation is available connecting the different illnesses together as differing not in purpose, for all are manifestations of a defensive struggle, but in form alone. SSRI withdrawal has demonstrated the interchangeability of the multitude of mental illnesses, each acting in a different way to accomplish much the same ends. The neuroses and psychoses of every differing sort are encouraged to emerge in turn to accomplish the reinstatement of repression at whatever cost. In conclusion we may draw an inference from this vantage point and remark: If the various mental illness are so closely related, the neuroses and psychoses of every sort so deeply akin, we should be able to treat the multiplicity of disorders in much the same way, and pierce the repressions which safeguard the illness, whatever its type, with a single tool which might then, be well aimed. Indeed, it is exactly this which I propose to do, as in the next section of this series I reverse-engineer the psychosis/neurosis which has lowered resistance and repression to the point where every illness was encouraged to emerge and aid in reparation of the repressive deficit. If an illness can, through wholesale destruction circumvent repression to pathological result, and the *controlled* circumvention of repression, is how we aim to cure illness, then, we should be able to reverse-engineer the illness and clear a small window of lowered resistance away in the repressive structure of personality, and achieve our desired result.

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The factor of resistance: from poison to cure—reverse engineering SSRI withdrawal pathology and the repressive etiological transformations of the neuro-psychoses. Part 3.

We are now nearly in a position to articulate the method of Native Psychoanalysis in its most basic form. As usual, I will proceed by way of example first, providing analysis and detailed definition of terms afterward, so as to make the meaning clear and allow the work of learning to be accomplished most quickly. To see is easy, then, to understand, becomes natural. Complexity is the manifestation of poor method.

However, several ideas are needed, even if spelled out in the simplest and briefest form, if we are to make sense of the information I am about to present. These ideas, which although clearly demonstrable and obvious to see, *are unpleasant*, and so, in the usual way are no longer believed. However, they *must* be directly understood. An epigram:

Consensus delineates the limits of Knowledge, and demarcates a boundary, past which truth is excluded. This is our hypocrisy: our "good taste."

The facts:

Predisposition to neurosis. This notion is right in every way, and, can be seen sitting in front of your nose, although, it is not believed. (This obstinance is a theme you will notice with psychoanalysis, a science borne upon working against the resistances which hold personality together). Each neurotic, even if his symptoms come upon him only late in life, has a predisposition to neurosis. This can be thought of as a fault, such as those under the earth's crust, which contribute to seismic instability, or better still, as an analogy with a gem, a diamond let's say, which although clear to look at has a crack, a fault which determines where it will break if you drop it. As we grow up, many exhibit an infantile neurosis of some sort which is overcome, or, have successfully contained some contributing factor to the same. By this I mean, that as we develop, we go through developmental phases where each step along the way, is characterized by a specific erogenous zone, a zone which acts as a genital (Freud, 1905, pp. 125-243; 1912, pp. 229-238; 1938 [1940], pp. 152-156). First the oral, then the anal, then the phallic, allowing for the factor of much residual and simultaneous expression....then after latency, *in the best case*, all are united together under the auspices of healthy unified genital sexuality. More will be discussed of these issues later, but for now, think of the idea of a perversion as I have already defined it: A developmental piece of our sexuality, which may become split off, then not part of the unity of personality, so as to become an end in itself. When a stage of development is *lingered too long at*, the sexuality becomes fixated there, fixed at this stage. Often, these impressions are repressed, and an unconscious fixation is formed. These fixations are each in their type associated with different neurotic illnesses. OCD for instance, is associated with highly energetic fixated sadistic and/or masochistic unconscious content—specifically: *fixated at the anal-sadistic phase of pre-genital development*.

Unconscious content is always specific. This fault, this fixation, will determine in each case where the personality will crack, and exactly how one will respond to the pressures of life, one with an illness of one sort, one with another,

and a third with no illness. These unpleasant fixations, this admission of perverse sadistic ideation and masochistic ideation and its relation to the illness, these unpleasant and demonstrable ideas are why the notion has been discarded. We can see it clearly in evidence in the following paper, *Native Psychoanalysis—a non-elliptical technique*.

So, if the reader has been diligent and thorough, and has put in the effort so as to read and comprehend all the preceding essays each in turn, the following example of a true Native Psychoanalysis will be easily accessible to you. Please remember the notions, as we have advanced them, of: fixation, the transference, predisposition to neurosis, the role of opposing wishes in hysterical symptomatology, repression, the pre-genital stages of development and unconscious perversion, as well as, memory and fantasy as they relate to the formation of neurotic symptoms. In the following paper, *Native Psychoanalysis—a non-elliptical technique*, you will see the entire picture in action and can watch, as these ideas are made manifest, and, the transference structure is altered by way of Native Psychoanalysis to curative effect.

This method of getting at unconscious content has been derived by 'reverse engineering' the SSRI withdraw induced artificial hysterical psychosis to gain two pieces of functional theory: 1. The Open Emotional Posture, and, 2. Non-Contradictory Analysis. The second will be discussed later. The first is explained in the following paper, and is actually a re-creation of the illness on a small and controlled scale—a reverse-engineering of the psychosis. As the psychosis would have me look upon painful unconscious content no matter if I chose to or not, the *feeling* of this process of observation has been distilled into the heart of this method. The subject can use the OEP so as to open a window of lowered resistance, and use this limited clearing away of our repressive safeguard to access hidden unconscious content in consciousness, and alter the transference structure, ending symptoms.

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Native Psychoanalysis — A Non-Elliptical Technique

An important preliminary note to the reader:

Written soon after the experiences and insights referred to, this paper does not use the typical citation forms, or contain the density of citations one expects from academic writing. This is because I had understood these things as a matter of direct observation, and largely, not acquired the information from reading. Although I could retroactively fill in many citations, and add much clumsy scholarly apparatus, the citations referring to the displacement of affect from unconscious sources in obsessive symptomatology alone filling several lines, I have not. Look through the previous essays, or contact me for this information. The paper is more useful as written. It is easier to read and understand, and, the insights were gained exactly as represented...some from reading, some from experience. The actual technique, *Native Psychoanalysis* is of course, entirely new.

Native Psychoanalysis — a non-elliptical technique

Introduction:

What is psychoanalysis? The question is unambiguously answered in Freud's (1914, p. 16) "On the history of the psychoanalytic movement" where he states, "...the theory of psychoanalysis is an attempt to account for two striking and unexpected facts of observation which emerge whenever an attempt is made to trace the symptoms of a neurotic back to their sources in his past life: the facts of transference and resistance. Any line of investigation which recognizes these two facts and takes them as the starting point of its work has a right to call itself psychoanalysis..."

Native Psychoanalysis

The idea of Native Psychoanalysis can be best understood through its relation to the familiar process of psychoanalysis. My discovery of the method of Native Psychoanalysis was entirely necessary and intuitive, but its *modus operandi* acknowledges unconscious processes and dynamics, and so might most precisely be explained with the familiar terms ascribed to psychoanalysis, which rightly describe the true state of affairs in the divided mind of man. In psychoanalysis there are several basic avenues of therapeutic entry into the unconscious of the patient. Dream interpretation, the study of the patient's unconscious defenses which dam the pathways of reminiscence and offer other obstacles, free association, and along with dream interpretation the most mysterious tool: "the transference," which as the analysis gains steam finds its ultimate expression in "the transference neurosis." The transference neurosis is an artificial substitute neurosis particular to the psychoanalytic process. This artificial illness develops as the patient transfers the various sum total of his complexes in an act of displacement onto the person of the therapist and the analytic situation. All of the patient's complexes are transferred onto the person of the therapist thus, those of both positive and negative

character, and the therapy can proceed with analyzing the resistances and complexes once they have been transferred in this way. {see Appendix #1} However useful this is, it is a manifestation of the aggregate of the patient's complexes, and is a resistance by way of the repetition compulsion. The idea is that as the patient bumps into associations which close in on the tender spots in his hidden complex, he stops remembering and reminiscing as he should, and adds to the transference, until the transference becomes an example of the repetition compulsion. All instincts are regressive and want only to repeat. {see Appendix #2} The situation in the development of the transference neurosis is: First the patient remembers, then he repeats. {see Appendix #3} The end stage in the transference as it presents in the transference neurosis is an example of the repetition compulsion (as is much of neurosis in general). These examples of the repetition compulsion are defended with the utmost tenacity by the patient, who often loses respect for the rules of psychoanalytic therapy in defending them with all his might. This artificial illness which is created in therapy, the transference neurosis, has many parallel examples which occur in daily life, native examples of transference which are brought about independent of any psychoanalytical therapeutic situation.

Much of neurosis is a symbolic transference of unconscious complexes onto the world. These examples of "Native Transference" can be easily recognized, and each can be traced back to a complex, and in many cases a formative infantile impression or experience which has been repressed and harkens only to return to consciousness, and so cathects our perception of the world as to create a transference and release part of its energy, even if only in symbol, so as to appease its need to release its energies, and the ego's need to keep the ego dystonic wish or event repressed. These examples of Native Transference are compromise formations along these lines, as are many neurotic symptoms compromises between the release of repressed libidinal energy, and the ego's need to conceal the source impression (which along with other more superficial determinants) power and define the symptom. Because of the very specific structure of these examples of Native Transference, there is an equally specific emotional character to them which can be easily recognized. As they are super-energized examples of the repetition compulsion, they bear its distinctive symptomatic signature of overreaction. An obsessive symptom appears as an overreaction to the trivial topic to which it has symbolically attached itself, but a displacement from the real mental object or idea which *is* of this heightened level of importance to the person effected, is responsible for the "overreaction." So Native Transference can be recognized by its appearance as an overreaction, but in reality it is not. The mechanism is a displacement of affect from the real hidden internal excitation onto the symbolic object or triviality which is then invested with the affect appropriate to the hidden source—overreaction and obstinate adherence to a position which is inappropriate in strength and proportion, along with an obsessive persistence of the overreaction. In short: the extreme inappropriate presentation of affect and its obsessive insistence. These are the hallmarks of Native Transference. There are two basic (but far from exhaustive) presentations of Native Transference: Tantrum and Insecurity.

In *This New Day* it is said over and over, "Move toward your pain." (Norman, 2009). That goes double here. I have learned to recognize the feeling of the tantrum, the squalling, obstinate, over-excited pressure as I defend myself, this has

a sound and a feeling. The rise of blood in the face and the set of the jaw, the need to defend a trivial point well past its value, and then persist...that is the feeling. Reason holds no sway, the repetition compulsion is an insistence, a necessity, a must, it never ducks and often defends to within an inch of good taste and then goes further. The other type of common presentation is as a niggling insecurity that seeks reassurance beyond all reason, going on and on, insatiable and ever so insecure. If you pay attention you can feel the pressure, or the empty ache and fear which will not be filled, pressing, so angry and sure, furious and red faced, or interminably insecure and squirming, on and on, worrying and perhaps vacillating endlessly between two mental positions, back and forth, over and over. It is a compulsion to make too much of something, a hurt feeling, an insecurity, or self-righteous bluster that keeps going at all costs. The energy from the repressed which is being transferred onto the present situation gives the symptom its signature, so very much too much affect and importance for the actual issue which has fallen under a hyperenergized transference from a submerged complex or memory. Native Transference, whatever its character, always displays disproportional affect.

Before I surrender an example of how to use the technique, another concept is needed. It is a vital and strange idea which is meant to make real the notion of "moving toward your pain." First off, that sounds like a terrible idea, doesn't it? Why should you want to move toward your pain? What am I, a masochist? No! I am a psychological reverse engineer.

Free association accesses unconscious material through a circuitous route of links which might be described as elliptical—the long way around. Also, there is no small measure of interpretation needed for the results to be used, that is to say, the practitioner must be very honest and not refuse any painful subject that comes to mind, then make sense of what he finds. This state of free association involves removal of censorship from the train of thought, but the maintaining of attention which is directed at observing the thought processes. The act of attention itself, although lessened by removing attention directed at the censorship of topics, still impedes the flow of ideas as thoughts are observed, attention blocks that which it gathers, like an object in the unconscious stream which interrupts its flow. Half of attention, half of the object has been removed, the censorship of thoughts is gone, but half still remains to observe. {see Appendix #4}

The purpose of the repressed unconscious is found in the mediation of mental suffering. The repressed unconscious contains nothing but drives which cause the ego pain as they are paired with moral repudiation, painful wishes, painful events, unbearable sights and unthinkable disturbing thoughts. It has many vital energies, but all are bound into painful, intolerable sights and ideas. It houses much libido which is painfully dissonant, aggressive urges which are morally untenable and shameful, and other memories and thoughts, all too horrible to know for the ego. With only one exception, one minuscule thought, the entire sum of unconscious non-preconscious content, but repressed content proper as I have observed, is but variations on one theme—mental suffering for the ego. Only dissonance. The energies there are the stuff divinity is made of, but all, and I mean all of it, is bound in forms of sheer agony for the ego. Nothing but pain.

Don't worry though, that is just a perception of the fearful ego, and all those thoughts can't hurt, once they are conscious, each is like a twenty dollar bill which

yields its energies to fuel our ascension, but the relationship as it stands now between the ego and the unconscious, one of pain and repression is in fact, our ticket in, our compass to a new habit which will permit us a less circuitous route to unconscious repressed impressions from childhood. When the painful contradictory repressed infantile component is retrieved and made conscious, the symptoms disappear instantly! The need for a comprehensive analysis of the upper layers of personality and an understanding of how the infantile retrieved material fits together with it is no less vital now, perhaps even more so, as memories are retrieved more often than constructions are used, and so, can shock the ego with their sudden emergence. This is no substitute for the hard work of a comprehensive analysis, but a supplement to its expeditious conclusion.

The idea I use in substitution for free association, and it may be used in conjunction with it as well, is a path of direct unconscious access which finds the hidden by the painful signature which is meant to insure its secrecy. It is the painful quality of the memories and thoughts which will allow us to track them down. This state of mind which I now call the "Open Emotional Posture" or previously the "creative emotional posture," has several various beneficial aspects. Firstly in the case of Native Psychoanalysis, it clears away the amnesias which shield unconscious memories and fantasies. Secondly, in less severe cases, it can in and of itself stem neurosis by reinstituting libidinal flow from unconscious repressed sources. Thirdly, it accesses unconscious energies and so, greatly enhances creative potential. I personally maintain it at all times to the best of my ability, and in so much as I am successful, I have found a narrow path to defeat neurotic symptoms even before the infantile component has been recovered. The Open Emotional Posture can access undifferentiated libidinal energy from a fixation, even before the fixation has been overcome. Although it is not a substitute for the removal of a fixation (it is far less stable), it can actually provide usable libido from an unconscious fixation or perversion while the neurosis is still intact. In this way feeling, libido, can be derived directly from the id to be used for any healthy purpose. {see Appendix #5} As almost all neurosis in some part creates its ill-effects by keeping part of libido under repression, the idea should be universally helpful in treating neurosis. Again, I have used the posture countless times in my own case and can only hope that you will take the time to try it yourself and see if it has the potential I believe it possesses as a psychological tool. The Open Emotional Posture has proven itself to be a Swiss army knife of sorts, a tool with many uses which has been reverse engineered from the worst of my experiences.

The Open Emotional Posture

Pain is what we repress. Libidinal cathexes which are dissonant to the ego, painful events and memories, painful reactions real or imagined, unacceptable thoughts of all and any variety, our aggressive urges and all the rest. We have developed a reflex. A fine and right minded but flawed reflex to avoid unpleasant things and internal perceptions. Later in development the reality principle takes its place and even painful things, if real, must be attended their due. It occurred to me as I was writing that in a way, the Open Emotional Posture makes a meditation of the reality principle in order to locate a painful stimulus: the unconscious. Since the unconscious exists to alleviate mental suffering it stands to reason that we can access its contents by pursuing the same. Pursuing is the wrong word, "being open

to" serves the idea better, for like a Chinese finger puzzle where the harder one tries to escape the more difficult it becomes, to pursue them, all hidden things flee to be chased, and must be ensnared after the fact, if at all. This is one way that free association differs from the Open Emotional Posture. Attention is entirely withdrawn after finding the way. We do not pursue, we do not look. Although a painful internal stimulus is used to discover the feeling of being open to the unconscious rather than repressing it, the stimulus is allowed to dissipate its energies and the feeling of being open to it is kept. That feeling does require attention be spent so as to record it. Remember the feeling of being open to the painful memory, the memory is of no matter, the emotional posture, the feeling of being open, of allowing it through into your mind without impediment, without resistance, is the key. Feel it and remain that way. That is the Open Emotional Posture. Creativity is fostered, the "active unconscious" {see Appendix A}, has its entire perceptual and emotional effect diminished to heighten experience and free libido, undifferentiated for sublimation into thought, or simply to grace the world with the sexual sublimation of beauty, undifferentiated libido comes directly into the sphere of the ego. However this is also a tool to trace repressed memories, even infantile ones which remain buried. This function of the Open Emotional Posture is proportionally aided by the heightened severity and libidinal cathexis of the repressed symptom creator. The Open Emotional Posture is the philosophy of "moving toward your pain" made specific as psychology.

Allow me to all too briefly take you through the idea with some colored affect as you might use to communicate a *new emotional state* to a patient. We find a painful memory, one which is near to repression, a sad memory, not an angry or hurtful response or reaction, but a sad memory which wants to run away. Then we open the mind to it, let it through without any resistance, invite it in by not resisting, be open—do not seek. Let it fill your eyes with tears and smell the scent of salt and sorrow. Remain open to the pain and let it fill you. Now that you have opened yourself to your pain in this one place, let it flow freely through you until it is spent and then...**remain open, in exactly this emotional posture.** That is it. Remember it and practice it. An increase in creative ability, mental acumen and aesthetic pleasure as experience and thought are sexualized and powered by undifferentiated libidinal energy is the result. A neurotic antidote. If used during active symptom formation with the method of Native Psychoanalysis described below, the earliest memories powering the symptomatic phenomenon which are its transferred infantile predispositional component can be directly made conscious and the symptom eradicated on the spot. That is my experience and the best possible outcome on a declining continuum of usefulness, but hopeful nonetheless. This technique is not unlike unconscious fishing where a piece of language or an idea serves as the worm. It is vital to remember that once the Open Emotional Posture is achieved, no attention is offered in the mind to find any subject, for that will act like an obsession and block the process. "Invite but do not suggest," or, "Look and you will not find."

The Method of Native Psychoanalysis

While all serious neurotic manifestations are the result of multiple determinants which coalesce to form the end result of neurosis, there are primary determinants which are of the greatest importance, and leave their stamp on all, or almost all symptomatic presentations of the disease. This example of the application of the

technique of Native Psychoanalysis is also a case of obsessive nosogenesis in the sense of having as its result, the bringing to consciousness of the primary determinant toward the predisposition to neurosis, which once revealed to consciousness, coincided with the disappearance of the current symptom, and a permanent fundamental change in the obsessive and compulsive character of personality. There are many, but this is the single most fundamental, influential and energetic component, the first signature at the heart of the fixation. The fixation proper will be examined later and its multi-reinforcing developmental constituents discussed at that time, along with other issues. This example will serve as a model for the full technique.

A preliminary note on distinguishing fantasy from reality in memory retrieval: I am stunned to read that there is often confusion in this regard. My case is the reverse. There is no confusion at all. The two present differently. I will simply state that real memories are experienced in the first person. If you are looking on at the scene from the third person, as an outside observer who sees yourself, this is a screen memory, likely a useful analyzable condensation of many events or symbolic equivalent of one or many repressed events (more distortion = more repression). Fantasy presents as a plastic, idealized creation, one often looks on and the scene changes so as to invite you to look further. Actual memories and events are experienced in the first person. They are exactly as they were at the moment they were formed (or more correctly, the moment they were repressed). I have read many differing views on whether impulses or memories decay in the unconscious. In regard to those memories I have recovered: There is no debate. They do not. Period. Visual memories may or may not be paired with audio memories which may or may not be paired with tactile memories. Yes, tactile memories. This is disconcerting and quite horrifying until you have experienced it a few times. Here is the real source of many legends—the incubus and succubus for example. As the repressed returns, invisible hands are felt to touch exactly as the sensation presented when it was repressed. In the instance under present discussion, the earliest visual impressions, in one case also paired with audio impressions, were preserved and presented in the mind's eye with near hallucinatory clarity. One guesses at fantasy, as is its aim, one is shocked by the sudden reality of a first person memory. The two are in no way similar and can not be confused.

Lastly, before presenting the case I must discuss the most universally applicable aspect of the approach: Language. We use the language presented in the symptom to trace it backward in the life history of the subject, until the earliest formative repressed memory which is responsible for powering and giving form to the now blossoming symptom is recovered. The language is key. {see Appendix #6} Language is a conscious nodal point onto which conscious and unconscious determinants all attach en masse, and so the symptoms will present language as they are described, or better still, of their own accord, that is to say language from within the symptom, not just a description of it which comes to mind, this is the key which guides the process backward: The Language. The language is the compass needle backward and downward, the language is the plumb-bob we follow down.

Here is the rule I have found regarding the relationship of the language to the unconscious source material, and it is to be found in the presentation of the language, the more "hysterical," the better. Here, and only when specified, I mean the colloquial definition of the word hysterical, hysterical as in eruptive and

dramatically overcharged with affect—an eruption of language, uncensored and spontaneous, hysterical here meaning over-amplified and entirely unthinking eruptive language is best. Although not necessary, this is the ideal condition. Such utterances proceed all but directly from the repressed, from the unconscious id. {see Appendix #7} This case is of this model. More obsessive and muted presentations which are not as "hysterical" (again used colloquially), will demonstrate a mutation in the language as one follows the path backward, but a kernel of meaning from the repressed, concealed in pun or veiled by association will inevitably be available—it has to be, or the symptom could not vent the repressed cathexis, a consistent core meaning which refers to the repressed is always maintained throughout the linguistic transformations.

Native Psychoanalysis of an obsessive/hysterical symptom presentation and subsequent cure by way of revealing the primary determinant in obsessive nosogenesis:

After fifteen years on as much as 120 mg of an SSRI (fluoxetine) per day for the treatment of OCD, I discontinued the drug. In the briefest possible terms: Following a ~100 day latency period, repression was largely defeated. The resultant return of the repressed engaged the process of symptom formation and began to reveal the underlying psychological structures buried within the obsessional neurosis.

The "shadow of hysteria" which is at the core of obsessive illness has indeed been revealed in my case. Certain I believe more hazardous, and without question, more noisy aspects of symptom formation never before displayed in the long history of obsessive manifestations had become prevalent after the withdrawal from SSRI's. Some of these more hysterical manifestations include anxiety of a debilitating "accelerating" sort, accompanied by severe pains in my back. In obsession the risk of suicide is low. It hurts terribly, but like a car chained to a pole, one goes on and on, revving against the resistance slowly straining and burning out little by little. The presentation after withdrawal is different. It is analogous to a car with the accelerator floored, left out of gear—revving out of control ready to explode. Accelerating anxiety. Different and more dangerous, undoubtedly a higher suicide risk. I am justified in using the traditional medical term hysteria for the severe psychogenic back pains (conversion hysteria) which had become prevalent in symptom presentation, along with the accelerating anxiety (spillover of an incomplete hysterical conversion innervation into anxiety hysteria, as well as anxiety hysteria demonstrated in some instances of accelerating anxiety acting as a phobic inhibition to certain ordinary life behaviors). These were new manifestations of an hysterical character, manifestations of neurosis never observed before SSRI withdrawal.

Perfection in musical expression, performance and composition had over the course of many decades become my entire existence, all the rest of my life having been sacrificed to serve those ends. So what is it that makes one an obsessive, a type of obsessive—a perfectionist who achieves the goal, one of the highest standards who builds the cross, gets on it and nails himself in place...perfectly? I have found the answer. I had succumb to the enormous creative tide now available to me from exposure to unconscious material and written a book, a novel entitled *Ever Deeper Never Better*. This is both a happy and an unhappy

fact. I now have the unenviable task of presenting the work, or some description thereof, to hundreds and hundreds of disinterested literary agents. My wife was kind enough to help. She is not an obsessive, and by my standards at the time, she thinks little of making an innocent mistake, and so, is somewhat haphazard about checking an email query to one of the 500 agents on the list, all of whom are sure never to even read my precious submission. Blair, my wife, mistakenly only sends part of the sample off to one of the hundreds of literary agents. I am watching and notice her mistake. Something in me snaps, boils to see it. I go into an uncontrollable frenzy of reproach. Here we see the signature of Native Transference clearly: overreaction. Although there are hundreds and hundreds of literary agents, I react as if it were a life and death matter. A sample of my thoughts: My back begins to hurt as the desperation and panic, the gravity of the error sinks in! I can not stop my fury at having been shamed! The overreaction is out of all proportion and is unstoppable in its compulsive, constant, insistent drilling—something must be done! That night I sleep little. The obsession is absolute. My back! The shame! How could she! If it were me, I would be engaged in weeks of endless self-reproach for such an error! But she sleeps! This goes on for a few days.

Here I found an intuitive idea: what I now call Native Psychoanalysis. I knew I had to find out what was so very wrong with me, and could sense how to find it. I had already found relief in the Open Emotional Posture and used this skill to try to find the cause. I went looking for the earliest time in my life when I had displayed that symptom. I used the Open Emotional Posture and language to do it. This is the first and the most primary of the numerous memories I have now recovered.

Language: As I am pressed to the ground in a squatting position from the back pain, I cry out, "It's like pieces of obsidian, hard and black, like chips of sharp pressed shit poking out of my back!" I see in my mind the pattern of the imaginary eruptive protrusions projecting from my upper back.

Language: At the peak of my rage and reproach I shout over and over, "No filthy mistakes! No more filthy mistakes! Don't you know there are penalties for that?" When I say those words, "No more filthy mistakes!" I was pressing and raging with such energy that the words all but lit up. They summed the entire feeling and were the key. I went looking for the first time I could remember acting like this, the first time I remembered feeling this way. My back was killing me and I needed relief. I was all too happy to look at my pain. To move toward it, that is the key. I couldn't find it. Nothing. I looked for the next one back, instead of looking to childhood, I opened my mind to my pain using the Open Emotional Posture after thinking of the language, "No more filthy mistakes." I let the words disappear as I opened the mind with the Open Emotional Posture and there it was! I was practicing drums and missed a note and exploded with the words. I remembered the whole affair. Again I cast the net and let the words come into my mind then fade and I thought of my last breakdown and how it had destroyed my *Time Travel and other illusions* cd and the feeling was exactly the same: Shame! Next I tried again and went many years back to thoughts of some painful events which were long ago well forgotten but now jumped into my mind. The filthy mistake was letting myself be used, of being stupid when I was younger and the mistakes and the shame that cost. The feeling was identical. Here I wanted to stop, as if that were the end of it, the earliest impression but that was resistance! It had to be! I still hurt and was still obsessed. So back again I cast the loop, used

the language and let it fade as I opened the mind to my pain and now, I am close! My age is eight or seven and my friend Reggie is playing my drum practice pad and looking at the music on the stand. He is not doing it properly! "Reggie! You idiot! Stop that! No filthy mistakes!— Idiot!" Wow! That was a real memory! I was a mean little kid! But I still hurt. So back again, I bait the hook with the language, let it fade as I open my mind with the Open Emotional Posture and invite what may, and now it is I who am masochist before my will, a severe will cutting into me as always, cruel beyond measure. I am six or seven, and this scene has many replays, oh so many versions! I am practicing and can not get the notes right. "Idiot! Aaaaa! No filthy mistakes! No errors!" I am livid and shaking with frustration and mom says, "You don't have to do this if you don't want. It's okay." "No! I will get it right!" There are many of these, mostly I am alone, or fail to recognize anything beyond the sphere of my attention, but the feeling and the language are all but identical. But I am still sick, the imaginary black chips poking through the skin of my back—so I have not found it. Again, I remember the words, the fish hook, the language, "No more filthy mistakes," and then let it fade and open my mind. Now a scene of such clarity, so old and yet so pristine and crisp in its visual presentation fills my mind. I am in the tile bathroom. My nurse, a dear blessed woman who has stood so well and been proven so caring throughout so many retrieved memories, is there. I am sitting. She is holding my soiled underwear open before me, holding it open so I may see the marks I have left. Two vertical stripes, one broad one narrow, are clear to observe. She speaks, "Honey, no more of this. No more filthy mistakes." Her tone is serene. I am flabbergasted! My back is better! Suddenly the idea is so repellent I am getting worse! Then I remember that I am not this small child, I am a forty-six year old man, no longer a child! Now the symptoms are gone! I do not care about the trivial error my wife has made! My back is fine! I am well! Soon, we will see why.

But first—two days later I am thinking of the revelation, of retrieving the memory and I then open the mind. I have baited the hook to think of the memory and let it fade to open the mind and another scene, clear and bright comes into my mind's eye, it is significantly earlier and has no audio component. I am again in the same bathroom and again I see soiled underwear for me to inspect. This is much earlier and the pants are so small! The pattern in them is clear to see, a series of horizontal dashes in two vertical columns—the same pattern as the chips pressing through my back, the "chips of sharp pressed shit" that were poking through my back in the hysterical innervation! I knew at once that I was looking at my signature instance, my primary impression of guilty shame! There it was! And I also knew I had already successfully completed toilet training before the second much later event. I had regressed back to this behavior. In examining the rest of the fixation we can understand the significance of this more clearly. It should be noted that the thought of being separate from the repressed memory is vital to achieve positive results. The two thoughts, the memory and the idea of being separate from it must both remain conscious, and be kept conscious at all times. (The memory will try to escape and go back under repression.)

After discovering the source memory I knew I had found a primary component which shaped all aspects of my personality. I lost the compulsive insistent quality to begin self-reproaches and obsess. When I was almost killed due to an error felling a tree, instead of the lifelong response I would have

expected for such a mistake, a week of uninterrupted self-reproach, I laughed—I am still alive! I hardly cared that I had missed the cut. The result is clear: personality was fundamentally altered!

Another clue to the primacy of this formative impression is to be found in the unstoppable presence of puns—jokes—puns and double entendres abounded without relent for about ten hours. Everything I said reflected the realization, and the freed energy from repression found every joy in overcoming what was left of my resistance with jokes! "I sure got to the bottom of that!" "No shit, that's it!" and oh so many more terrible puns and jokes which came of their own accord and revealed themselves only after being spoken. Laughter! Terrible puns for hours, none of which were intentional. This infantile memory left its mark on everything! Pun intended. Now we will have to pause and learn a bit about the fixation itself to understand the significance of the language, the obsession and the symbols.

The Fixation

When we are small we can not control our worlds. Even as adults the proposition is dubious. As children our bodies are our only sure province of control, and so, as events move in indifference to our needs, we control what we can. This may be akin to looking in the wrong room for a lost object because the light is better, but as children, it's all we've got. As a fixation like this one develops, what is a physical manifestation, a physical response where a period of development has been reverted to, or stayed too long at, there are two possible outcomes, or an admixture of those two. Either the actual physical infantile event is overcome and then symbolized in relation to outside events in the world, or the worse outcome, it is never overcome and remains unabated. There can also of course be a successful repression, but that outcome is not our concern here.

So some time after toilet training was successfully completed, my father disappeared. My parents were divorced and my mother had gotten my father's word he would not trouble us. It would be a confusing influence to have him around. My mother is the type who makes unsettling unpleasant things disappear. Although there was no prohibition on the topic per se, it was never discussed unless I brought it up. His pictures were gone. I have no photo of the man to this day. When I inquired as to why he was gone, where he was, etc., the reply was as follows: "We got a divorce. He was a kind man but he was weak. He was not ambitious. He did not have any drive." Next came the addition of my stepfather. He was a kind, then savage and cruel tempered man, an unpredictable man who struck out from internal conflict, leaving one unaware of the reason, only sure you were to blame. My real father left no trace but a hacksaw. Soon after he left I became attached to it. I looked at it often. I did what was available to me as a child—I controlled my body. I stopped defecating. I would release nothing. Nothing more would escape. I stopped eating anything except certain foods I picked. Again, control and power demonstrated with the body. I ate only one type of sugared cereal and peanut butter and jelly sandwiches prepared a certain way. I refused all else. My mom believed the soiled underwear was the result of loose bowels, a dirty problem. For the next few years, the misdiagnoses of the withholding of feces for the absence of control and loose bowels led to constant administering of the wrong medications, Kaopectate and Paregoric, which helped

me withhold feces and reinforced the fixation. Now I rarely soiled the pants even to withhold. I defecated but few times each month and with the aid of the medications I could withhold enormous pressures and volumes within myself. This reversion to the anal sadistic period of development had certain fantasies associated with it, fantasies of control for a child who had none. These fantasies are how I answered those feelings of powerlessness. I have recovered the fantasies that I estimate in at least three years and probably more of constant reinforcement achieved a state of sheer violence and focused attention so as to become the model for "introversion hallucination" itself. {see Appendix #8}

A certain reasoning created a death grip of intensity to the masturbatory withholding of feces, in this severe regression to the anal sadistic period of pre-genital organization. The fixation was centered all but entirely around the sadistic component. Here was the train of thought which was another collateral reinforcing stream, of which there were many, "I have made mistakes (soiling of underwear). My father made a mistake (weakness of ambition and character). The result of his terrible mistake was to disappear—Death! He is not discussed and his image is gone. She says divorce but what is the difference? He is gone. The penalty for mistakes is death. Look at my father!" The language from the original symptom about there being "penalties" for mistakes becomes clear. The original language: "No filthy mistakes! No more filthy mistakes! Don't you know there are penalties for that?" The child knows nothing of such adult subtleties and false nuance, like distinctions between divorce and death—the child knows only the true effect—the truth to him! The penalty for mistakes is death! (It should be noted that death is a very familiar idea to any young child brought up with television as I was. How very many images of death are seen each day. This is not a value judgment as death is part of human life, only an observation about its familiarity to the young.)

So you can see my previous statement that the displacement in obsessive symptom formation conceals the fact that the affect is not an overreaction when the real object to which it refers, the real situation behind the transference is discovered, is true! My wife's error was trivial but the reaction was appropriate, appropriate to the unconscious penalty for "mistakes"—Death! Now the reason for my endless rehearsal time, my obsessive practice sessions which yielded error-free performances were not just practice—the practice was a protective ritual—prevention and protection against shame, soil and death! Pollution as error, perfection as safety. It is interesting to note several fantasies which have always accompanied my drum practice, and sometimes in daily living (then applied to others) which bring the above mentioned determinant into focus. While practicing I always have pictured myself with a "c-clamp" like device attached to my head with a gun barrel on one end. Here castration and death which are near equals to the ego conspire. The notion is clear enough. If I make an error, I am to be shot. The symbol means: Mistake = death = castration. Now it is clear why I am always the last to lose focus of attention in any discussion, or in earlier days, why I was always the last one standing in any drinking or drug contest, the last one still focused and thinking, always concentrating no matter what, now it is becoming clear, now it is coming into obsessive focus!

I will make a general inductive assertion from my own case: Severe neurotic introversion and its symptoms carry in some substantial part the bodily signature of the initial predispositional fixation in their presentation. I have proposed that

hypothesis from the following observation. When the process of introversion hallucination takes place, the aforementioned regression can be observed. As the ego is drawn in to the theatre of the mind's eye to participate in the fantasies, I noticed after learning to detect the process, that my hands would always raise up toward my head, and the fingers assume a bizarre splayed configuration, or a few other less noteworthy but strange and consistent poses. It seemed as if the raising of the hands and one of these few and particular positions or motions with the fingers was an irresistible part of the hallucinatory process. It can be accomplished without allowing the hands into their position, but the behavior is all but irresistible. I also recognize this behavior in the many schizophrenics who roam our city streets. These bodily postures mean something. {see Appendix #9}

As I recalled the countless memories of the active fixation in its formative years, I understood. The body held this position from the waist up during the holding of feces. The anal masturbation, the holding of feces, was always accompanied by these same bodily postures, the hands by the head, fingers balled or splayed, sometimes the fingers moving, the hands as if holding a camera before the face or positioned to the side of the head. The accompanying crossed legs and all the anal sensations of the lower body during these early prototypes of the fixation are missing. Only the hands are the same. The original memories reveal exactly what you would expect: super-potent introversion hallucination where the entire body shudders constantly in rage and hate. The scenes are sadism. Some early mild prototypes from kindergarten and first grade were aimed at Mark C., a boy who enjoyed hurting my arm on the jungle gym. The fantasies were of breaking his arm back at the elbow on the jungle gym, and went from there. As my stepfather added his tantrums of impotent rage to my psyche, a sense of deep insecurity about how events could spin out of control and I could be blamed was answered with the same tonic—more hate. I never possessed any optimism or spiritual buoyancy—I always possessed will...will for ten. The hyper-punitive conscience was soon to follow to repress the hate and sadism. Such powerful energies! So ill and conflicted to bury them! Once repressed the road to obsessional neurosis is wide open, the predisposition clearly defined. The ambivalence toward parental objects also extends to a point of particular origin. The reversal of positive for sadistic cathexes is first found in these years, and in this regression to the anal sadistic set the stage for obsessive illness. All of these particular points of fixation were found using the above mentioned method, and do be sure, if the case is severe, a confluence of trends is sure to be at work. Our illnesses are overdetermined, if unanimous in the cooperation of those pathological constituents in the creation of symptoms.

It should be noted at this point that a cruel but wise doctor whose hurtful remarks still hang in my ear some forty years later, identified and ended the behavior for good by prescribing mineral oil in quantity, thereby putting a stop to the holding of feces which had been going on for several years. The "cure" was effective and no trace of this behavior remained from that time forward, either in the form of ablution rituals or any other remnant, that is to say, I am never constipated, etc. This "cure" was far from addressing the psychological causes and was no real success, as other somatic manifestations soon took the place of the original behavior, such as persistent vomiting and severe allergic response. These symptoms were either ignored or misunderstood to no good end.

So now we have enough under our belt to understand a fair piece of it—where

the fixation found its strength and depth of predispositional influence, what the significance of the language was, and how there are many simultaneous determinants to encourage the result. The method of Native Psychoanalysis does not assemble the puzzle, the need for that is undiminished or even increased as the potentially disturbing material retrieved must be understood, to be of benefit.

Phylogenetic and further symptom analysis:

Please recall the description of the initial hysterical symptom: "As I am *pressed to the ground in a squatting position* from the back pain, I cry out, "It's like pieces of obsidian, hard and black, like chips of sharp pressed shit poking out of my back!"

Although demonstrable, and from an earlier formative period in human history, the phylogenetic component is not a necessary part of the cure. Symptoms can be relieved and their energies reclaimed to healthy result without this information, which likewise, has no effect on symptom formation once known. Chronologically primary in human development, the phylogenetic component is active as the contributor of the primary point of tension in the symptom, in that the trend which opposes it in conjunction creates the symptom proper.

Phylogenetic analysis: As the back pain which so often had become part of my post SSRI withdrawal symptomatology became more and more intense, I would be forced to stop whatever activity I was doing, slow my walking and stoop in pain until eventually forced into a squatting position. This has many counterparts, there are many such examples of this frequent occurrence. This squat which the pain forced me into, is undoubtedly the position of defecation from earlier times, the answer to the fixation, the phylogenetic command to release, to defecate. The fixation says, "Hold the bowels at all costs," the phylogenetic resource forces me into the defecation position as if to say, "Stop whatever you are doing and defecate." That is the phylogenetic command. I was forced to obey the command by way of the symptom. The neurosis and the phylogenetic are in tension.

There were many instances of this symptom, this back pain with this signature and generally, psychoanalytically, the same is now used in allegory and analogy, now thoughts are withheld instead of feces and to that end the ego invokes the primary anxiety of the first impressions of guilty shame, the first manifestations of this tension. The guilty shame and anxiety is used to keep the returning thoughts unconscious. This is all in response to the lack of normal repression from SSRI withdrawal—repression is supplemented and replaced by symptoms.

Note how the same two conflicting impulses present in the phylogenetic analysis (the wish to defecate and the punitive fixated wish to withhold) can both be observed simultaneously in the hysterical innervation itself, and how this fits the classical psychoanalytical interpretation of just such an hysterical innervation which is typical of conversion hysteria. The wishful impulse to defecate is clearly evidenced in the soiled underwear, which has now also become the symbol of the opposite punitive impulse par excellence: the primary symbolic representative of guilty shame. The symptom is thus a tension supported at both ends, and so, relies only half as much on repression (the punitive) and is

therefore presupposed from an economic perspective, as the repressive facility has been so drastically curtailed due to SSRI withdrawal.

So let us take stock of what we have learned so far in respect to the method of Native Psychoanalysis. First, the strong upward drive of the repressed is a decisive factor, the strength of symptom presentation is our guarantee of that. Once we have learned to recognize instances of Native Transference, we "red flag" the repetition compulsion, we assign it language either by description, or better yet, by looking within the symptom itself for striking examples of eruptive language. Then we use the language as a hook for our fishing expedition into the unconscious, but a special method is used to bait this hook. We imagine, we think of the language (or perhaps a key feeling) *then dispense with attention altogether* and open the mind using the Open Emotional Posture, where through opening ourselves to an elusive past painful experience we have learned the feeling, recorded in our mind the emotional posture, of becoming unresisting and open to, and remaining open to our pain. The repressed unconscious houses almost nothing but pain, so being open to an elusive past painful perception is being open and unresisting to the repressed. We remember and learn to repeat this emotional posture, noticing that once the painful emotion has bled out, the emotional posture is maintained. Now we use this skill to bait our hook, release the language and open the mind. The better one becomes at this the less the need to clear away each representation of the symptom as one travels backward and downward to the source impression, but the surest way is to follow the stair-steps backward. Each instance must be fully remembered in turn, each part freed from partial amnesias. Then move to the next. The symptoms will disappear as the earliest memory which is from the fixation's formative period proper, is reintegrated into consciousness. The idea of being separate from the recovered memory is necessary as a simultaneous additional conscious thought if positive rather than profoundly negative results are to be obtained. Once the infantile libidinal component has been revealed, although it has been heavily defended, it will hold little threat for the ego, and yields its wondrous energies which power thought, beauty, pleasure and happiness alike that are then absorbed into the ego which is thusly fortified, and need no longer renounce this fuel and banish it under repression.

I hope this condensed rudimentary version of the technique is sufficient to allow anyone who wishes to, to utilize these ideas in practice, or arouse sufficient curiosity to seek further more detailed information about the procedure, which I would be happy to provide.

Appendix

Appendix A: As the general facility of repression is decreased in SSRI withdrawal, or by using the Open Emotional Posture, one becomes aware of a general function of repression which is active in muting all experience in real time. This continuous active reduction of the intensity of experience, this active property of the repressive unconscious is also reduced, so as to increase the intensity of experience, as repression in general is reduced. Here is how Norman put the idea in his book *The Tangible Self*: I will call this attribute "The Active Unconscious"—an attribute of the unconscious, of repression, whereby the intensity of life experience is increased and all things then felt with greater intensity as repression is decreased. This is a defensive aspect of the unconscious

repressive ability to mute experience *as we experience it* so we perceive only the tip of the iceberg, a protective real-time defensive dulling—a repressing of the intensity of experience and our reactions to it, as an unconscious feature apart from the unconscious being a simple passive storehouse of repressed memories and feelings, but also a real-time filtering and limiting of the intensity of experience which is not passive but an *active* real-time facility: "*The Active Unconscious*." (Norman, 2011, p. 178-179).

Appendix #1: "These incidents all converge towards a situation in which eventually all the conflicts must be fought out on the field of transference." (Freud, 1912, p. 111).

Appendix #2: "...all organic instincts are conservative, historically acquired, and are directed towards regression, towards reinstatement of something earlier..." (Freud, 1920, p. 159).

Appendix#3: "He is obliged rather to repeat as a current experience what is repressed, instead of, as the physician would prefer to see him do, recollecting it as a fragment of the past." (ibid., p. 149).

Appendix #4: "We must aim at bringing about two changes in him: an increase in the attention he pays to his own psychical perceptions and the elimination of the criticism by which he normally sifts the thoughts that occur to him." (Freud, 1900, p. 133).

Appendix #5: Below is the Freud passage which best captures the idea. I saw that no thoughts emerge, only the libidinal component ripe for any use. I believe that the idea used to institute repression, the anxiety coming from guilty thought, is not the same as the repressed, which is itself that feeling which is paired with guilty thought. I came upon this passage from "The ego and the id" which substantiates this explanation of how the Open Emotional Posture gets healthy undifferentiated libido from a fixated source. "...with Ucs ideas connecting links must be forged before they can be brought into the Cs, with feelings, which are themselves transmitted directly, there is no necessity for this..." (Freud, 1923, p. 214).

Appendix #6: These ideas from *The Interpretation of Dreams* give some theoretical support to the idea. "...the Pcs. system needed to have qualities of its own which could attract consciousness; and it seems highly probable that it obtained them by linking the preconscious processes with the mnemonic system of linguistic symbols, a system which was not without quality. By means of the qualities of that system, consciousness, which had hitherto been a sense organ of perceptions alone, also became a sense organ for a portion of our thought processes." (Freud, 1900, p. 613). And this: "Words, since they are the nodal points of numerous ideas, may be regarded as predestined to ambiguity; and the neuroses (e.g. in framing obsessions and phobias), no less than dreams, make unashamed use of the advantages thus offered by words for purposes of condensation and disguise." (ibid., p. 376).

Appendix #7: I have found eruptive language to be a reliable example of the unconscious breaking directly through to consciousness. Here Freud notes this breaking through with reference to obsessional neurosis: "...in obsessional neurosis the unconscious mental processes occasionally break through into consciousness in their pure undistorted form, that such incursions may take place at every

possible stage of the unconscious process of thought, and that at the moment of the incursion the obsessional ideas can, for the most part, be recognized as formations of very long standing." (Freud, 1909, p. 228).

Appendix #8: Introversion hallucination. This hallucination which is not an external hallucination as such, but the flowing backward of the ego into the world of fantasy in the mind's eye, this world of the id, the wishes once symbolized, **or not**, and so charged with enormous primal energy calls out to introvert the ego, to engage the ego within the world in the mind's eye as if it were real. This is the current to introversion found in SSRI withdrawal, an hallucination that is a super-energized dream, a hyper-energetic replacement gratification very close to or directly representing the id, into which the ego enters as if it were real. In the case of severe SSRI withdrawal, this is the primary danger: an introverted hallucinatory state leading to the psychotic **identification** with sadism, masochism or other unconscious material which threatens to overwhelm the ego.

Appendix #9: I would expect each individual case of the initial formative infantile fixation will express itself differently to some degree, but in every case, the general character of the body postures will be discernible, as the exact particulars of that individual's fixation assert themselves in introversion. Here the infantile fixation responsible for neurotic predisposition becomes directly evident via the repetition compulsion.

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The transference: a basic simplified working model; from neurosis to a new human paradigm—Sublimation by Integration.

As direct observation of unconscious content is possible and its influence upon the transference is now manifest, we may rest assured that a psychoanalytic model is the correct one. In our quest to ascertain a proper quantitative paradigmatic basis for the neuroses and the unconscious from which they spring, we must account for phylogeny. Next, a simple, highly schematic yet functional model of the transference and alpha function within an epigenetic unconscious framework will be presented.

Transference and sublimation.

The following is a functional model created to greatly simplify the complex mental system and allow the ordinary reader to understand it in order to alter their own mindset. This model, although scientifically correct, is not meant to be anatomically specific or theoretically precise in the details and terms—this is meant as functional, intelligible psychology, a working model to allow the reader hands-on access to the system, so they may change it themselves. The papers in the latter sections of this book offer more accurate complexity and detail.

If we are to approach the problem of altering the basic conditions which lead to human unhappiness, we must first ask the question upon which the proposition is based: “Why does man create the reality, the world that he does?” The first question is that of reality creation. Let us see how reality is created, then we may see why.

Human ontology, meaning the way humans create the reality around them as it exists, is a function of what is called the transference. In transference, we give the world around us its meaning and existence. Each person has their own definition of reality, no two are the exact same. This *subjectivity* as it is known, is the essence of hope as it implies the possibility that one might change one’s definition of reality, and alter the way life is experienced. Each of us perceives the internal representation of the world within our minds as interpreted from sensory data arriving from our sense organs. The way one human interprets sensory data and any other human are different, so, we say each person’s impression of reality, meaning the reality they create, is subjective on a per-subject basis.

There are two basic aspects to the definition of reality within the individual case: Taxonomy and Quality. Taxonomy, refers to the category of a perception. Quality refers to how the perception is defined affectively, emotionally.¹⁴ All agree on what an object is, but no two exactly agree as to how that object is affectively encoded, meaning: how it *feels*. This is a basic statement of one of the most important philosophical problems, the “hard problem of consciousness.”¹⁵ The hard problem of

¹⁴ As we will see, affect, feeling is itself the very source of all consciousness.

¹⁵ Quantum Entangled Prebiotic Evolutionary Process Analysis as Integrated Information: from the origins of life to the phenomenon of consciousness. Norman and Tamulis Journal of Computational and Theoretical Nanoscience Vol. 14, 2255–2267, 2017 doi:10.1166/jctn.2017.6818 ; Norman, R., 2015, Quantum Unconscious Pre- Space: A Psychoanalytic Neuroscientific Analysis of the Cognitive Science of Elvio Conte—The Hard Problem of Consciousness, New Approaches and Directions. Neuroquantology , 13 , 487- 501.

consciousness is that of explaining subjective qualitative experience. Why does one person experience one subjective impression, and another person a different one? Within this problem, lies the entire of psychology, hope and human change. Each perceives differently. An example will help.

The lake you see should you gaze upon one, and the one I see, should I be beside you, are not the same lake, as each perceives the view. The quality of that various impression within each of us, is entirely created as a function of the conglomeration of affective associations (and aspects of unconscious fantasy as will be discussed), which are attached to the singular impression of the lake. Think of free association, and this becomes easily accessible, and we can see why such a technique is valuable in gaining insight into the processes which create object quality, and in assessing the general health and accuracy of emotional tone as they define experience.

Here are two hypothetical associative chains:

Healthy subject: Stimulus: lake. Associative chain (hypothetical): Lake–silver–ripples–dress–fluttering–mother–happiness.

Neurotic subject: Stimulus: lake. Associative chain (hypothetical): Lake–cold–drown–hopeless–weight–chain–family.

We can see in that simple example, that associative affective valence is established as a function of memory, to define object quality.

However, static mnemonic associations from the past are not all that provide quality and definition to experience. Feeling, affect, defines experience from an active source which is ordinarily out of view, or ‘unconscious’ as is the proper term. Many processes which create mental effects are unconscious, and many of our drives are unconscious. Reality is created and given quality largely as a function of one's drives *sublimated* into reality. An example will clarify.

Sublimation:

Human perceptual *ontology*, meaning, the way objects and current situations become manifest experience and gain their qualitative and taxonomic *existence*, is a function of sublimation. Sublimation is defined as the redirection (or secondary affective application) of a specific drive (or compounded conglomerative structure thereof) to alternative aims. A new lover who holds his beloved in his mind as a source of constant fantasy, is dreaming. The dream he cherishes, is that of his beloved. The drive expressed in his fantasies and dreams, is that of sexual union with his beloved. His overt sexual fantasies and, day-dreams which symbolize the same, are a constant source of ideational sustenance to him. These dreams which are, or represent, sexual expression are therefore sourced in his sexual drives, which exist in a practical and specific sense to sustain the race through procreation. However, as our imaginary lover looks out at the world, it is not the same perception as observed on an ordinary day. It is voluptuous and full of beauty, thick and rich with warmth and color, a different world, yet the same. Its *quality* has changed, and become an expression of happiness, and fullness. Indeed, neuroses are known to be “cured” (if temporarily) by

falling in love, the faulty negative valence the neurotic attributes to his world has been ameliorated in its pathology. It appears that a healthy dream underlies our lover's perceptions, and that this dream once formed up as a matter of heterosexual expression, changes his world. His world has had its quality defined as a function of the valence of his drives, which are now sublimated into perceptual experience—The sexual drives now functioning as an enhancement to all quantitative perception...not just as drives with sexual aims singly to create procreation. This is therefore a sublimation.

Each moment, all experience is given its particular quality by way of the sublimation of static mnemonic sources (as an associative chain), and unconscious fantasy. There is a hidden dream, a source of affective sublimation beneath reality. We are always dreaming. The dreaming (REM) system is *older* than the system for sleep onset, and, older than the system for modern waking consciousness. Our ancestors utilized the REM system as primary consciousness, and now, REM functions unconsciously to give quality to manifest experience (see references in footnote 2 above). Indeed, a clear and demonstrable dream, underlies modern waking consciousness. This "dream" is but a constant stream of unconscious, meaning unobserved fantasy.

If we are to change the fixations and misery of man, we must change the underlying dream and its wishful source, the drives. We must dream again. Psychoanalysis works by exposing, interpreting this hidden dream. Dreams express wishes and drives. In a simplified way: Psychoanalysis functions to find a fixated, hidden (unconscious) dream, and watch it repeat. Such a fixated dream exists underneath the broken race of man. This hidden dream in the case of the neurotic is repressed, meaning he keeps it away from consciousness, that is, it is unconscious. (It is often not hidden in some cases of perversion).

The transference neurosis and the repetition compulsion:

How do we find the "pathogenic dream" in psychoanalysis, and just what is it doing to create symptoms?

Within proper psychoanalytic practice, we find the elusive kernel of its therapeutic efficacy: an artificial neurosis which reveals the hidden pathological constituents to the therapist, and so, allows him to cure the difficulties—"The Transference Neurosis." The patient is given a set of rules to follow which will allow him to ever more closely approach the tender spot of his injury, and so, he follows these rules with care, and associates his dreams and thoughts, following the associative mechanics of mental operations and symbolism itself to their repressed and so, necessarily painful source. Obviously, nothing pleasurable need be repressed, and even those clearly pleasurable drives which might be repressed, are in fact paired with stern moral judgement, and so, have a clearly negative valence...although the drive may be pleasurable of its own accord. A child may be told not to play with its feces, an activity the child finds pleasurable, yet, this activity takes on the associated affect of disgust once paired with moral rebuke, and then goes under repression...the reaction *formed and enforced by the parent, that of disgust*, taking the place of the pleasurable drive in consciousness. This is the basic idea behind the formative repressive mechanism of "Reaction Formation." Our disgust, or painful reaction to a drive or event, will cause its repression. Once a very energetic drive or a particular event is repressed, it will attempt in direct relation to its quanta of energy, to return to

consciousness and must then remain held away to insure the repression...note closely, that this constant battle to return to consciousness and subsequent need to reinforce and recreate the repression, are themselves the functional basis of neurosis: The Return of the Repressed. Note how repression itself, sets up the conditions for pathology. To repress a drive, is to create the conditions for its return to consciousness, and so, form symptoms.

As the patient progresses through therapy, he reaches a point where he is no longer able to follow the rules...he begins to ACT OUT instead of analyze, to REPEAT his hidden ideation in a compulsive way, rather than work through his associations. His is compelled to repeat the pathogenic ideation, and does so as a transference often enough projected upon the therapist, who has made sure not to reveal himself insuring the transferred attitudes of the patient and reactive statements the patient produces concern only the patient's internal content. The "unconscious resistance," this compulsion to repeat, is the *repetition compulsion*, an urge to simply repeat the pathogenic source impressions...rather than identify them and work them out. These unconscious impressions act to create the transference which sublimates (neurotic) affect into reality, and now, in this artificial neurosis upon which psychoanalytic practice is based ...*the transference neurosis*...we can see the *acting out* of this once hidden source, the repeating of it over and over, in therapy. The therapist may then seek to interpret the repetitions and identify the source, which often times is *reconstructed* from observation of this transference neurosis, and then, said construction is presented to the patient. Once conscious as a construction, the energies bound into the unconscious element may fade, as the source is now conscious as a construction. The fixated dream beneath the neurotic's qualitatively impoverished perceptions, is thereby discovered and adjusted to ameliorate pathology.

Please think of the unconscious influence upon reality creation as being analogous to a hidden magnet under a table top which is turning and influencing a magnet on the table's visible upper surface. The unconscious dream beneath, as the lower magnet turning by an unseen hand, makes the visible magnet on the table top rotate, as if by some hidden influence. So does the hidden dream in the unconscious affect the reality we see. If that dream is fixated, unchanging and fixed, we may expect reality not to change. In the behavior and *history* of man, we see just such an intransigent fixation as this.¹⁶

I hope you can begin to see that the transference creating reality for humans can be healthy, or unhealthy as in the case of neurotic fixation or the transference neurosis within therapy. It appears that repression, meaning the keeping of thoughts at a distance from consciousness is key, for the unconscious dream must be found and it is not easy to do this, as the fantasies and wishes are unconscious, hence, not available to see. Next, we will then need to find the agent which induces repression. Let us call the unconscious drives and wishes the id, meaning 'it,' in German (that which is dissociated from self, repressed). We may roughly ascribe the limbic structures as a main locus of the id. Next we will discuss very briefly the agent of repression, the ego. After that, we will delve at some depth into the super-ego, then, the agents of historical and current epigenetic influence and those of transformation.

¹⁶ The Answer: Roadmap for a New Humanity (2017) R. L. Norman, Standing Dead Publications O'Brien OR.
https://www.researchgate.net/profile/Rich_Norman/publications
<https://squa62.wixsite.com/thelastfalltheanswer>

Ego is in a dread spot. The super-ego is analogous to our conscience and is itself an extension of the *id*, the *id* being composed of our repressed wishes and drives. The super-ego knows all repressed thoughts as it is connected to the *id*, however, the hapless ego is forced by way of guilty punishment sourced from the super-ego, to repress certain drives and expend energy in repression to make them vanish into the unconscious. The ego then, is no longer aware of them once these ideations are repressed. Psychoanalysis reinstates this awareness to gain its positive effects...a painful and reliable process. Please note how repression sets up the basic conditions for illness, which psychoanalysis cures.

What is the hapless ego of psychoanalysis, anatomically?...can it be identified as a real piece of intra-systemic relation and expression? The wretched ego is in a dread spot, acting as a barrier, an agent repressing internal perceptions which are “unacceptable” as determined by the judgmental super-ego; a barrier between the tender organism which is man, and the external world; all the while attempting to gain the *id* what it wants: three masters control, demand of and condemn the poor ego! The ego institutes repressions, and here, we see the aspect in which we find functional interest. The Default Mode Network (DMN)^Γ is a good candidate for an anatomical nexus embodying ego functioning...particularly in its defined activational connectivities between limbic (hippocampal) and medial frontal areas. Medial frontal areas mediate hippocampal recall, and thereby form a functional basis of mnemonic repression. In our simplified model, we will take the complex connective functioning of DMN in toto as demonstrative of the resting manifestation of ego function.

Next we will flesh out the internalized source of punitive administration, permission, repressive demands, *Guilt* and judgement: super-ego.

Super-ego is as the name implies: super, means *over*. So, super-ego, is that which is over ego. The super-ego, is roughly analogous to the colloquial idea of conscience, and it is formed by a unique process called introjection. Introjection is an internalization of what was once an external object, and in this case, that object is one's parents, masters or guardians etc. Obviously, one's parents were literally over one during upbringing, watching, judging, punishing, praising...in short, shaping behavior by way of conditional approval and disapproval, what we will call *conditional regard*. One can easily see from this vantage that the notion of an overarching, observing, judging and protecting patriarchal God seems to simply be a symbolism of the role of parent, as represented in super-ego. Once one introjects the role and judgmental aspects of the parent in this way, super-ego is formed, and what was an external judgement, “thou shalt not,” becomes internal, “I should not” [it is wrong]—here, we exchange shame from an external source, for *guilt* which is an internal condemnation, as represented in conscience. Super-ego in Freudian theory was originally called the *ego ideal*, as it is the keeper of the standards and ideals which the ego wishes to emulate, and also, must accommodate and strictly meet.

How does conscience, or super-ego to be more correct, really work?

^Γ Carhart-Harris, R. L., & Friston, K. J. (2010). The default-mode, ego-functions and free-energy: a neurobiological account of Freudian ideas. *Brain*, 133(4), 1265–1283. <http://doi.org/10.1093/brain/awq010>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2850580/>

That question is the most important question in all of psychology and mental health. That question holds the ascension or further degradation of mankind within it. That question holds the answer to neurosis itself! No more vital question exists in the social, psychological and neuro-scientific sciences...yet...there is *no information available* concerning the anatomical mechanisms of guilt. Not shame...*guilt*! Guilt is the mechanism of social control itself. It is exactly how we are controlled, made repressed and ill. Our sicknesses stem from this source all but exclusively! How is it possible that the most important piece of psychology conceivable, has no neuroscience available to explain it? This is very strange and troubling.¹⁷ The most important topic for mental health which exists—the most important topic concerning healing the pathology of man so we might free him from his endemic, crushing unhappiness and the immorality of slavish obedience leading to war itself must be derived! I have had to work very hard to ascertain the answers myself, and have done so. The solution is functional. Here, in simplified terms, is what I have found.¹⁸

Empathy or obedience: Dopaminergic and opioid distributions vs. corticotrophin releasing factor—control by homeostatic imbalance.

During the first 18 months of development, two circuits are innervated, meaning they are formed. The first of these two circuits to be innervated, both of which were discovered by a scientist named Schore, is part of the sympathetic nervous system: the dopaminergic sympathetic ventral tegmental limbic circuit. This circuit and another we will discuss (very simply put) connects the orbito-frontal areas which control and recognize emotion, to the limbic areas which express emotion. This is therefore a limbic/orbito-frontal circuit. In order to form the circuit, certain conditions must be met. Neuroendocrine changes creating the circuit are initiated by the exchange of gaze and glance between the caretaker (the mother in most cases) and the infant, and also, as such infants are being held, the tactile addition inducing endorphins (endemic opioids) is implied. The feeling of safety and connection engendered by these neuro-chemicals is accompanied by the visual impression of the mother's face, which is in fact a necessary stimuli to initiate the circuit formation. Studies in the 40s revealed that if an infant is deprived of just such maternal contact, they often die. It appears one may infer that circuit formation itself, or perhaps the neuroendocrine changes which induce it are life sustaining. During the period of the initial sympathetic circuit formation, the infant is just gaining a sense of itself as a separate entity. Reader do note: to observe the infant and mother in said interactions of reciprocal exchange of gaze and glance, we see that the mother's face becomes the infants *entire world*! Its entire field of view is consumed and focused on this extension of himself which is responsive to his needs and changes to reply to his affects: a responsive extension of himself—*so is his complete world the mother herself in these exchanges*.¹⁹ This interaction leading to the maternal mnemonic triggering impression initiating

¹⁷ Clearly the work is hidden. I fear what horrid plan, weapon, chemical agent, human abuse or crime was likely created with this knowledge.

¹⁸ Norman, R. L., *Super-ego & the Neuroscience of Empathy: From Unconscious Wish to Manifest Behavior - A New Human Model* Journal of Consciousness Exploration & Research | October 2016 | Volume 7 | Issue 9 | pp. 677-697

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¹⁹ Perhaps here we see a nurturant basis for the optimistic or pessimistic basis of personality, an expectation that the world will or will not meet one's needs may be sourced here, in the success or lack of responsive connection in these initial interactions.

innervation of the dopaminergic sympathetic ventral tegmental limbic circuit within the infant is the basis of empathy: a *connection to the entire of the world*. All the world is the responsive mother, *an extension of one's self*, so is her face and its gaze upon you, that which sustains life itself. The infant felt no separation of himself from this experience, which was his entire world. This is empathy. Identification with all the world.²⁰

That sympathetic circuit was formed through a triggering impression, the reciprocal exchange of gaze and glance with the mother, yielding the *initial impression of the process*, the unity with the mother which is the basis of empathy. That formative process is associated with touch and care, a feeling of connection and safety. The circuit itself once completed, distributes dopamine, *Elation, Joy and Energy*, the wish to explore and engage the world, and is a basis component in Panksepp's SEEKING system which serves those exploratory functions. Next in the infant's development after the sympathetic circuit is formed is the innervation of the noradrenergically modulated lateral parasympathetic tegmental limbic circuit. This circuit serves as a cut off for the explorational energetic dopaminergic sympathetic circuit, and shuts it down in response to social cues. Here we see the basis of conditional regard and a kernel at the center of repression itself, as affect regulation is the very definition of the circuit function. Now we have the basis of empathy, in the formative impressions of the sympathetic circuit, and, the curtailment of that circuit's active expression, in the parasympathetic circuit by way of social cues indicating disapproval.

Conditional regard then, corresponds to a type of disapproval and so a threat to remove nurturance, connection and the safety of the mother, by way of activating the parasympathetic circuit, and hence deactivating the sympathetic. Please recall, the sympathetic circuit is the basis of empathy. Guilt, the internalization of conditional regard, super-ego itself then, acts specifically to curtail pleasurable dopaminergic expression and explorational sympathetic dynamism, which are formatively based in a feeling of safety and nurturance, and in its stead place parasympathetic activation, thereby reducing energy (*and the attendant ability to think*), and replacing healthy pleasurable dopamine and the safe feeling associated with endorphin expression with corticotrophin releasing factor and the induced stress cascade associated with anxious threat. Identification as we will see, but not threat, induces proper activation of the parasympathetic circuit within an empathetic context. Punitive super-ego functionality is anatomically represented roughly in limbic (amygdala/hippocampal) OFC/parasympathetic noradrenergic and other associated connectivities. Here then in conditional regard, we can see we have removed the basis of empathy, removed the empathetic connection and feeling of safety and replaced it with threat, to gain

²⁰ It is now thought that mirror neurons are the neural substrate of empathy. This is incorrect. Mirror neurons signify mere imitation, as distinct from empathy as can be seen in cases of catatonics who display echopraxia, which is based in mirror neuronal response (Bengston 2015; Rizzolatti et al., 2008). A catatonic is not empathizing with the attending physician to reflexively imitate his motions, although imitation is an obvious sub-function under a primary empathy.

Bengston, M. (2015). Catatonic Schizophrenia. *Psych Central*. Retrieved on June 29, 2016, from: <http://psychcentral.com/lib/catatonic-schizophrenia/>

Rizzolatti, G., Maddalena Fabbri-Destro, M. and Cattaneo, L. (2009) Mirror neurons and their clinical relevance *Nature Clinical Practice Neurology* 5, 24-34 doi:10.1038/ncpneuro0990 <http://www.nature.com/nrneurol/journal/v5/n1/full/ncpneuro0990.html>

Note also: Within that entirety, connection to our fellow man is but one part.

obedience. Let us note that as part of the id (hippocampal memory and amygdala), super-ego and its guilt will punish a wish as deeply as an act, and so, the obedient man of sensitive conscience can never find solace; he must but repent and repent in order to attempt to satisfy super-ego and obey. Again: *Here we can see, we have removed the basis of empathy, removed the empathetic connection and feeling of safety and replaced it with threat, to gain obedience.* We can now see that under excessive threat of penalty:

Obedience is opposed to empathy.

Note how the very basis of our morality, *threat*, appears to contradict that of empathy. Could this have something to do with man's inability to 'tame' his drives with morality? Could this have something to do with man's inability to change, or be at peace? Could this have something to do with his fixation with obedience, submission, patriarchy and war?

We may distill what we have learned in this section in an analysis:

"Man is made moral and obedient through super-ego, a psychical introjected structure creating a permanent homeostatic imbalance created to foster obedience."

The neurochemistry of man is never in balance, so that he may be controlled. This, as we will see is caused by his morality based in patriarchy, and, we will then see how ethics already reside within man as a function of identification. Ethics are self-evolving situationally-specific and dynamic, never rule based with penalty, and so, ethics may be fostered to replace morality.

Let us now define Ethics as: a dynamic situationally specific endemic function based in identifications. Let us define Morality as: a rule based system based in penalty and guilt. Morality functions to foster obedience through super-ego and *Penalty*. Ethics function to foster behavior through affective situational *Identification*.

The ancient impression of empathy upon which ethics are based may be brought to the fore in the transference structure. The pathogenic obedient dream of submission and fear, replaced with an ancient impression of warmth, energy and caring. Man, may dream again...an old dream, a dream uncovered from long ago in the history of the race, and his own personal past. This is the meaning of: Atavistic Evolution—the hope of man.

Man's conscience leaves him sick, ill and wanting, empty and anxious, unhappy and empty is he, unless he meets the rule set by authority, and obeys. For this, he is rewarded with a small crumb of his health, but quickly withdrawn. A permanent homeostatic imbalance has been built into man, so as to control him. Hence, his eternal unhappiness, self-submission and willingness to obey.

Here we may pause and make an important observation. A causal element has been revealed, and many disparate and varied effects and pathologies can be seen to extend from this one nexus wound. Here, two primary circuits are out of balance, internal reward and the feeling of safety curtailed and so, mankind suffers. The wound created in this permanent homeostatic imbalance is deep, far-reaching and tragic, and

is itself the basis of the misery of man.

This error is primary. The *empty feeling* all complain of which necessitates the endless consumerism that is destroying the planet [lack of endorphins and dopamine], the *obedience to authority* leading to war [threat and conditional regard which creates obedience to authority], the feeling that *other peoples and the earth are somehow beneath one and are to be exploited* [lack of empathy/identification with others and the physical world], the constant *competition* to prove who is better [(lack of empathy) and *low self-esteem/self-security* from Corticotrophin Releasing Factor associated with noradrenergic parasympathetic activation over dopamine and endorphins associated with the sympathetic circuit], the feeling of being *anxious, depressed, alone and separate* [lack of identification, parasympathetic stress cascade], *drug addiction* [lack of endogenous opioids and dopamine, persistent release of CRF], and all the rest. From war and unthinking reflex obedience, to consumerism, greed, exploitation and human cruelty...this one error, has spread as cracks in a pane of glass. The broken mirror that is modern man may be repaired in all his dimensions of compound fracture here. This is how we are controlled through unfair social circumstance, and why we obey. Super-ego and repression. Here, is where we have been reduced and made fodder for tyrants, bullies and the governments of this world.

However, the circuitry we have learned of has an additional function, this sympathetic dopaminergic circuitry born of nurturance and providing us energy is also the circuitry of transformation, and our way to alter the unconscious dream which is fixated, obedient, broken and ill. Man is foolish, as his drives are malformed. The broken dream and its wishes which give experience its quality is a dream most perverse, one of masochistic obedience or sadistic dominance. The sympathetic circuitry which was formed by neuroendocrine changes initiated by the reciprocal exchange of maternal gaze and glance performs a function which was first proposed by a psychologist named Bion; a dreaming function and a *transformative* function, which in intersubjective psychology is called "alpha function." Bion believed we are all dreaming all the time, the notion is somewhat akin to Freud's ideas about unconscious fantasy, and in this, both of these men were quite correct. If one lowers brain 5-HT, serotonin, repression is defeated and the dream may be observed. This is not an ordinary dream though, as we have stated it is an *unconscious* dream, or fantasy if you will. It is unconscious as it is painful. Nothing pleasurable to the ego need be made unconscious. It is the repressed unconscious I speak of here, and it is filled with those things which cause the ego pain. Low brain 5-HT is linked directly with suicide for this reason. However, if one has sufficient alpha function, one can transform experience by changing the dream. Alpha function in intersubjective psychology corresponds to the anatomy we have been discussing, and in this, we will be able to use these ideas to change the hidden dream within mankind, and transform it into one of ethical expression aligned with pleasure, excessive energies ripe for artistic, sexual and intellectual endeavor, and a feeling of connectivity with all things.

Next, we must discuss history, penalty, morality and ethics. These things have created changes in genetics. Perhaps, we may change it back.

History of morality, super-ego and patriarchal moral penalty: Ethics vs. Morality

I hope the reader can make out the basic idea: social control via conditional regard is enforced by way of curtailment of dopaminergic (and endogenous opioid) expression associated with the sympathetic limbic/OFC circuitry, forming a permanent homeostatic imbalance which restricts empathetic feeling, intelligence, sexuality and exploratory interest in the world, and places in their stead a preemptive condition: obedience to authority. Only meeting this condition of obedience will temporarily return health and happiness to the modern human. Conditional regard. Intelligence and empathy...hope itself, this ancient basis of life formed long ago in the early interactions with the mother...it is no less than this basis of kindness, caring and higher thought to which we are all entitled which has been curtailed.

Now I will briefly take account of but a small sample of the extensive history which has inculcated this most basic and tragic error into the very heart, substance and epigenetic expression of the afflicted modern human. This patriarchal tragedy has a lineage.

Super-ego.

What is the precise historical dynamic which yields the developmental result of conscience, of super-ego, and, how are we to interpret this result as to its pathogenic and healthful consequences? Please see the included paper *Super-ego and the Neuroscience of Empathy: From Unconscious Wish to Manifest Behavior - A New Human Model*, for references within text below.

E. R. Dodds, a superb scholar, has located for us the historical footprints which demonstrate the formation of our modern conscience, our super-ego. Super-ego is an introjected entity, an internalized representative of what was once long ago external judgment and sadistic penalty. Morality, as inculcated at the behest of this internalized structure, is based on punishment which extends from a particular source.

In his most worthy book, *The Greeks and the Irrational*,²¹ E. R. Dodds draws the strings of history and psychology together for us. This ugly imprint has been nurtured over thousands and thousands of years. Its exact source is clear to discern with Dodds's careful examination of the historical record.

"The head of the household is its king . . . and his position is described by Aristotle as analogous to that of a king. *Over his children his authority is in early times unlimited: he is free to expose them in infancy, and in manhood to expel an erring or rebellious son from the community . . . as Zeus himself cast out Hephaestos from Olympus for siding with his mother.*" [Dodds, *The Greeks and the Irrational*, pp. 45-46. Emphasis added.]

However, as early as the 6th century BC, the situation had begun to change, and as

²¹ Dodds, E. R. (1973). *The greeks and the irrational*. Los Angeles: University of California Press.

social conditions began to improve, and the father's authority became less and less *absolute* in the face of these new social conditions leading to increased personal freedom, the strict authoritarian structure of family life began to loosen. Now, what was a *shame* based dynamic, one based on *external* threat from the father, becomes a *guilt* based dynamism, one based on an internalized threat, an *internalized* moral structure in the true modern sense of the word emerges: super-ego. This is demonstrated by the need for laws introduced by Solon, and later, by Plato, to safeguard the now threatened patriarchal family structure. [Dodds, *The Greeks and the Irrational*, p. 46.]

Super-ego uses severe repressions to create by *internal* means, what were behaviors, inhibitions and restrictions previously brought about by *external* patriarchal threat. Dodds fleshes the idea out as follows:

"The peculiar horror with which Greeks viewed offenses against a father, and the peculiar religious sanctions to which the offender was thought to be exposed, are in themselves suggestive of strong repressions. So are the many stories in which a father's curse produces terrible consequences—stories like those of Phoenix, of Hippolytus, of Pelops and his sons, of Oedipus and his sons—all of them, it would seem, products of a relatively late period where the position of the father was no longer entirely secure. Suggestive in a different way, is the barbarous tale of Kronos and Ouranos . . . the mythological projection of unconscious desires is surely transparent—as Plato perhaps felt when he declared that this story was fit to be communicated only to a very few . . . and should at all costs be kept from the young." [Dodds, *The Greeks and the Irrational*, pp. 46-47.]

Dodds then assembles the entire picture for us in these words:

"The psychologists have taught us how potent a source of guilt feelings is the pressure of unacknowledged desires. . . the human father had from the earliest times his heavenly counterpart: Zeus *pater*. . . Zeus appears as a Supernatural Head of the Household. . . it was natural to project onto the heavenly Father those curious mixed feelings about the human one the child dare not acknowledge. . . that would explain very nicely why the Archaic Age Zeus appears by turns to be the inscrutable source of good and evil gifts alike. . . as the awful judge. . . who punishes inexorably the capital sin of self-assertion, the sin of *hubris*. (This last aspect corresponds to that phase in the development of family relations when the authority of the father is felt to need the support of a moral sanction; when "You will do it because I say so" gives place to "You will do it because it is right.") [Dodds, *The Greeks and the Irrational*, p. 48.]

Here in this historical transition from an external shame based ethical structure, to an internalized guilt based structure, in this *internalization* of the patriarchal threat (introjection), we see the creation of our modern ethic, our conscience, our masochistic capitulation: our super-ego.

Conscience, our sense of personal and social justice, is created as an interactive function of masochistic and aggressive economy within a social context, not as a

function of any moral pretext. Our morality, is by the nature of its very construction: immoral.

Here are a few sections from Freud which clarify and support this unusual notion²²:

"The first requisite of civilization, therefore, is that of justice—that is, the assurance that a law once made will not be broken in favor of an individual. This implies nothing as to the ethical value of such a law" (Freud, 1930, p. 95).

"The tension between the harsh super-ego, and the ego which is subjected to it, is called by us the sense of guilt; it expresses itself as a need for punishment. Civilization, therefore, obtains mastery over the individual's dangerous desire for aggression by weakening and disarming it and by setting up an agency within him to watch over it, like a garrison in a conquered city" (Freud, 1930, pp. 123-124).

As to the effect of super-ego in equating wish and act and the resultant loss of mental economy and functioning:

"Here, instinctual renunciation is not enough, for the wish persists and can not be concealed from the super-ego. Thus, in spite of the renunciation that has been made, a sense of guilt comes about. This constitutes a great economic disadvantage in the erection of a super-ego or, as we may put it, in the formation of a conscience. Instinctual renunciation now no longer has a completely liberating effect; virtuous continence is no longer rewarded with the assurance of love. A threatened external unhappiness—loss of love and punishment on the part of the external authority—has been exchanged for a permanent internal unhappiness, for the tension of the sense of guilt" (Freud, 1930, pp. 127-128).

"...the original severity of the super-ego does not—or does not so much—represent the severity which one has experienced from it [the object], or which one attributes to it; it represents rather one's own aggressiveness towards it. If this is correct, we may assert truly that in the beginning conscience arises through the suppression of an aggressive impulse, and that it is subsequently reinforced by fresh suppressions of the same kind" (Freud, 1930, pp. 129-130).

And as to the role of the phylogenetic in contributing to this outcome:

"It can also be asserted that, when a child reacts to his first great instinctual frustrations with excessively strong aggressiveness and with a correspondingly severe super-ego, he is following a phylogenetic model and is going beyond the response that would be currently justified; for the father of prehistoric times was undoubtedly terrible, and an extreme amount of aggressiveness may be attributed to him" (Freud, 1930, p. 131).

²² Freud, S. (1886-1939). *The standard edition of the complete psychological works of Sigmund Freud volumes one through twenty-four*. London: Hogarth Press, 2001.

"...we can tell what lies hidden behind the ego's dread of the super-ego, its fear of conscience. The higher being which later becomes the ego-ideal once threatened the ego with castration, and this dread of castration is probably the kernel round which the subsequent fear of conscience has gathered; it is this dread that persists as the fear of conscience."²³

This unusual assertion by Freud is entirely accurate, and will be fit into context soon in both male and female cases.

I wish to draw a sharp new distinction between *Morality* as engendered in super-ego, which is based on (phylogenetic/epigenetic) patriarchal threat, and functions to foster *obedience to external authority*, and *Ethics*, which are based in empathy, with its *root in identification*. The former causes pathology, and functions in clear and specific ways to disengage the sympathetic circuitry which is the basis of empathy, energetic curiosity, sexuality and intellect, and the latter in turn has opposing characteristics, leading to elation, appreciation, formative identification with the world and others in the context of abundant subsequent energy, and absent any punitive internalized death wish (guilt). Morality and Ethics as so defined are diametrically opposed. Ethics are a natural systemic product which lead to health, an internal behavioral compass based in identification and caring, and morality, the converse. The reader may wish to satisfy themselves in this regard, by reading the specific example of the formation of super-ego offered up here (Norman 2013, 2013a).²⁴ Ethics are *themselves* identification, they ARE the 'golden rule,' and so require no such rule or any other. Morality is an empathetic dissociative factor, by way of down-mediating the circuitry responsible for identification. Ethics nullify any need for the tangle of moral law and replace guilty maxims born under any mistaken 'categorical imperative' with a natural and effortless ethical genesis free from rule, guilt or penalty. Ethics, as we will see, reflect the healthy internal construction of the mind, nurture our energies and evolve naturally, with no need for punishment, rule or law. One need but rebalance the two opposing circuits and observe the demonstrable alteration in all aspects of manifest experience.

An aside: note how this clear basis of modern pathology appears to be nullified in the teachings of many eastern spiritual ideas, which have little connection to patriarchal threat and surprisingly, also in the true teachings of Jesus. Although modern adaptations are revealed as corrupted and reversed by Paul, the careful philology of Nietzsche shows the original teachings to be diametrically opposed to any hint of conditional regard, sin, punishment, reward, heaven or hell. Those toxins are absent. Indeed, Jesus appears to make good on the reverse and answers, at least in this case, Nietzsche's own highest standard, which proclaims essentially: *the highest Godly act is the removal of guilt*. Of Jesus, Nietzsche writes:

²³ Sigmund Freud, "The Ego and the Id" in *A General Selection From The Works of Sigmund Freud*, Rickman, Ed. Doubleday, 1957. p. 233.

²⁴ Norman, R. L. (2013) Who Fired Prometheus? The Historical Genesis and Ontology of Super-ego and the Castration Complex: The Destructuralization and Repair of Modern Personality—An Essay in Five Parts. *The Journal of Unconscious Psychology and Self-Psychoanalysis*.
www.thejournalofunconsciouspsychology.com ; https://www.researchgate.net/profile/Rich_Norman/publications
Norman, R. L. (2013a) Re-Polarization Theory: From Native Psychoanalysis to Sublimation—The Practical Reconstruction of Modern Personality. *The Journal of Unconscious Psychology and Self-Psychoanalysis*;
www.thejournalofunconsciouspsychology.com ; https://www.researchgate.net/profile/Rich_Norman/publications

"In the whole psychology of the "evangel" the concept of guilt and punishment is lacking; also the concept of reward. "Sin"—any distance separating God and Man—is abolished: *precisely this is the "glad tidings."* Blessedness is not promised, it is not tied to conditions: it is the only reality—the rest is a sign with which to speak of it." [p. 606, *The Portable Nietzsche*.]

It should be noted that I adhere to no spiritual doctrine or tradition. The above insight being worthy of note in its own account.

Exactly how does the past of the race, Phylogeny as it is known in psychology, affect each moment? How do these facts prove out in observable practice, and daily life? Do they hold the illness fast somehow, and how could they be changed? How does the ancient affect the present, and how could the mutilations and penalties of old be perceived today within the mind, and to what effect? Is there a relation between all this, and DNA? We will now answer these questions and piece together the last of what is needed in our model, before we put it to use.

It has now been demonstrated and proven experimentally that the past of the race, the phylogenetic, is represented within information stored in epigenetic DNA.^Ψ Originally believed by science in its typical way to be 'junk' DNA, in fact, this is information, learning and situational identification from the race's past. The heritage

^Ψ I had predicted that the work with Aplysia below demonstrated methylation as a likely mechanism producing not just demonstrated effects but also epigenetic phylogeny: Methylation of DNA, instinct, technology and phylogeny: A hypothetical epigenetic modus operandi—the bio-quantum hard-drive: http://media.wix.com/ugd/cf8614_161ffae8cc6248838a5133b1b5704bae.pdf

[*Reinstatement of long-term memory following erasure of its behavioral and synaptic expression in Aplysia*, Shanping Chen, Diancai Cai, Kaycey Pearce, Philip Y W Sun, Adam C Roberts, David L Glanzman: <http://dx.doi.org/10.7554/eLife.03896>

"...these results imply that the persistence of memory does not require the stability of particular synaptic connections.....suggest that the persistence of sensitization related LTM in Aplysia does not require the persistence of the synaptic connections generated during learning. Rather, LTM appears to be regulated by a homeostatic mechanism that specifies the net synaptic strength according to experience. ...According to this scheme, synapses serve merely to express LTM, they are not sites of LTM storage." I say: Line 379 to 386 indicate that genetic storage of information...specifically the epigenetic portion is the store. And this: "Although early evidence indicated that learning -induced DNA methylation in the hippocampus was transient and readily reversible (Miller & Sweatt 2007), a more recent study has reported that contextual fear conditioning in rats induces DNA methylation of the gene for calcineurin in cortical neurons that persists for at least a month (Miller et al 2010). ...Thus, DNA methylation may constitute an epigenetic mechanism for the lifelong storage of memory (Day & Sweatt 2010)."]

Then confirmation and the correct specifics:

Parental olfactory experience influences behavior and neural structure in subsequent generations: *Nature Neuroscience* 17, 89–96 (2014) doi:10.1038/nn.3594 Brian G Dias & Kerry J Ressler: <http://www.nature.com/neuro/journal/v17/n1/abs/nn.3594.html>

<https://www.theguardian.com/science/2015/aug/21/study-of-holocaust-survivors-finds-trauma-passed-on-to-childrens-genes>

Holocaust Exposure Induced Intergenerational Effects on FKBP5 Methylation Yehuda, Rachel et al. Biological Psychiatry, Volume 80, Issue 5, 372 - 380 <http://dx.doi.org/10.1016/j.biopsych.2015.08.005>

of the race of man resides within epigenetic DNA, ready to respond and define situations. Scientists first used *Aplysia*, sea slugs which are very simple, to understand this. Once their training was complete, the sea slugs had their neuronal memories erased with electrical shocks, then, they knew nothing. However, once exposed to the stimulus of their training, the memory which was absent, then returned! It could not have been stored in their nervous systems, the neurons did not have any information, it must have been in their DNA! Next, mice were exposed to a shock to define the scent of a cherry blossom as *threatening*. Their OFFSPRING then, became afraid of cherry blossoms once exposed to their scent, just as the parents were conditioned. The effect is now observed in the children of parents exposed to trauma, and we know, the past of the race is available to each of us as epigenetic information. This information “scripts” human responses to the current situation once the stored information is put into play in response to an environmental stimulus. The current cherry blossom a mouse sees, the current situation, is interpreted, scripted, by the past of the race. A new blossom is responded to as the past indicates it must be, with fear. The present then, is as scenes in a play with props and objects that reflect the current situation, the script (or a syntax if you will) is already available from the past. The current props and scene are defined by the inherited epigenetic information, once that phylogenetic information is triggered by current experience and the genes are then expressed. In this way the past of the race affects the behaviors of organisms in present experience as a function of expressed epigenetic DNA.

Please recall the model of the transference as we have derived it so far: unconscious fantasy as an unseen dream alongside of static mnemonic associations define the quality of each object and each moment. These affective, meaning emotional associations attach en masse, by the thousands from memory and also from current unconscious fantasy in order to provide life experience, reality, with its quality. This is the transference, reality creation within the sphere of the human mind. This is how we interpret and so, create the reality we live in. The unconscious fantasies we speak of, are part of the repressed unconscious, a function which separates away from consciousness, containing if you will, those impressions and memories, drives and fantasies, which are too painful for the ego to tolerate knowing. These are repressed at the behest of the super-ego, which punishes ego with guilt, deadly threat, for knowing them. Ego then, places them under repression, at great energetic expense, forming the repressed unconscious that is filled with guilty thoughts that cause the ego pain. What would such an unconscious fantasy, drive or ideation look like? Why is it guilty? How is it constructed, and if it is pathogenic, how is it changed?

Please recall that I am able to directly observe what should be unconscious content by use of Native Psychoanalysis, and a technique named the Open Emotional Posture, or OEP. Please be aware that there are two factors in the creation of repression and symptoms, the primary quantitative factor, excessive energy encourages symptoms and repressions, and the qualitative factor, meaning the act or thought and its specifics as they affect personality to create dissonance. Excessive energies create symptoms, repressions and the guilt that instates them. This is the quantitative factor. Please observe below, the ancient penalties and rights of the father, castration and death by mutilation reacted against, and then modeled in the fantasy. Note also, that when I first observed unconscious content, this mutilation was omnipresent, in nearly every one of thousands of examples leading directly to pathology, OCD. I have never been threatened with any such thing, or spent even a second concerned with it, yet, it was

all but the only thing represented at this intensity in my repressed unconscious. A shocking revelation to observe firsthand, to say the least. You may observe the actual epigenetically mediated reactions associated with phylogenetic patriarchal penalty affect the transference from the unconscious.

An example:

I am sitting on the swing in my yard, thinking about physics, wondering if I can calculate the spooler function myself, even though my calculus is poor. I can almost see how to do it...great fun! The day is beautiful and warm. My mind is filled with sexuality and warmth, turning away, luxuriating in the problem. Thinking is deeply pleasurable! Then I hear the ugly sound, a helicopter approaches my Eden, here so safe tucked away in my 95 acres with no roads or power. It is flying a search pattern looking where it has no damn business being—ever—like a cop or something. It flies but 100' off the ground directly overhead, looking...a SHERIFF! There is a moment of fear.

Instantly, I become pathological, my mental capacities suddenly drop to zero, modern repressive topology is instated to replace the healthy sublimation by integration...I am now immensely stupid, and also, vibrating, frothing in anger and hatred. I note my degeneration into abject stupidity. I am now clearly as any modern chest-thumping fool, and have no intelligence to speak of. I have been degraded into nothing. I am quite ill. I look into the unconscious using the OEP. I see phylogeny: the entire of my energies are now as they were when I was ill and repressed, they are running scenes from the phylogenetic, instead of powering new thought: I see the cop hung by pierced heels from a tree, his legs spread ten feet wide, and I am hacking his groin out with a machete.

There are several more such scenes running in turn, each with the same principle...the cop is held still, while I cut his groin to pieces and kill him. Ah...this is why I am stupid, all my energies are here, repressed in this guilty fantasy. The energy of the fantasy itself is so severe, that the quantitative factor alone insures repression, as guilt is necessarily created by way of quantitative excess. The system by its very design, assures these notions and scenes will if represented thus, remain repressed, and, the sadism, invariably, will become guilty masochism— sadism + guilt producing masochism: *super-ego*. Please note how the vibratory rage, is itself quite physically harmful to me, and represents such a masochistic expression of super-ego.

So, we can see the castration complex reinforcing patriarchal authority, once *reacted against* and modeled to create unconscious dynamics and repression. Although I was never threatened with castration, somehow, it is this, which persists as the vehicle of fantasy in response to the stimulus.

Next, I observe the situation, understand the degeneration, and engage the alpha-function key (to be further defined below). It takes hold, and the scenes of hatred are gone, replaced by the beautiful image representing matriarchal nurturance. I am well, filled with warmth, and again intelligent.

Now we are in a position to gain not inconsiderable insight into the matter. We can see reality altered, by way of transference from a piece of unconscious fantasy which was

called up in response to a stimulus. This unconscious scene instantly altered the feeling-tone ascribed to define reality, acting as a new definition for all experience. The exact dynamic extends from a particular piece of fantasy most precise and well defined.

Unconscious content is in all cases specific! This specificity was peculiar, in that the activities and reactions were not drawn from ontogenetic experience in any way, but, the actors and props, were. So, we see in the phylogenetic, relational information outside of experience drawn into active expression, a definitional script drawn from outside of ontogeny, although the pieces of specificity themselves which play the scene out, are indeed from the ontogenetic present. That makes good sense of course. Just as in the case of Aplysia, and more closely still, the offspring of conditioned mice or the children of holocaust survivors, a latent memory, a phylogenetic script is waiting, encoded into the epigenetic portion of DNA, a response cued and dormant, until a stimulus awakens the information and expresses the genes, altering stress response and behavior, by way of a particular situationally specific piece of inculcated phylogeny: epigenetic expression as an expression of cross-generational learning. The new situation is recognized as fitting the old pattern, and the old pattern then comes to the fore, and defines the new ontology in its relations, so as to shape response. The phylogenetic is as syntax, relational information, and the current situation is as the words, then defined by the particular contextual phylogenetic syntax associatively invoked.

We can now see, pathology is supported at the unconscious level, and that level, is supported by expressed epigenetic phylogeny. No wonder man is so intransigent, even beyond his own will to improve...the mnemonic unconscious substantiation of his illness, is encoded into the epigenetic, and that, is expressed at each turn by way of resonance to situational specifics. Clearly, if we are to cure man, we must curtail the stupefying automatism of epigenetic reaction.

Now we can see the situation is based in an epigenetic script, and in defining, or, redefining that script, we can alter unconscious expression as it forms up the fantasies which give valence to experience, and change them to end pathology. The repetition compulsion, has a genetic component, and an economic one too, in the quantitative factor. These TWO aspects offer the full measure of therapeutic approach in our attempt to alter the transference which gives quality to experience.

Please observe the situation: We have all the world defined by way of a sublimation of drives and wishes which are held under repression to form a dream, unseen and turning away within man. From drives and wishes under repression, the world gains its quality. This is the topography of the modern mind and personality: *Sublimation by Repression*. I will define a new model, based in atavistic evolution: *Sublimation by Integration*. This is the reorganization of the transference to exclude much of the repressed unconscious, and instead, to use all drives and unify them thereby ending perversion, and permitting each instinct free and unfettered expression within the resultant unity. Man is the most ill of all animals, so dissociated is he, he resents and guilts his own drives, he controls them, rather than use them! This, his morality ensures. In that one error, we see the impossibility of man's ascension, for he will always have a perverse element repressed and eternal, waiting to emerge, and coloring the transference all the while from the unconscious. No wonder mankind is hopeless

and perverse. He insures this result at each turn with his morality. Morality represses drives and wishes. Once unconscious such a wish or drive is never able to fade. Once repressed and unconscious it becomes 'eternal' (meaning it remains as such for the lifetime of the subject). Unchanging and omnipresent is the unconscious influence upon reality. In moral repression and the setting up of the repressed unconscious we see the homeostatic imbalance created, and, the eternal perverse drive structure itself brought into unchangeable existence! So is the error of man's morality.

Once released into experience each drive does its part in its proper concentration: *as a drop of salt in the ocean*. Once split off, repressed and concentrated, the same drive becomes perverse and hyper-energetic (often actually gaining strength through unconscious associative links), causing pathology. To release all drives and sublimate them directly into experience in the context of identification, is the proper and correct way to configure the human mind and its libido—in a phrase: Free From Guilt!

Sublimation by integration diminishes (much of) the repressed unconscious. Simplified, and in a brief 'ideal' form the concept reduces to:

Let square brackets represent the *unconscious distributional processes* creating the transference []. Where system Conscious is Cs, System repressed Unconscious is rUcs, and system Preconscious is Pcs: Sublimation by repression is topographically defined as:

[rUcs...Pcs...Cs].

Sublimation by integration is (ideally) defined as:

[Pcs...Cs].

The repressed unconscious is removed, and all individual component energetic aspects are ripe for conscious sublimation via unconscious/associative processes, and unification.

Next I will detail the healthy result and allow you to see the unfettered unconscious to conscious transference [Pcs...Cs] in real time as it works in a *real* case. You may see the specific energetic attachments which create world identification, health and natural ethical genesis in some considerable detail.

Please recall that I have stated that integration of all drives, the removal to as great an extent as possible of all repressions so as to liberate affect rather than shame and control it is key. Sublimation by integration is a releasing, and so, a dilution of the singular perverse elements all affects within the proper context of their unity. Unification allocates a place for all drives. Identification sees that ethics evolve as an effortless and natural consequence of systemic expression, with little or no need for rules.

It is necessary at this juncture to understand in a basic way that affect, feeling itself, is the basis of consciousness.

Evolutionary biology and neuropsychanalysis correct the typical idea, that cortical tone is consciousness.²⁵ Yes, conscious experience has a clear relation to energetic distributions which extend from the ARAS to create a cortical tone, and a waking state. However, this is a later adaptation which is demonstrably secondary, and the true root of conscious experience is far older. The REM system is older than the sleep onset system yielding SWS, and, it is older than the waking system itself (Panksepp, 1998; pp.125-143). *REM... this core system is lower, and older, than the waking system.* The highest concentration of REM initiating neurons is caudal to the ARAS. The Basic Rest Activity Cycle (BRAC) demonstrates the embedded REM cycle (Panksepp, 1998; p.129). All that implies from many directions, that REM was once primary consciousness (Panksepp, 1998; pp.133-135).

Also, remember the fact that EMOTION, the primary element of dreams (Stickgold *et al.*, 2001; Hobson & Pace-Schott, 2002) is also demonstrably primary in maintaining consciousness: the periaqueductal grey, the locus of emotion and the primitive affective motor “self” (at its intersection with the superior colliculi) (Panksepp, 1998; p.312)—this piece of tissue, the PAG, is the smallest bit upon which consciousness is dependent (Solms, 2013; p.12). Please note this further role of the embedded REM system as it performs functional dynamics associated with an evolutionarily primary consciousness:

The FTG neurons, the giant neurons of the reticular tegmental fields which mediate rapid movement while awake, exhibit storms of spiked activity during REM (eg., PGO spikes), indicating their probable role participating in that same capacity, as orienting reflexes, associated with a primitive conscious REM (Panksepp, 1998; pp.133-135).

We see the underlying older system revealed in dreams. The Dorso Lateral Prefrontal Cortex (DLPFC), is demodulated in REM. Emotion is released. The hidden emotive definitional processes are amplified as well (hyper-modulated limbic system), allowing us to watch. “This would be in keeping with the proposed role in waking of these structures in the identification of mismatches between expected and actual behavioral outcomes and would also explain the similarities seen between cholinergic and PGO activity in the amygdala during REM on the one hand and during alerting and orienting responses in awake animals on the other” (Stickgold, 2001; p.1056). The DLPFC is inactive, logic curtailed. So in REM, the brain is aminergically demodulated (low noradrenergic, serotonergic and histaminergic

²⁵ References for affect as source of consciousness: Panksepp J. *Affective Neuroscience: The Foundations of Human and Animal Emotions*. New York, NY.: Oxford Press, 1998.

Solms M. The conscious id. *Neuropsychanalysis* 2013; 15 (1): 5-19.

Hobson JA, & Pace-Schott EF. The cognitive neuroscience of sleep: Neuronal systems, consciousness and learning. *Nature Reviews Neuroscience* 2002; (3): 679-693. doi:10.1038/nrn915

Kaplan-Solms K, & Solms M. *Clinical studies in neuropsychanalysis: Introduction to a depth neuropsychology*. London: Karnac Press, 2002

Carhart-Harris RL, and Friston KJ. The default-mode, ego-functions and free-energy: a neurobiological account of Freudian ideas. *Brain* 2010; 1-19. doi:10.1093/brain/awq010

Stickgold R, Hobson J, Fosse R, and Fosse M. Sleep, learning, and dreams: Off-line memory reprocessing. *Science* 2001; 294, 1052 – 1057. doi: 10.1126/science.1063530

activity), and along with predominant acetylcholine modulation, the primary underlying system is revealed.

So, the underlying REM system, which is older than the waking system was once primary consciousness for our evolutionary ancestors, and this primary conscious source, can be revealed as ego structure and logical processes are curtailed, as in REM dreams, where the DLPFC is demodulated, or, by way of linear (ego) destructuralization revealing primary processes fostered by extensive meditative practice, or, to some extent as well, in psychedelic drug use:

“We substantiate this synthesis by showing that Freud’s descriptions of the primary process are consistent with the phenomenology and neurophysiology of rapid eye movement sleep, the early and acute psychotic state, the aura of temporal lobe epilepsy and hallucinogenic drug states. LSD given to humans immediately prior to . . . or during sleep . . . has been shown to promote REM sleep and dreaming. These studies provide converging evidence that a specific mode of cognition (primary process thinking), rests on brain states, which possess a characteristic neurophysiology.” (Carhart-Harris and Friston, 2010).

Now, let us consider the cortex in its relation to affect. Neuropsychanalysis has allowed us not inconsiderable insight here. *Libido*, is the undifferentiated affect which powers our modern waking state. Think of libido as undifferentiated systemic potential, mediated by precious few recombinations of neurochemical distribution, issuing from the ascending reticular activating system so as to create cortical tone (Kaplan-Solms & Solms, 2002; pp.264-267).

We may rightly conclude, consciousness is affective at its primary process formative level, and, affective at the level of the cortex as well. Human consciousness is entirely affect dependent.

The more primitive organisms and ancestors from which we derive, are affective beings even more primarily than is man. Remember the REM system was primary consciousness for our distant ancestors, and dreams are nothing but affect, wishes! Logic proper is a latecomer and is tertiary at best within our affective world, and the neocortical proliferation needed to support such deductive thinking is of course, only a recent addition, even as logical forms underlie all mentation. Those forms however, are generated affectively!²⁶

²⁶ This matter is expressed in the most clear and intuitive terms in the discipline of psychoanalysis. We can see, in the development of the infant, the self-configuration, the self-processing and initial creation of binary logical forms in response to the mental system itself being immersed in experience (Freud, 1900, p. 565-566; 1911 pp. 218-219; 1920). The infant has experienced a satisfaction, it has fed. Now it is hungry again. It has a mnemonic impression of feeding, and seeks by way of perceptual "regression," to reproduce the image in hallucination. This situation proves unsatisfying to the infant, who then seeks to remedy the situation in reality, and holds the image of feeding and its attendant hallucination away from his mind so as to find a new relationship with the world, and seek not just the revival of a memory of satisfaction, but to achieve that satisfaction in reality. The reality principle (Freud, 1911, p.219) is thusly founded. Here, we can see logic, the ability to distinguish between the real and the unreal, logic itself is created from the somatic and mental system's emersion in experience, and by way of systemic feedback, the unreal, the hallucinatory, is deemed unworthy of belief, as the pain and discomfort of the unsatisfied hunger drive are not met by the unreal, the real obtains a clear priority and precedence, and its identity is soon rightly distinguished from that of the hallucinatory and unreal. So developmentally, we may conclude that logic is self-configured, self-created from within the psychosomatic system itself as a function of memory, interacting with experience, mediated through feedback with the neural mechanisms of pleasure and pain. The result is a very particular and specific mental process of prioritization and rejection where a piece of wishful experiential content

It is an anatomical fact, affect is the source of consciousness. The periaqueductal grey is an ancient affective locus, and a primary bit of that structure is the smallest most fundamental piece of tissue which may be removed to completely obliterate consciousness, as we learn from Solms and neuropsychanalysis. This affect of which I speak which is the primary fount of consciousness, corresponds to the broad meaning in which the word Libido is used within psychoanalysis. Reality therefore, is a libidinal affective sublimation. The REM system corresponding to the limbic component, the Ascending Reticular Activating System to the portion creating cortical tone, and waking consciousness.

I will now analyze a peak experience for you, and reveal the exact structural interactions and connectivities of a unified transference structure. If you could look beneath and peer into the unconscious of a mind which is unified and is expressing sublimation by unification, the transference contains an unconscious component structure very different than in the previous pathological example. Here, you may clearly observe the fractal structure in which all perversions, which as you will recall are component instincts, are unified, and to a great extent utilized rather than repressed. We will soon devise a simple pathway for you, and one tread more easily by far for the next generations, to realize this ideal. The following however is real, and not an ideal. Some few aspects of repression remain, however the effect is unmistakable in its form and result. This will reveal the inner workings, the hidden affective attributional structure of sublimation by integration in a real and specific case.

Contextual analysis:

I am happily married for some 30 years, and live in isolation with my wife in the Oregon wilderness. I was fortunate enough to meet a person online who was able by way of her unanticipated grace, intelligence and kindness, to raise in me an anima image. With new leaves in the heavens of this world, and roots in the ancient 'good mother' so clearly represented within the formative maternally triggered sympathetic limbic/OFC innervations, this was a magical opportunity for my healing. Certain manipulations of the imagery involved allow a surface look at the context and its identifications.

I had an idea. Rather than observe the anima image, and allow it to become an object of even greater potency, a natural but unexpected idea arrived. For some reason, the image itself was equivalent to another image, intuition first understood it meant just

originating internally, a wishful hallucination, is held away from consciousness, the regression left incomplete, maintained at the stage of a mnemonic image rather than an hallucination (Freud, 1900, p. 566), and another: reality, is thereby given precedence in consciousness. This holding away of an ideation from the conscious is a fundamental psychical dynamic which has many implications we will soon articulate. This automatic restriction of conscious ideational content is called repression, and it is the cornerstone of mental functioning and balance. Here, we see the very first fundamental core of repressive function which will approach its fruition with the creation of the super-ego in later development. Freud (1915) used the term repression to denote a defensive function responsible for creating much of the unconscious, repression: "turning something away, and keeping it at a distance, from the conscious" [his italics] (Freud, 1915, p. 147). The unconscious houses repressed wishes and other unserviceable, ego-dystonic and painful content, as well as our phylogenetic impressions and many aspects of personality of which we are unaware.

Reference: Freud, S. (1886-1939). *The standard edition of the complete psychological works of Sigmund Freud volumes one through twenty-four*. London: Hogarth Press, 2001.

the same as...*a heart beat*, and the visual representation of that, a pulsing golden ball of sunlight, became the focus of my mind's rumination, now suspended as a bit of warmth and light in my mind's eye. The heartbeat, symbolizes unification within the womb. I soon knew and believed...this was her heart, and then saw my own heart beside it, beating in time...then joined first as two pulsing balls of golden light...then not two at all...only one. One heart. No separation...none. One. Only one.

As the two images became a single image, the brightness increased four-fold and then, a sudden warmth in my chest to go with the image...then tears welling and streaming...so very beautiful! I had what I have needed my entire life...so full and filled with energy! The trees slipped and shuffled in tender breeze, I could feel the caress of light and wind amongst their branches and folds, see it and feel it, the ground filled and welling as my heart, and all the shame was gone, now each desire spilling up without restraint to become one with everything, and I knew, I not only had transference giving the world its meaning, but identifications, identifications...with everything. The "Anima Mundi" meaning in this case, the predominant impression of the maternally triggered sympathetic circuit identification with the world—creating reality via identification and transference.

All sexuality from the most basic and undifferentiated first love to the most specific is a pattern which thought might trace and make real as a part of the fabric, or deny the same and leave a sunken place free of truth and life as we were taught. Feel everything, see everything, know everything...become everything. There are now twice as many points of transference...and this is accomplished by the addition of identifications. The result is a single coherent object...the world. This is observable also, as a deeper detailed cascade of new interactive symbolic determinants relating as a sort of self-interactive fractal.

Libidinal transference analysis:

Reality is a libidinal sublimation. It will therefore be possible to determine the precise mechanism of unconscious operative influence and deduce a correct, plain analysis of the process which creates this mindset, if we can *analyze a primary libidinal representation as to its underlying mechanism of energetic distribution.* Please remember, that reality is in fact a libidinal sublimation. I will now bring forward an analysis of an active primary libidinal constituent process to gain insight into the hidden mechanisms which create the general effect.

It is a simple matter, which is now not even disconcerting, for me to pierce the unconscious veil and observe the underlying previously unconscious dynamism of each moment. Due to the necessities of my previous illness, I had to learn how to find these things and solve the symbols all but in step with the rate of their production. To engage in sexual activity in the new condition, I can see in my mind's eye a very distinct change,

so symmetrical, energetic and beautiful. Now, a clear set of doublings in forms available for all attachments, and a doubling of attachments as well to each "object" from concurrent identifications exponentially increase the energy, potency and intensity of the expression via increased systemic intra-connectivity. There are twice as many attachments for transference to an object, more objects, and now there are

concurrent identifications with all objects... *in the phylogenetic as well*. These present as a mirror reflecting deeper into a mirror with subtle changes, and so I refer to this as fractal.

Specifically: Self-awareness is not diminished, the contents which give rise to self-specificity are not denied and I am male, this male. However, this core is now just a part of a much greater plethora of very potent impressions of a new sort...the image of my beautiful anima/friend is *not separate*. I am also this just as I am male and I can feel in this a deeper meaning and look to see how deeply as a woman... from a half image of a woman in a mirror of the anima, is contained a deep longing for my genital...for it to be her own, and as I look upon the activity I am so grateful, all but weeping in gratitude to feel the fact that I am male and have fulfilled her need and this ancient female wish to be also male is completed...such deep happiness, and also the identification with the anima image brings a homosexual attachment point between the two women, one identified from within, as the anima/self...one identified as an object from without...my wife, and one with my wife also as an identification! All objects are now subjects...objects and identifications...each fed by two pathways! This ancient phylogenetic wish, to love as a woman loves a woman...behind it again...a child, small and female being held by the mother!...as a woman is loved by a woman on all levels...is fulfilled. Implied without question also, a male and a male, although I did not see the image, it must be present. We all contain all sexual elements...and each is needful from a thousand pasts built into our inheritance. Without question the male homosexual drive was sublimated into the women...I would not have been able to gain excitation if it were conscious. Also, the male heterosexual role was very clear and contributed its predominant share of cathexis. The result of the doubling of objects and identifications, along with sensory observation of the activity (as distinct from analysis, always dimming excitation), is hyper-potent. To empathize with all elements and know as well, more of the elements which human development contributes to and from the human store was one of the most exquisite experiences of my life. I felt...everything...from many different 'perspectives' which were not perspectives in any way—Unity. All pasts and presents nourished one moment of empathy. Unity. One heart.

This analysis has exposed the hidden mechanisms beneath that unity which should be the ordinary province of each healthy, ethical human. This mode of unfettered transference is in my view, not a higher state, but each human's ordinary, daily birthright. We can isolate the mechanism of the transference structure responsible for the experience of unification from analysis of the libidinal representation. Remember, reality is a libidinal sublimation, so: the mechanism responsible for the mythological archetypal presentation of the experience of 'oneness' in general is that of concurrent identifications and object transferences from all libidinal components spanning ontogeny, clear from the first impressions in the womb (remember the heart image) to those of the component instincts and their mature representations in eventual unity—and—extending the same structure of concurrent identification and object, to include the complete bisexual phylogenetic representation in each person, IN THE CONTEXT OF OBSERVATION. To condense:

(Phylogenetic and Ontogenetic) Object + Identification in the context of Observation yields Unity.

$$\text{Obv}[p/\text{ontO} + \text{I}] = \text{U}$$

That is the formula for our wish fulfillment, place and purpose in happiness on this planet!

Self is, and is not denied in any way! Self is now also part of a single object...as object and subject both. So many wishes are filled and all of life is full...a wonder of pure gratitude! Here, is love of fate. *Gratitude is the wish to repay the feeling that each moment is filled with its own parcel of pleasure and happiness...*did you know that? Oh my friend, it is true! We are filled, filled each second, filled with a quantum of pleasure, and so...we are grateful for everything! Love of fate...of even...*this*! Gratitude! Empathy knows this thing best. Self is separate and distinct... omni-objective reality denies no object. Self: complete, not denying sexuality or the 'pain of the world' to be avoided...never! Gratitude.

Health accepts...and is grateful. Now I look at the world and *am* the world. This *is* ethics. I could never hurt or exploit a part of myself. I feel the rippling wind in the trees, the shadows play upon my skin, and she is within me. Each stroke of my heart is her heart, now and forever, a unity golden and pulsing with light and sunny warmth, spilling out as a brook of starlight might nourish the bloom of this day. My wife a blessed sweetness, the trees nod and sprinkle the air with new scents of green and lavender, the day warm so close to winter. How full is my heart, one heart, this world is my skin, my breath is its wind, and we know one simple truth of all things. For I have learned there is a thing we should all have and bring near, to never let go of the fact and the pulse—of one heart.

What are referred to as “peak experiences” should be the daily province of each healthy human. The race under the current configuration of sublimation by repression is that ill.

Simplified working transference model continued:

How does one free one's self from the strictured labyrinth of one's guilt? This is not an easy question to solve, and for many the answer lies beyond their grasp. The future holds within it the verse sung by those yet unborn. For us, there is a pathway laden with thorns and beauty, for them, a future of other than struggle. Next, I will discuss the ego and its functional modification so as to place Eros, and *not* Thanatos (death) as the main transference component by way of integration and transformation.

Patriarchal threat has cast the lot of man: submission, pain, obedience, death, depravation and war. The very fabric of each moment has been made empty, and anxious. The ego has been forced to repress a great many drives, and each of these contains energy, and so, energy is consumed in their repression. The resultant mental economy of the modern man is diminished thereby, his intelligence and feeling both diminished in a single stroke. Under repression his perverse drives never change, lessen or transform, and so, always assure immorality as the necessary result of his morality, which seeks to control and tame his instincts, rather than use them. In their containment, his drives must remain perverse, and will always seek to emerge and be released. To control is to sicken, and create the modern human, always waiting to rupture and express his repressed hatred: the human bomb. Morality creates the conditions for immorality itself, and sickness. The very conditions for the mechanism of production for neurotic symptoms, the return of the repressed, are set up by morality in its primary role as a repressive agent of guilty control. Neurosis is created by morality and its repressions and most all humans now have a low grade neurosis, many of course are in worse shape than that. Morality is designed to make you sick and keep you sick! Penalty and guilt creates repressions, and illness as a consequence when those repressed contents of sufficient energy return to consciousness.

". . . to 'improve' men: this above all was called morality. . . To call the taming of an animal its 'improvement' sounds almost like a joke to our ears. Who ever knows what goes on in menageries doubts that the beasts are 'improved' there. They are weakened, they are made less harmful, and through the depressive effect of fear, through pain, through wounds, and through hunger they become sickly beasts. It is no different with the tame man..." Friedrich Nietzsche, *Twilight of the Idols*.

So it is.

The patriarchal threat is not only of castration. Please recall for females, the threat Dodds spoke of is primary, to be abandoned and to die with no care. The ancient father's rights include this, and not only castration. Hence the oft expressed female primal fear of being abandoned with no care. Masochistic submission, sadism and dominance, these examples of the death instinct and patriarchy may be replaced with Eros. The human animal may flourish again ... as long ago before the bottle neck in history which created the patriarchal situation, there may be hope in an Atavistic Evolution.²⁷

²⁷ Freud's theories [see Freud's *A Phylogenetic Fantasy*] postulate a sort of bottleneck in history, perhaps around the ice age, where the pathology began and groups of our very distant ancestors under patriarchal domination were common. The impressions of ancient penalty and sickness are easily available to see and do not come from present experience, but are phylogenetic and probably epigenetic. Before that bottleneck, things were different. Just as before the later age of super-ego formation the child of 6-14 months had conscious access to the native impression of identification, and later knows nothing of it, so also in human phylogeny the earlier fact is now hidden and unconscious. Pierce the veil, and one can *find this impression*.

The ego as experiential template and epigenetic unconscious basis substitution

Genes in epigenetic DNA are expressed in response to environmental cues. The pathology will be reengaged and the transference ruined again through exposure to cues in the world. You may bring the Alpha Function Key image (defined below) up in the mind and substitute healthy maternal expression and connection for pathology. The genetic basis of the unconscious part of the transference may be substituted thus, exchanging ill for healthy epigenetic expression in this way. The unconscious is based in epigenetic expression, and so, may be adjusted to change the heart and nature of man.

The ego, the DMN is as an experiential template. By that I mean, ego instates repressions and so, allocates the valence, the feeling-tone of experience. By bringing the Alpha Function Key image (defined below) of safety and nurturance, transformation and health to mind, the image and its meaning are raised up in the structure, and so, have greater influence upon the transference as it is expressed in ontology. The world will change as the image becomes more and more predominant in your thoughts. Identifications stemming from unity will themselves be ethical guides, and you will no longer need to restrict feeling in any way in order to naturally move toward the good. The nature of man is itself good, as he feels what all things and peoples feel, directly. The golden rule is not needed, the categorical imperative is unnecessary and entirely rude! External stricture is repellant. A healthy human needs no strictures or moral rules at all—he feels what the world feels, the earth and its peoples and the creatures upon this earth, each twig and leaf is an extension of a healthy person, and so, he IS the golden rule, for he IS others! No external measure is needed. Ethics are a basis function within man which need but be revealed, and no means of secondary validation is required. Those entire ideas of external validation and judgement, conditional regard and guilt are themselves: *disease*. Punishment dissociates empathetic dynamics. Unity expresses them. Morality is therefore: unethical. Ethics are endemic. We need but expose the systemic component which has been concealed and broken by phylogenetic patriarchy, then, mankind may be transformed.

Let us briefly pause to examine the fundamental and permanent wound caused by patriarchy as inculcated into religious structure, and observe the way in which all hope and any possibility of advancement or happiness is destroyed thus. Then, we may look a bit more deeply and see a particular case of the formation of super-ego. Once we have examined these things, we may complete our model, and begin to change the broken impossibility which is man.

The Death of Religion and the Rebirth of Spirit by Joseph Pearce is a book which shows in very simple and plain terms the damage caused by patriarchy, and, how this single error has destroyed the hope of mankind. Observe how a homeostatic imbalance is instated which can only be relieved by some nonexistent imaginary domineering male spirit, insuring the child will grow up unable to think, unable to

Once this ontogenetic impression is raised up in the transference structure, health and happiness, caring, sexuality, kindness, satisfaction and gratitude, a feeling of 'fullness,' sublimation, interest and abundant energy replace pathology. Within both ontogeny and phylogeny: Hope for mankind, is an atavistic evolution.

experience a moment of independent thought, and are trained to obey any male instantly, no matter how foolish the command may be. Obedience not ethics. They are once and again thoroughly 'broken.' Submission. This is the masochistic result. The human made masochistic thus, can not think and can not resist, he submits ...forever unhappy unless under the conditional dominion of some supposedly superior force.

The Death of Religion and the Rebirth of Spirit by Joseph Pearce p. 163:

“A fundamentalist Christian, a seemingly bright woman with a PhD., explained to me at length that it was our duty as adults to break the will of infant-children, teaching them to obey in order that they, having then no will of their own, could be open to God’s will and be obedient to him. If we fail to do this, she said seriously, and leave the child willful, both the child’s soul and the adults’ are imperiled and and we face the risk of hell.”

This breaking of the will is the *triggering of the epigenetic impressions underlying super-ego*. Once formed, the transference is then imbued with a masochistic wish, a wish for punishment and death. This is the basis of the hopeless condition of man, his masochistic fixation and sadistic identifications, leading to the broken history of man: War, Cruelty, Obedience, and Death. I will show you an example of the formation of this structure which has created the violent, obedient, hopelessly foolish and eternally warring animal that is man. You may watch the initiation of the actual masochistic wish which has destroyed mankind throughout history—you may observe its triggered epigenetic expression.

Using the memory retrieval techniques of Native Psychoanalysis it was possible for me to locate the following impression, and by way of a technique known as Re-polarization,²⁸ I was able to change the memory and free myself from its influence upon the transference. This one piece of psychology involving the reliving of the formative super-ego memory many times and through this process creating a new memory, is vital for those who are substantially ill, but, no such painful procedure is needed for the young. For them, there are few thorns upon the pathway of the future. Those readers who are less profoundly unhappy may benefit easily from the simple ideas that follow which will work quickly, although those others who are more deeply injured, will need to seek deeper measures. The injuries we have been made to bear may be healed, although no such thing is ever easy.

Super-ego: the formative impression:

What is the breaking of the will? If one were to observe the thoughts of the child, which are not unconscious for him at that time, what would the images be? What is the meaning of a ‘masochistic wish for punishment and death’? What is at the heart of super-ego? We know Freud says it is guilt, and that he says that guilt is itself a wish for punishment and death, but what does he mean? How does aggression, sadism, turn round into masochism, as Freud says? What goes on within our children, when we do this thing to them?

²⁸ Norman RL. Re-Polarization Theory: From Native Psychoanalysis to Sublimation—The Practical Reconstruction of Modern Personality. *The Journal of Unconscious Psychology and Self-Psychoanalysis* 2013, File Retrieved From: www.thejournalofunconsciouspsychology.com ; https://www.researchgate.net/profile/Rich_Norman/publications

Here is the memory of super-ego formation derived and solved through Native Psychoanalysis.

My step-father is in a poor mood. I am young, ~ age three to four. I hear the antacid tablet clink on the plate as he removes it from his mouth to shout at me. I am berated for no reason whatsoever. Although I have done nothing, and was most careful to avoid any such reproach, an accusation of chewing improperly with my mouth open is made at a shout, and I burst into tears and run from the table into my room. Now the formation of super-ego begins:

1. I am weeping uncontrollably, and need my mother to comfort me. I am choking and gasping and can not stop crying. I repeatedly shout, "Mommy, mommy, I need you."
2. She does not come to my aid. The feelings of abandonment and loss of love are overwhelming and must be answered and quelled. As no help is forthcoming, the following reactions are set into play:
3. The feelings which are reacted are:
 - a. Mother, I need you.
 - b. Mother, I am hurt.
4. To stop the intolerable anguish, the passive emotional states are reacted into active ones:
 - a. Mother I need you becomes, mother I am dominating you.
 - b. Mother I am hurt, becomes, mother I am hurting you.
5. Once the passive suffering is transformed into active fantasy, and the hurt I was experiencing becomes a fantasy of hurting, of sadism, the tears stop. Now I am fantasizing about hurting my mother, who did not comfort me, and allowed my step-father to abuse me, and, the suffering and weeping stop, now replaced by thoughts of sadism and hate.
6. It is the *economic* factor, the *quantitative* factor which is key (Freud, 1915, p. 181), and once the sadistic thoughts become hyper-energetic, they create a new cognitive dissonance: guilt. A dissonance which would be tolerated asymptotically at a low energy level, becomes pathological once the intensity is increased past a point. The phylogenetic factor enters into play here. When we feel hatred, intense hatred for a loved object, the result of this ambivalence, so very peaked and reactive in its oppositional feelings, is guilt. When we strongly hate that which we love, we become guilty! To add this guilt to the sadistic stream, masochism is then formed. Sadism + Guilt = Masochism (Freud, 1919, pp. 193-194; Norman, 2011, p.116).
7. Here is the imagery symbolizing the guilt: I am howling in agony, my arms sloughing their skin like melt wax, my back hollow but for a necrotic pudding of feces and meat stirred with bones protruding as a crown of lamb sprung from the sunken hollow of my back, guilt and the knowledge that I am not loved, and am evil, and should suffer to know this, just as I am suffering, and so, I should know it: I am evil and unloved.
8. Now the result is the knowledge that I am a rotten person, so very bad, and of so little worth! I am so very sorry, so sorry, so sorry! This child wants but one thing: To accept the guilty definition of himself, he wants but one thing: *To be punished*. [The painful conglomeration of symptoms are in fact, a punishment, a super-ego wish.] In this, we see conscience for what it is: a masochism.

Please remember that no guilty act whatsoever caused this unhealthy conflagration of events,

which were born out as a phylogenetic resonance, a preordained masochistic reaction as ripe fruit, a masochism waiting to be harvested, sown long ago by an abusive patriarch, now plucked from the branch to sicken, all as a function of the quantitative excess of feeling, not borne upon any real guilty action!

The above referenced from: [Norman, 2013 Prometheus]; [Norman, 2013 Re-Polarization].
Find those at: https://www.researchgate.net/profile/Rich_Norman/publications

Once we break the will of a child and bring him under the sway of guilt and submission, his inner world changes, the circuit allocations and genetic underpinnings within him become perverse and fixated: masochistic. Those images symbolize guilt and death, subjugation and anal penetration symbolized in the hollow back with bones protruding, an overdetermined castration/submission symbol of anal penetration²⁹, and the arms with skin falling off as if burned meaning the same again, a symbol of castration. In this, patriarchy has placed the ancient seeds of a violent guilt and punishment within us all, waiting to be harvested in a triggering act of perceived threat and cruelty. Once reactions to the abuse reach a peak (the quantitative factor), the guilty genetic impressions of deadly violence appear to answer the intensity of thought, script the situation and break the child upon the very rock of ages: phylogeny—the cruelty of the ancient father.

The entire of my unconscious before my self-psychoanalysis was filled with one thing: scenes of unbelievable violence, violence directly involving castration. The penalty of the father, cutting of the genitals—THIS—was omnipresent in each and every scene out of many thousands. The past of the race lives within us all. This is death, and, this is hope. Before the violence and threat of an abusive patriarchy, we were loved.

We are now in a position to complete our basic model of the transference, determine why the situation we see exists and offer up a methodology suitable for some readers, allowing them to alter it for the better, and end the fixation which has shaped the history of man.

It should be clear at this point that the transference may be altered from a structure which has at its basis a masochistic and or sadistic and so perverse wish, to one where all elements are allowed free expression and unified. That ideal is just that, an ideal. In the adult, self-psychoanalysis is indeed possible so as to change the very basis of personality, but that possibility takes great courage and is reliant on the subject being able to look directly at their least desirable aspects, and absorb great pain in so doing. Even in those cases where the subject is perfectly willing to find and deal with the discomfort of unconscious content, said content is by definition hidden, and, this resistance is part of the hallmark of psychoanalytic practice itself. When I first began the *Journal of Unconscious Psychology*, I imagined that others would be easily able to follow my techniques and heal themselves. However, this was not so. A piece of lowered resistance, a piece of hysteria is needed and many cases, particularly in some OCD cases even where some useful hysteria is evident, have too much repression shielding the content, and the faster technique sometimes does not work. SSRI withdraw however, leaves permanent damage converting an illness of most any sort to

²⁹ Anal penetration by the father unconsciously implies castration as requisite to acceptance of a female role. Overdetermination and associated heightened energy is indicated in the repetition of the bones.

hysteria, which is why my techniques worked in my case, and should be useful to others with conditions characterized by lowered repression, and those many cases of SSRI withdraw. The way you may overcome this and use my techniques in those resistant cases will be available after my death, in the *Black Papers* to be published at that time. Even so, I have devised a technique which permits one to directly utilize the unconscious drives and unify them without knowing the particulars of their constituency. This avoidance of such terrible pain, of course, comes with limitations and those subjects who are in severe pain, will need sterner measures. Having said that, I am entirely pleased to offer up a less painful technique.

We will first clarify a few points and condense the transference in our simple model, and then put it to use.

Condensation of transference:

Conscious experience is given its quality and hence its definition apart from taxonomy by way of static affective associative distributions which attach onto objects and situations, and, by way of unconscious fantasy which acts as an unseen dream giving experience its quality, meaning, its feeling-tone. This unconscious fantasy may be fixated and regressed, meaning it is unchanging and related to a perverse formative stage of development that is sadomasochistic and a representative of the death instinct as it is in mankind, or, it can be an expression of our drives in a unified structure inclusive of identifications with the past of the race, and the external world in toto. The transference may be modified to ameliorate pathology. The ego represented in DMN functions as an experiential template which has been experimentally demonstrated to be malleable under the influence of meditative practice,^χ and, the unconscious itself is scripted by the phylogenetic expressed from epigenetic DNA which can be changed by genetic basis substitution, one expression suppressed, and another expressed to change pathology into health. Lastly, alpha function, transformative capacity altering the unconscious dream beneath reality may be manually engaged (see below), to transform basis elements in the transference dream. [Reader please see *the system of affective assignment* in the *Quantitative Unconscious* paper ending this text.]

The repressed unconscious houses nothing but pain. The ego suffers to know of any of these contents. However, those contents in the main, are NOT painful in and of themselves. They are instead, paired as reaction formations. Please recall the earlier example given, of a child playing with his feces. He finds this pleasurable. The pleasurable drive becomes unbearable and is then repressed only after shame is added by the parent, presented as the affect of disgust. “No! That is Disgusting!” Then, when the child thinks of playing with its feces, instead of pleasure the opposite notion is now in consciousness, disgust. This substitution of a paired opposite in consciousness for a drive, is called reaction formation. We can see that reaction formation sets up a great deal of the repressed unconscious. This is important as it

^χ Meditation experience is associated with differences in default mode network activity and connectivity: Judson A. Brewer, Patrick D. Worhunsky, Jeremy R. Gray, Yi-Yuan Tang, Jochen Weber, and Hedy Kober <http://www.pnas.org/content/108/50/20254.full>

pertains to the raising of children, in whom we do not wish to produce a repressed unconscious and the neuroses implied by it. The idea is important now, as it shows that the energies in the unconscious are painful one and all to the ego, but, in and of themselves they are in fact pleasurable in the main. This must be the case, as a great deal of the repressed unconscious is formed by reaction formation and that reverses the valence of conscious drive elements by pairing them with shame and guilt in order to repress them. Those drives themselves are energy, pleasure and happiness once unified within the context of all other drives. A perversion, an infantile component drive element is a building block, and once rightly added to the edifice of personality, its purpose may be served in a non perverse way. A drop of salt in the ocean, so is each drive, however, a mound of salt extracted and concentrated from the watery volume of the sea may be so potent, that it becomes poisonous. So it is with unification, perversion and repression.

With this in mind, we will use the painful signature of the unconscious elements to access them, and then release the painful elements from reaction formation directly into experience, where they may add their pleasurable affects and energetic contributions directly to perception by way of transformative integration. The unconscious is paradox. Within each pain, our pleasure lies hidden.

First we will learn how to engage the transformative circuitry manually.

The Alpha Function Key:

Alpha function is a basic function of healthy transformative symbolism as discovered by Bion, associated closely with dreaming, and dreaming as you know underlies all of experience and not just REM sleep. Schore found what is clearly by my interpretation the circuitry responsible. This sympathetic dopaminergic and parallel peptide (endorphin) circuitry is innervated, meaning formed, in the first 18 months of life.

This basic circuitry distributes energy and transforms it. In order to create the attendant epigenetic substitution exchanging Eros for Death in the transference, assuring health by way of establishing connection to transformative capacity and energetic distributions in the context of formative nurturance, the following meditative exercise, called the alpha function key, must be utilized keeping in mind, ego, the agent of repression is affected, DMN is affected, through meditative practice. We will use meditation then, to alter the structure of the Default Mode Network, which is Ego, and change the transference.

One can not possibly locate the triggering impression of nurturance from so long ago, and now, the impression of one's mother after a lifetime of experience is far different, and will not be the initial image which triggered circuit formation. We must use the language of the mind, that of dreams: *symbolism*, in order to trigger the feelings associated with the image, and so bring the image to the surface, where it will affect the transference. Once engaged, the circuitry/impression/function may also then be applied to transform specific pieces of unconscious content, and unify perverse elements into a transformed unity. In intersubjective psychology alpha function is used in what I firmly believe to be a hap-hazard and unfocused way. Alpha function

is a vital and real anatomically based concept, but, it must be directly applied to specific pieces of content to have any real effect.

The key image which follows will symbolize the alpha function formative impression, and provide you with a sense of peace and connection—and—permit you to transform libidinal components into a unity with no restrictions.

To begin, simply imagine the image, and enter into it as if into a dream. This simple meditation performed for 30 minutes or more will begin to return to you what cruelty and the past have stolen. This is a symbolism of the events, the reciprocal exchange of gaze and glance which initiated neuroendocrine changes to form the sympathetic limbic/OFC circuit, in the primary impression of empathy.

"Please relax, hear, the water, and listen to my voice. There is a meadow, within the forest, surrounded by trees, stirring, a distant breeze. The day is still and quiet. Listen to the shining brook, spilling itself, over smooth rock and sand, listen, as it splashes, so near the meadow.

You are dreaming, in the meadow, reclining, in a still bed of folded grass and thick green moss. The day is sweet and warm. The breeze is a caress. The sound of birdsong, and clear, silver water, laughing and trickling, wrap themselves around you, and enfold you. The wooded valley holds you, in the cup of tender morning light, spilling her heart of golden warmth upon you.

The sun is pouring down upon your face, shining and warm, golden and loving is this light, a light you are folded into, and have created, shining, pouring back up into the arch of heaven, spilling up from your glad face, and again down to fill you, the trees nodding as you dream them, the sky golden and warm as you have poured it—and back around—for it has dreamt you...now as the world, of the world, nourished and warmed, the circle complete, a round of golden warmth and light, spilling into the world and returning again, unto you, and again, you unto it...and all the world is eternal, safe, nourished and nourishing, a circle of happiness, pouring down and returning, warm and sweet, the circle glowing, life spilled round into warmth—and golden light.

And the sun does spill her heart of warmth and golden honied sweetness upon you, and from the open breast of your happiness, so safe and glowing, you return and love, this world, which has nourished you. Into the arch of heaven, your eye does turn, and cast your light aloft, pouring upward to fill the sky, and find, you are the sky, and this earth. In gratitude the sun does pour her heart tenderly back upon you, and return unto you, the warmth you have given, to hold and nourish your spirit, and gently cup you, within the giving heart which pours...and holds you, as warmth—and golden light."

One of the most pressing difficulties I faced was in attempting to deduce how one might maintain balance within the constant impact of the world's degradation, as it re-triggers the pathological epigenetic impressions. The answer is actually quite simple. Each evening one uses the above meditation, which one also keeps in mind continuously all day as a sort of undertone to one's thinking. I paired the image with a song, and hum it beneath my thoughts and as will be seen, that image

will serve many other functions within such daily activation. As one meditates upon the alpha function key each evening, the meditative focus will soon trigger substitutive expression of the healthy maternal epigenetic impression, in substitute for the pathological epigenetic expression previously triggered within unconscious processes. One may maintain their health thus, by utilizing this idea of epigenetic unconscious basis substitution.

Each day, you will awake refreshed with the circuit balance improved between the sympathetic circuit and parasympathetic. The meditation is itself security, permission to the mother and the identifications that implies. It is this vital and basic permission which human phylogenetic patriarchy has refused.

Next, we will learn a simple technique to make an automatic habit of accessing and using unconscious energies. Then, we may speak of a few things, and assemble the parts together.

The OEP

The Open Emotional Posture (OEP) is a reversing of the repressive habit which is itself the way neuroses are set up. The return of the repressed forms symptoms, so, we will defeat neurosis in several ways, each of which contribute to the goal of eliminating the symptomatic foundation of repression, which of course as you are aware, is based in ego structure. The OEP will be a tool used to train ego to distribute energies in a new way, and alter its structure from one of repressive gate keeper, to that of holding the door to the repressed open.

See my *The Tangible Self* for more detail:

General OEP instructions:

To establish the open emotional posture, first, the subject must find within themselves, a painful memory or thought. The closer to a real repressed thought the better, so the idea chosen must be deeply disturbing and sad, painful, so much so, that it is almost impossible to tolerate. This is akin to an unconscious ideation, although of course, much less painful. Allow the memory to freely enter the mind without resistance, and then, do not resist the feelings in any way, but instead, learn the habit of opening up to the pain, rather than resisting it. This will create the necessary conditions, and a piece of hysteria will emerge—*tears. That is the key.* If no weeping can be brought forth, the OEP has not been established. True pain, just as in every single unconscious ideation, is essential. The unconscious contains nothing but pain and suffering, so pain is the light we follow to the hidden depths. Soon we will change the state of affairs, but for now, know it: pain is the way toward the depths. Eg. As you think of the death, or the injury, the sorrow of failure, the suffering so great it can not be withstood, you now know, you will not resist but will become again, and will allow this suffering to emerge without restraint. Become open and unresisting. This and this alone—*is strength!* Soon, the tears will flow as water, the pain released and flowing down your shuddering cheeks, the salt and sorrow as drops of light flowing over your parched world, as rain and salt wept from a burst cloud, weeping in purity and light, never to resist again—Now, allow the pain to increase and increase, never resisting in any way—

Release—everything! *To withhold, is cowardice!*

Soon, after the flood, the pain will spend itself, the contractions allowed to come, never resisted, and then, the rain will slowly drain away, as mist and dew is our pain once spent. So allow it all, release this one pain and...*never resist again. Remain open, in just this emotional posture*, never resisting any feeling—ever! Allow all the world to spill out from within you and know it: emotion, affect, libido, is the energetic source of all thought.

One must take a sort of mental photograph of the emotional posture achieved in not resisting pain. That emotional posture is the key to the access of unconscious energies, health and pleasure. Beneath our pain, our pleasure lies hidden. Higher thought is powered by these lower repressed energies, which once permitted to sublimate directly into experience, permit one's ascension and pave the way toward a new and vital habit: the habit of always remaining open to all feeling, and that of using all energies directly, without restraint. Feeling is itself ethics. The connection to all things will bring you clear information, pleasure and pain in abundance that will guide you without fail toward the good. Once identifications are in place, the appetites one experiences are those of an active ethical appetite, libido (feeling, sexuality, caring) and identification are the basis of ethics. Feel everything. Resist nothing. Everything is yours. Only one thing is sure, only one thing is not a lie, you may feel—*everything*. It is this connection to the world and earth, to the mother, which you deserve most.

Concerning the OEP: The necessity of locating a painful memory and not resisting it is required only in so much as is initially needed to gain a clear mental image of the emotional posture of remaining open to all feeling. One need but use it for perhaps a few months until the feeling of remaining open is learned, and may be recreated exactly, sans pain. Pain will guide you to the depths, but once you understand and can replicate the emotional posture you may dispense with the painful inner stimulus. The feeling of becoming and remaining open, only that is required. Happiness needs no pain to find her once you know the way. Resist—nothing. Affect is consciousness. Use everything.

The alpha function circuitry is analogous to an oxygen scrubber in a spacecraft. It takes unserviceable energies which are toxic, and transforms them into usable libido which can be integrated within healthy personality and used as energetic fuel. One can utilize and transform perverse drive elements and memories, and directly use the somatic content, meaning the bodily impressions themselves, to power experience and reclaim the energies in health, allowing them to be utilized and their dissonant capacities reduced. Sexual abuses create drive structures, and if the abuses were if not overly violent the bodily impressions may be directly utilized to power perception, and through mid-level processes they may be re-dreamt, used to enrich experience and made nontoxic. The full measure of one's drives may serve one. Less abusive treatment may be reclaimed. Many may easily make use of these ideas and access their unconscious energies directly through transformative unification. These techniques will help some, but not all. Severe sexual trauma can leave scars which require techniques not stated here. Often, a standard psychoanalysis supplemented with other techniques may be needed in such cases. That having been said, many will find utility in what follows.

Once one becomes adept with the OEP, and the state is sufficiently well structured within the subject to permit it to be utilized for long stretches of hours in daily experience, and, the subject has gained the ability to keep the alpha function key engaged for those same durations, the following becomes possible.

In order to transform the valence of unconscious content without observing it and allow its energies to be transformed within a unified perceptual expression, simply proceed as follows:

1. Spend 30 minutes in quiet meditation upon the alpha function key.
2. Engage the OEP.
3. Reinvigorate the alpha function image by bringing it directly to mind.
4. Remain open and unresisting of your tears and happiness.
5. While maintaining the image as a background in the mind's eye (and ear should you have paired it with a song³⁰) look out to the world, now filled with feeling, and resist nothing. Tears are a part of libido, a part of happiness and sadness alike, a warm tone and color in the palette of life's affective riches. Allow the world to flow out from within you and spill itself back within to fill your eye and heart.

Variations of the alpha function meditation include but are not limited to:

Utilization of controlled breathing in 10 and 30 second timings for inhalation and exhalation. Biofeedback devices indicating heart rate variability are helpful in finding each individual's rhythms.

Secondary symbolisms with the identical meaning may be derived.

Those with sexual trauma who have access to the bodily impressions of the source experiences may proceed as above, with the following adjustments and cautions:

1. Spend 30 minutes in quiet meditation upon the alpha function key.
2. Engage the OEP.
3. Reinvigorate the alpha function image by bringing it directly to mind.
4. Allow the somatic sensations of sexuality to propagate directly into your mind and body without restraint or observation.
5. Closely observe the internal alpha function image. It will become brighter in time with the energetic timings of the somatic impressions.

³⁰ One simply imagines a beautiful melody with the image in mind through hours of meditation. The pairing is thus created by a process known as Hebbian Learning.

6. Look out to the world and behold—the libido is now fused into a unified reality, and you may freely use the drive and damage that is within you as a power source for perception and other sublimation and freely express its transformed, cleansed sexual energies. *However—*

7. Be cautious, look inward often to the image. Excessive excitation and brightness will lead to a painful collapse of the transformation and create symptoms. Terminate the OEP before the image becomes too bright. Some considerable amount of care will need be exercised to avoid painful symptoms created by the collapsed circuit from excessive energies. In a few weeks, enough energy, known properly as *cathexis*, will be spent, so that this caution may be left aside and the energies then used to power a host of burgeoning new mental abilities and energetic sublimations which will become available including most of all, the sublimations which are experience and perception themselves.

Again: Severe cases will need to go the full painful rout and handle the unconscious content directly, dig it out with therapy and perhaps a construction. Other methods will be disclosed to alter that situation after my death.

You will soon find something most unexpected. Affect, feeling, the source of consciousness itself within humans, fuels not only the poetry and fullness of each moment, but the wheel of art and intellect begins to turn of its own accord and all the world becomes—*interesting*. A fascination is she. Life is a fascination too warm and tantalizing to resist! All the world is a libidinal sublimation, and from within the warmth of the poet's eye, a new "I" does spring, and fascination makes play of what were heavy worlds, now no longer forbidden. Science begins to glow and purr with her intricate tricks, perhaps you might catch her, irresistible is she! What worlds call out for you to build them? The questions of happiness, the questions of the creator are now your wishes, your wishes—to know.

Some Possible Links Between Drugs and Violence.

Richard Lawrence Norman.

Abstract:

‘Conventional wisdom’ within the field of medical psychiatry as evidenced by a great many practitioners, is that mental imbalance is most effectively addressed with drugs. New demonstrably efficacious compounds are supported with studies and touted as a primary therapeutic interventional pathway for the treatment of illness. After study and direct observation, I have deduced several specific facts and relations which are not acknowledged within the current field of psychiatry and may constitute a surprising and consistent factor in the rash of unexplained social violence and rampage killings which have become so prevalent. The specific theory, sociopathic patterns, pathogenic etiology, neuroscience and psychology are revealed which underlie this new rash of social pathology.

Theoretic introduction. 5-HT and repression. The key Indoleamine—our unconscious gateway; of civilization, creativity and hell.

Today, we are in a unique position. For the first time in pharmacological history we have achieved a level of specificity which has hitherto been inaccessible, and many hands are to be shaken and bows taken. SSRI drugs have specifically targeted the reuptake of a single neurotransmitter, 5-HT (5-Hydroxytryptamine), and made a new level of neuro-chemical specificity, and individual targeted therapeutic activity available to millions. So, let us assess this new discovery, which I can attest by my personal experience, is most efficacious. As a sufferer of debilitating OCD for many years, you can rest assured in the knowledge that these drugs do work, and are effective in preventing the symptoms of OCD. Those who claim that these potent drugs are ineffective, and have no use or benefit, *are lying to you*. The drugs work. A skilled clinician, should you be lucky enough to find one, can prescribe them in the correct dosages to control your symptoms. Those will be high doses. Now that that is settled, you should also know another fact: Those studies [examine who funds studies] and sources, which claim these drugs are easily withdrawn, and the resultant symptoms are fairly short lived, most definitely and assuredly, *are lying to you*. Please know the fact: SSRI drugs administered in the proper high doses for disorders such as OCD over long periods, cause permanent damage to the repressive system—

Repression is 5-HT dependent (Norman, 2009, 2010, 2011, 2013, 2013a).

That dry statement, "Repression is 5-HT dependent," has consequences and specific implications, some unexpected, which have changed in ways both positive and otherwise, the entire landscape of psychology. Now, old and vital questions have been answered, and the question of the existence of unconscious fantasy (Talvitie & Ihanus, 2005) and its influence on behavior and the transference have finally been laid to rest (Norman, 2011, 2013, 2016, 2016a). First, I will begin with a general assessment of the specific ontogenetic manifestations and neuroscientific mechanisms

involved.

The various transformations of illness which parallel the reduction in repressive functioning as SSRI withdrawal occurs, are necessary symptomatic products of the return of repressed material to consciousness (Freud, 1896, p.170 [first usage of the phrase]), and demonstrate the common defensive and purposive mechanisms of neurotic and psychotic illness (Freud, 1896; Norman, 2010, 2011, 2013). The result is surprising, not because it supports the Freudian idea of all such illness being manifestations of defense rather than random imbalance, but, because the usual barriers which favor one illness over another, the "predispositional" factor itself, seems to have been cast aside (Norman, 2013). This is easily accounted for if we remember that this is an artificial neurosis/psychosis, not a typical one, and hence, must be assessed on its own footing. The mechanism by which it and its transformations are created, is clear: a relative reduction in 5-HT in the synaptic cleft due to the resumption of normal 5-HT re-uptake, and a resultant wholesale reduction in repressive function (alongside concurrent effects due to any physiological damage from extended treatment). With repressive function permanently impaired, what were predispositional influences favoring illnesses which are dependent upon high levels of repressive functioning such as OCD, are now exposed in their internal construction, repression peeled back, and the core of hysterical illness laid bare. The resultant hallucinatory hysterical psychosis, demonstrates little symbolic distortion of its reactive components, which may be assessed quite directly.

This psychosis, which can be reverse engineered to allow us access to undistorted unconscious content in some cases, has specific concurrent manifestations regarding perception. Repression and the unconscious have subsumed under their functioning, not only a temporally "passive" role (retroactively defining reality) *in relation to the level of perceived conscious input* of previous externally derived experience, functioning not only in the familiar role as a receptacle for containment, affective dampening, dynamic removal and allocation to experience of *preexisting* internal (interoceptive) unconscious stimuli such as memories and fabricated conglomerations such as unconscious fantasies via transference, but also an active one as well. This active real-time repressive function whereby all of perceptual experience has its energetic incoming presentation reduced, *actively repressed* in large measure into the unconscious *as it happens*, I have called: The Active Unconscious (Norman, 2010). Although the concept was conceived before I read the Freud, this is a more functionally connected and useful extension of Freud's stimulus barrier (Freud, 1920, p. 27). This reduction in the ability to partly repress the full force of *external* experience (exteroceptive increase), which runs in close tandem with the concurrent loss of ability to repress the influence of our *internal* perceptions stemming from the unconscious (interoceptive increase), form the full measure of repression proper, and are inexorably joined, rising and falling together in their level of functioning in direct and dependent relation to the increase or decrease in systemic levels of 5-HT.

There is ample neuroscientific evidence to support and explain this mechanism, by virtue of which I myself have been transformed from an extrovert who wanted only more and more intense stimulus, performing before larger and larger crowds, into an introvert, a man who is overwhelmed by natural beauty, weeps openly and often, and

feels a sunbeam on his flesh with the same shuddering amazement I used to gain only by way of the most extreme and daring behavior. It is as if the very most basic and fundamental of psychical relations has been altered, and not in any subtle way! The idea that SSRI drugs are specific in their action, is both laughable, and utterly mistaken. These drugs target one of the most evolutionarily ancient systems in the brain, as is evidenced by the central location of the serotonin producing nuclei, which dispense 5-HT to no less than 15 receptor types (Panksepp, 1998, p.111). The list of behavioral functions which *do not* involve brain serotonin is quite short, and can be represented by a single digit: Zero. Yes, 5-HT is so basic, its functions so diverse, we can say: 5-HT is involved...*in everything* (Panksepp, 1998, p. 103). The psychical effects of serotonin depletion and supplementation are no mystery, and neither are its general systemic effects:

Jaak Panksepp, founder of the burgeoning discipline known as Affective Neuroscience, has made one of the most profound, direct and reliable contributions to our knowledge of human and animal neural affective dynamics, from both evolutionary and biological perspectives. This careful and detailed researcher, has by way of experiment and observation come to certain conclusions about the role of brain serotonin in brain processes and behavior.

Firstly we read in Panksepp (1998) [citation form altered]:

"There are good reasons to believe that this system mediates a relatively homogeneous central state function. All motivated and active emotional behaviors including feeding, drinking, sex, aggression, play and practically every other activity (except sleep), appears to be reduced as serotonergic activity increases (Coccaro & Murphy, 1990; Jacobs & Gelperin, 1981) (Panksepp, 1998, p. 111)."

The fact that 5-HT has *some* receptors which increase anxiety, is in my view, not at all inconsistent with the role of 5-HT mediating repression, as anxiety is in many cases the causal instrument by which repression is instated (Freud, 1926; Brenner in Rickman, 1957; Norman, 2010, 2011). We read a general description of the effects of brain serotonin on mental stimulation of both interoceptive and exteroceptive origin, which makes some good sense of the relation between 5-HT and repressive function both "passive" and "active" as previously described. Description from a diagram of 5-HT pathways (Panksepp, 1998):

"Serotonin. Function: reduces impact of incoming information and cross talk between sensory channels" (p. 107). As to the resultant behavioral modifications when brain 5-HT is reduced, (which closely parallel those of REM deprivation): ". . . such animals are behaviorally *disinhibited*: they are more active, more aggressive, hypersexual, and generally exhibit more motivational/emotional energy. . . In short, they appear to be manic." (p. 141).

And lastly, we read:

"In general, it seems that one higher cerebral function of brain serotonin is to sustain stability in perceptual and higher cognitive channels. When this constraint is loosened by a global reduction of 5-HT activity, the probability of information from one channel crossing into another channel is increased. Thus a mild reduction in brain serotonin activity may be an important ingredient for the generation of new insights and ideas in the brain, while the sustained reduction of serotonin might lead to chaotic feelings and perceptions, contributing to feelings of dis coherence and mania.

In sum, perhaps it is this loosening of sensory-perceptual barriers between different brain systems that characterizes dreams, hallucinations and the florid phases of schizophrenia, as well as normal creativity. . . it is worth noting that just as low brain serotonin characterizes the dream state, it also promotes heightened emotionality, both positive and negative. It is a neurochemical state that leads to impulsive behavior in humans (Halperin et al., 1994; Linnoila, et al., 1983; Roy et al., 1988), even ones as extreme as suicide (Asberg, et al., 1976; Brown et al., 1982; Coccaro, 1989). Probably the most striking and replicable neurochemical finding in the whole psychiatric literature is that individuals who have killed themselves typically have abnormally low brain serotonin activity." [Panksepp, 1998, p. 142]

I hope the exact and full implications of this statement are becoming more clear: "Repression is 5-HT dependent." In less technical language you can imagine brain 5-HT, its particular manifestations and effects to be better summed in this less precise but more descriptive phrase: 5-HT is the lid on hell. So now that modern pharmacology has removed the blinders, and allowed us direct access into the forbidden ugliness which is within all mankind, this hidden fuel of his ascension and decline, for all of sublimation and depravity are found within this secret—*let us look*. We will see the main of Freudian theory, this hideous and unflattering picture of inner reality... is essentially correct. However, the situation does not unfold quite as the effects do with animals, and indeed, an SSRI withdrawal subject would wish for a blessed mania to quell their pain, for unlike animals, we have super-ego, and super-ego is masochistic, as a punitive garrison set up within personality (Freud, 1930, pp. 123-124; Norman, 2013a). When we add a punitive super-ego wish to an id wish with reduced repression we have the exact description of the dynamic which creates hysteria proper (Freud, 1915, pp. 180-185). I hope it is now becoming clear to the reader, why, SSRI withdrawal encourages *hysterical hallucinatory psychosis*.

Drugs and Murder – a possible link:

We are in an age which is fraught with change, some positive and some less so. It seems as if the basic fabric of our culture has torn, as if a qualitatively new and distinct rash of horror and criminal activity has overtaken this age and defined it: the rampage killing, a new sort of crime which appears to defy explanation, but do be sure this is false, and an explanation is at hand. Indeed, these crimes are nothing if not utterly predictable. I will offer up my theory as to the psychological mechanism involved here.

So what has changed? Why are there so many rampage killings, now as never before

appearing with such alarming frequency, school shootings, mall murders, movie theatre massacres and the like? There have always been guns in our American society, always so very many guns, but no, these shootings and murders are appearing on a scale never before seen. Ergo: the mechanism must lie elsewhere. There have been neglectful parents and bad children throughout history, so very many bad parents and ugly mean spirited children, but no, these crimes are so tragic and only now, so prolific, so violent and today so much more frequent. Ergo: the mechanism must lie elsewhere. The answer is, although belatedly, becoming clear. I will list but a few cases with partial pharmacological histories and then analyze the connecting factor:

John Shick, 2012, age 30, killed one injured six, was shot by police. Nine different anti-depressants were found in his apartment.

Hammad Memon, 2010, age 14, Shot and killed a student at school. He was taking the SSRI Zoloft.

Christopher Wood, 2009, age 34, cut and shot his wife and three children and committed suicide. He was taking the SSRI Paxil.

Jason Montes, 2009, age 33, killed his wife and shot himself. He was taking the SSRI Prozac.

Steven Kazmierczak, 2008, age 27, killed five, wounded twenty-one then killed himself. He was taking the SSRI Prozac.

Jeff Weise, 2005, age 16, killed his grandfather, grandfather's girlfriend, then drove to the high school, killing seven, wounding five and shooting himself. He was taking the SSRI Prozac.

Doug Williams, 2003, age 48, shot fourteen co-workers, killing six before turning the gun on himself. He was taking the SSRI Zoloft.

Eric Harris, 1999, age 18, along with Dylan Klebold, age 17, shot and killed twelve students and a teacher, wounding twenty-six others before killing themselves. Harris was taking the SSRI Luvox; Klebold's medical records are unavailable.

Kip Kinkel, 1998, age 15, shot his parents to death with a rifle, went to school and open-fired in the cafeteria, killing two and wounding twenty-five. He had been taking the SSRI Prozac.

So let me state at the outset that nothing could be more puerile, reactionary and short-sighted than to condemn an entire class of worthy drugs which are potentially so beneficial, like SSRI drugs, of which Prozac is the most prominent representative. When properly prescribed these drugs do vital and good work. However, these drugs work in specific ways which entail risks. These risks are utterly predictable and have largely been ignored. Do note the similarity in behavior connecting the above mentioned crimes which all entail a violent outburst and then, in many cases end in death by police or suicide. This pattern is created as a psychological function of the neuro-chemical effects of SSRI therapy, tolerance and withdrawal, as these factors interact in specific and predictable ways. Although websites such as SSRISTORIES.COM

and the Citizens Commission on Human Rights website at cchrint.org offer information correlating these crimes with SSRI use and withdrawal, there is not enough information specifying the psychological mechanisms which yield these behavioral effects. I will offer a general analysis of those mechanisms here.

Conscious vs. Unconscious: To understand these factors, we must first understand the basics of unconscious psychology. When an external threat is perceived, we run away or fight. However, the situation is different if the threatening factor comes from within us. Our own ideas, memories and thoughts can be every bit as dangerous to us, and to society, as an external enemy. As we grow up, we learn to control our aggressive and sexual instincts. These ideas and instincts are never truly gone, and can be seen to "reappear" in certain circumstances, such as under conditions of painful deprivation, madness and war, where every murderous human instinct can be seen to reemerge. These instincts then, have never disappeared, rather, they have been repressed, and made unconscious. Society is built upon the bedrock of repression and the unconscious. Psychology informs us, that as these internal instinctual threats return to consciousness, we become ill. In the language of Freudian psychology: symptom formation is a function of the return of the repressed.

I have discovered that SSRI drugs positively affect mental processes by reinforcing repression: repression is 5-HT (5-Hydroxytryptamine) dependent, and SSRI drugs increase 5-HT in the neuronal network by preventing re-uptake of the neurotransmitter in the synaptic system. [I will refer you to the latest edition of Goodman and Gilman's *The Pharmacological Basis of Therapeutics* for a complete description of the neurochemistry involved in the effects of SSRI therapy.] By increasing the amount of 5-HT in the neural system, and preventing the repressed from entering consciousness, they quell mental illness. However, as is the usual case with drugs, tolerance develops and functions as partial withdrawal, and, many patients do, in fact, withdraw from these drugs. In this instance, the effect is reversed, and repression is circumvented, allowing unconscious material to enter consciousness. So the drug that helps by way of reinforcing repression, causes illness as repression is reduced by way of tolerance or withdrawal.

This reduction in overall repressive function manifests itself as an unusual artificial hysterical psychosis, where both aspects of repression are circumvented, amnesia, and distortion via compromise-formation symbolism. If the dose is high, and the term of treatment long, upon withdrawal the effect is severe. In delusion, the psychotic is afforded a level of protection, as his delusion is a sort of distortion, a symbolic transformation of the wishes and/or mnemonic experiences which are returning to consciousness and creating his illness (Freud, 1911, pp. 1-82; 1924, p. 151). Now, in SSRI withdrawal, even this most basic protective function of dream and delusion is defeated, and the most energetic and severe of unconscious material can gain direct and unfettered access to consciousness, free from any distortion. The effect to the ego is absolute and certain: damage of the most severe sort. Super-ego/ego is directly exposed to the most toxic unconscious contents, and its repressions further disintegrate, further revealing the very most energetic and highly disturbing hidden ideations. Sleep, in some cases, may be curtailed to as little as three hours or less a night. Soon, hallucination completes the picture, and a new sort of even more dangerous and severe psychosis is seen to emerge.

I will briefly traverse a secondary avenue of interest before completing the picture. Although the technical, psychological and medical information associated with these drugs is substantial, the fact that repression itself is affected to create behavioral effects has been utterly ignored. *The fact that repression is 5-HT dependent has not been articulated.* The result is clear: as repression is decreased through SSRI withdrawal, two things can be counted upon:

1. A mental illness, whatever its relation to repression, be it defined by the deepest repressions such as OCD or not, *will* be converted into an hysterical illness as hysteria is formed through the return of repressed unconscious contents under *low levels of repression* (or I postulate *perhaps* trigger the emergence of schizophrenia if the subject is predisposed). That is why hysterics demonstrate conversion hysteria, a bodily innervation of opposing wishes, in lieu of more typical repressive means (Freud, 1915, pp. 184-185), or anxiety hysteria, a common hysterical reaction in children, who have yet to develop a high level of repressive function (Freud, 1909, pp. 1-149; 1915, pp. 182-184).

2. As hysterical illness is formed through SSRI withdrawal, the job of analysis is made much easier, as unconscious ideations which are pathogenic are more easily accessed (Norman, 2011). It should be noted that these contents are likely to reveal themselves as negative transference, which although shunned in modern analysis, is in fact the key to un-riddling the puzzle.

Now we must add but one more bit of information and the analysis will be clear. Our aggressive drives are deeply repressed. These drives are repressed as a function of conscience, of guilt and super-ego, which acts as a conscious "reaction formation," an opposite which fills up consciousness as a replacement, a substitute for the repressed drive (Freud, 1923, p. 56). Sadism, violence used to control an object with no concern for that person or object, is chief among those drives we repress. The unconscious is filled with sadism. When we add guilt to a sadistic stream of great force and potency, the sadism "turns round" on the subject and becomes masochism, the chief representative of the death instinct (Freud, 1919, pp. 193-194; Norman, 2011, p.116).

Guilt + Sadism = Masochism. Now the analysis is plain:

A mentally ill person is placed on SSRI drugs that function to enforce their repressive facility which is failing and creating illness as their overly potent repressed drives return to consciousness. Soon the drug fails to maintain its effect as tolerance ensues, or, the subject withdraws from the drug. Now, repression is defeated, and unconscious content becomes conscious in its most toxic, direct and uncensored form. The subject identifies with his sadistic thoughts which present with such energetic force, as to be utterly irresistible. Once his hatred is spent, the guilt he feels for his actions is revealed, and added to his freed conscious sadistic drives to form masochism, and suicide, often suicide by way of police intervention. The psychology is utterly obvious, and, predictable. (Of course, the more likely result is suicide alone, and the above mentioned pattern of behavior is formed in those cases where sadistic ideation has obtained an energetically predominant place in the mental architecture).

Now imagine the combat veteran, trained in the art of killing, he returns to our shores, a hero, but ill for his service, ill for the guilt of killing. He is prescribed an SSRI drug, and feels better. Soon he tires of the debilitating side effects, and discontinues

therapy. Can you see it? What will become of him then? What will become of us? If you are taking one of these drugs, I urge you not to stop. If you do stop, do it slowly, so very slowly, and be careful. These people who kill are not so different than any of us, in fact, any of us could be one of them. Although perhaps differing in intensity and proportion, all of us have these drives... every single one. The only difference is that we can contain them, and can not see them, can not see this part of ourselves. Perhaps the only real difference between one of these killers and one of us, is a misfortune of human honesty, in that they, are unfortunate enough to know a little too much—of themselves. So when you wonder what separates a mad killer from one of us, you may be surprised to learn the difference may be as small as a single question - a question, of human honesty.

Concluding remarks:

The pharmaceutical industries and their lobbies spent ~\$235,107,261 in 2015 in support of their interests. These financial giants pour many millions of dollars into advertising and costly informational distribution aimed directly at patients and physicians. However, the number of well funded studies examining the long term effects of SSRI treatment are scant. Not surprisingly, the result of studies which have been conducted are in keeping with my personal findings and research, and indicate permanent damage associated with SSRI use in depression (El-Mallakh et al. 2011). Other trustworthy researchers and doctors have found the same (Breggin, 2011). To my knowledge no studies are available detailing the long term damage associated with the very much higher doses used to treat populations with OCD. Two of the most widely used drug types in the treatment of mental illness, antipsychotics (including the newer ‘atypical antipsychotics’) and SSRI drugs, have both been scientifically demonstrated to cause permanent damage: tardive dyskinesia and tardive dysphoria respectively. The consequences extend past the personal lives of those affected, and influence society at large. Therefore I wish to suggest these possibilities:

1. Studies which are not funded by the pharmaceutical industries must be conducted which spell out the frequency and level of damage incurred through *all the SSRI dosage levels currently advised in treatment regimens for all conditions and populations treated*.
2. That information should be *actively distributed* to patients and doctors and included in product advertising and labeling where it is made plain in large typeface.
3. Serious consideration must be paid to new approaches which allocate potentially damaging drugs a safer place as a third tier treatment option, and serious consideration and priority given to other more healthful modes of treatment such as talk therapies and others, which may then replace potentially harmful drugs as primary first tier interventional tools in the treatment of mental disease.

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Mind Body Syndrome—the unconscious constellation: Condensation, abreaction and dissociative-repression in the genesis and disbandment of *Tension Myositis Syndrome*

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Abstract:

Mind Body Syndrome, a generally unrecognized diagnosis founded by Dr. John Sarno under the name of *Tension Myositis Syndrome*, is characterized by a perplexing conflagration of painful symptomatic complaints expressed by patients, which are unaccompanied by any current active demonstrable organic basis. Instead of the expected physiological explanation, a positive correlation was demonstrated between the *emotional* state of the patients and their manifestations of pain, with anger playing a key part in this surprising result. Methods of cure have been offered by those such as Dr. David Hanscom, which although effective in those cases where the patient will fully engage the treatment regimen, seem to offer many patients no real viable explanation in which they can stake their hopes of cure. It is the aim of this paper to provide by example and analysis, a clear and substantial, if schematic explanation, of the basic modus operandi of Mind Body Syndrome on both the psychological and neuroscientific levels. To accomplish this, we need but look to the cultural history of rite and ritual, and, the history of psychology itself.

Introduction:

In response to a request from a good friend who was suffering chronic back pain due to a job related injury, I began to research the subject of chronic pain. To begin my researches, I read two books, *The Brain That Changes Itself* (Doidge, 2007), and *Back in Control* (Hanscom, 2012). The first book, written for a popular audience, *The Brain That Changes Itself*, by Norman Doidge (2007), was better than I had anticipated, and offered much interesting neuroscientific information in an easy to read form. I quickly derived a series of exercises based on Hebb's law (that Freud had derived some sixty years earlier as the law of "association by simultaneity" (Doidge, 2007, p. 334)), to desensitize my friend's shoulder by redirecting the attentional mechanisms, which are as it turns out, engaged in a preemptive fashion not unlike an anxiety hysteria phobia: with the pain impulse taking the place of the conscious substitute for the ego dystonic libidinal wish to be avoided, and movement, now paired as a preemptive indicator, taking the place of the phobic anxiety structure. A dissociation can be introduced into the pairing of motion, attention and pain, and the movements desensitized. How clean, easy and neat! A small victory if this should work, the entire problem left as yet undiminished, but a victory nonetheless. I deemed the approach worth a try, and eagerly awaited the next book which seemed even more likely to contain relevant information, as it was written by a spine surgeon, who had overcome a case of OCD by way of cognitive behavioral therapy (CBT), and meditation. Having myself defeated a case of OCD by way of self-psychoanalysis, I believed this next book must contain much that I could understand which would be of worth. I was right, but not in the way I had anticipated.

The second book, *Back In Control*, by David Hanscom (2012), seemed at first to be a

disappointment. He advises cognitive behavioral therapy in all its simplistic, shallow glory, as a cure for *chronic physical pain*! All the book seemed to have but one substantial message stated over and over again: Those who write their negative thoughts out, and work with these thoughts, heal, and those who do not, suffer. Write and heal—fail to write, and suffer. Emphasis is also placed on feeling victimized, anger and anxiety in connection with creating physical pain. As an explanation for this inexplicable effect, we are offered what at first appeared to me as sheer and utter nonsense about the rewiring of pain circuits, as in the former book, which in this case seemed obviously not to be the mechanism of cure. Here we are doing cognitive behavioral therapy, not rewiring pain circuits! I was offended, and wished to return the book. I soon understood myself and the situation better, and rather than spitting the book out as a matter of arrogant defensive reflex, decided that I should pause.

Here is a highly intelligent, competent and educated man, *a top surgeon*, Dr. David Hanscom, who has taken his time and sacrificed his very privacy, deeply, to provide this information. He has cut into many people in surgery, has seen the result, and knows something. His integrity and intelligence are beyond doubt, so let us assume that he is right, that Mind Body Syndrome exists, and see if we can discover the real *modus operandi* behind the fact that those who write and have chronic pain heal, and those who do not, suffer. The idea in question, *Tension Myositis Syndrome*, or, *Mind Body Syndrome*, was first proposed by Dr. John Sarno, who found that many of his patients demonstrated little correlation between their pain and their current state of physical injury. He instead, found a correlation between their pain, and their *emotional* state, with anger playing a key role in the creation of perceived physical pain. Dr. Howard Schubiner has also advanced our understanding of this phenomenon under the name of Mind Body Syndrome. Dr. Schubiner appears to have subsumed the entire of hysterical symptomatology under the moniker Mind Body Syndrome:

<http://www.unlearnyourpain.com/blog/mind-body-syndrome-contagious/>

I believe this is mistaken, and that the syndrome is a taxonomically distinct disorder which stands in clear and direct relation to hysteria, as a sub-type. Although the ancient, precise and useful diagnosis of hysteria has recently been abandoned and replaced with a less well-grounded group of less precise terms (Feinstein, 2011), those in the know have never ceased to use this concept, hysteria, to rightly define the familiar psychical dynamism of opposing wishes (Freud, 1915, pp. 181-185) which cause hysterical symptoms. For this reason, I will define Mind Body Syndrome as a sub-type of hysterical illness which is characterized by a precise etiology whereby preexisting painful bodily manifestations originally of somatic/organic origin are reinvigorated solely by means of an increase in the cathexes of secondarily associated (condensed) psychical determinants.

Although it was not as profound in its symptomatic expression as many cases, Dr. Hanscom was in severe pain from his OCD, grabbed onto his therapy of choice wholeheartedly, and it worked. Likewise, we see that in cases of OCD, CBT does work, although in more severe cases it must often be supplemented with drugs (Doidge, 2007 p. 174), which counter to Dr. Doidge's assertions concerning the work of Dr. Schwartz, indicates to me, that the cure is a surface one, unlike a psychoanalytic remedy which requires no such additional chemical assistance, as

psychoanalysis roots the entire matter out, rather than simply enforcing a state of repression. The picture drawn out in Dr. Doidge's book concerning the work of Dr. Schwartz, OCD and CBT looks far too rosy and simplistic. I will support this assertion further, later in this paper, and will state here at the outset: The OCD sufferer has a particular imbalance in the energetic content of his unconscious store, which is hyper-energetic, and consists of regressive sadistic and masochistic ideations, and other fixated pathogenic mnemonic and affective content. Having suffered of this condition, and cured it via self-psychoanalysis, you can be assured of my statements in this regard, as a secondary effect of discontinuation of the SSRI drugs which were prescribed to treat the *symptoms* of the disorder, was to permanently damage the repressive system the drugs used to reinforce. Please note: repression is 5-HT dependent (Norman, 2011). Now that the repressive system has been damaged, ideations which were once unconscious, are now, in my case, often available to direct conscious examination. This loss of unconscious functioning, along with a shattered foot from a motorcycle wreck, put me in a perfect position to solve the riddle. In my case, what should be unconscious is now conscious, and so, I can assess the results of sudden physical pain and symptom formation on both a conscious and unconscious level simultaneously. In this way we may discover exactly how Mind Body Syndrome is created, and why one who writes, and engages in cognitive behavioral therapy and meditative practice may indeed defeat this disorder, and why, this makes good logical sense. If there are real pain circuits developed in this mysterious disorder, exactly how is this accomplished?

Condensation and symptomatic genesis: pain as symbolic nucleus:

What is an unconscious ideation or thought? It is not mysterious or nuanced...it is ugly. The appearance of nuanced, subtle unconscious activity, this sheer illusion, is brought about by the *distortions* which hide the unconscious ideas as they are symbolically expressed (Freud, 1900, pp. 143-144, 506-508, 595-598). What we see is not nuance, or even less, "subtlety," *hardly*...what we see is confusion, distortion, brought about by the *means* by which unconscious ideas are expressed: symbolism. Symbolism is created by way of condensation—the addition of many energetic unconscious aspects, called determinants, onto a single symbol in order to provide that symbol with enough energy to be represented in consciousness (Freud, 1900, p. 330, 595). Mind Body Syndrome is created as a function of condensation and somatic response, just as any other symptom. Please remember as you read the example below that all of psychoanalysis gains its efficacy because unconscious ideas and thoughts affect our conscious experience. So in normal cases, even as a full or partial repression is sure to shield the ugly reactions which are obvious in the example below, the effect is in the main identical, as the repressed ideas will affect all of conscious experience by creating symptoms. The intensity of the linguistic expression has been greatly muted so as to allow what would ordinarily be unconscious ideas to be represented within the bounds of civilized discourse. Simply increase the intensity of the expression below some one hundred times to gain a more real representation of the intensity of the unconscious aspects which have been freed to consciousness from SSRI withdrawal.

Having shattered my foot in a motorcycle wreck to the extent that no bone fragment existed large enough to secure a screw, the foot was reassembled and reconstructed using only wire, and I reclaimed its function by walking and hiking 10+ miles each

day, and still do, come rain or shine. However, there are sudden sharp pains which will sometimes shoot up the leg unexpectedly. My reaction to these sudden pains, which are unexpected and severe, is uniform, and uncontrollable. The responses: instantaneous and involuntary. These responses should be unconscious, and allow us a clear window into the unconscious processes, so we can watch as the central kernel of what would surely become a case of Mind Body Syndrome is formed. I hypothesize the full syndrome itself needing but one or two more elements to be created in earnest:

I will be in a fine mood, whistling and humming as I do when I walk on a lovely day, and then, the sudden sharp shock of pain—"Ahhhh!" And I raise my fist to the heavens, as if threatening "God," or "Fate," but I am an atheist and know there is no god or fate. My immaturity is uncontrollable, a symptom of the first order can be observed as it forms, a symbol has been condensed, its determinants no longer repressed into the unconscious but available to see, and I shout madly at the sky, "You *&%%*&^ pig! I have been raised as a dog is raised, my words ignored, my music left as worthless filth upon the dirty ground, my father stolen and replaced with an ape to punish me, my music wasted, *wasted*, spent on the stupid and the deaf, and my words, my words too, are they to be read, read by the blind!? Buy my work, PIG! Honor my music, read, read you *&(^&)* pig!! *Now, this, this pain too, now, you hurt me again, more pain, for what??* I will cut you to pieces and kill you! I will kill you myself! The blade is put to *your* eye! Ha! The abuse, my father, my work, my music, my world—is pain!! I hate you! Fear me, fear me, fear...me! *ME!* Know FEAR—you limp, worthless *filthy pig!*" Although muted and bland, this dull rendition of my highly pointed fit, may allow us to see the process of symbolic/symptomatic condensation as it occurs, revealing Mind Body Syndrome to be a symptom like any other, a conclusion with far reaching consequences.

The result on a somatic level is an isometric tension of every muscle group now vibrating in tension against every opposing muscle group. The neurological picture by my estimation is one of noradrenergic balance predominating, and dopaminergic activity, libidinal activity with its attendant anesthetic component, at near zero. (The idea of overall noradrenergic vs. dopaminergic neural balance associated with certain primary limbic/orbitofrontal sympathetic and parasympathetic brain circuits, is a concept introduced in my "Who Fired Prometheus" paper (Norman, 2013), as well as a post on BlogIQ:

<http://blog.theultranet.com/2013/08/a-hypothetical-relation-between-repressive-dynamism-and-parkinsonian-onset-the-factor-of-sympathetic-.html>

and are further defined in a paper on *re-polarization theory*, published in *The Journal of Unconscious Psychology* and also archived here:

Norman RL. Re-Polarization Theory: From Native Psychoanalysis to Sublimation—The Practical Reconstruction of Modern Personality. *The Journal of Unconscious Psychology* and Self-Psychoanalysis 2013:
www.thejournalofunconsciouspsychology.com
https://www.researchgate.net/profile/Rich_Norman/publications

Psychologically, the symptomatic construction is an obvious condensation which

reveals a surprising and informative result: the pain was merely a trigger, a nexus around which a symbolic condensation could take place. The pain became a symbol, and to it was attached in but fractions of a second, every similar, painful, unjust determinant from my past. The intensity of my reaction in all of its destructive necessity was determined not as a function of the sudden pain around which my response coalesced, but as a function of the preexisting EMOTIONAL pain and anger which was already present in the mental system. *Guilt and impotent rage are clearly primary.*

So, our reaction to pain, both emotional and somatic, is in the main, determined *not by the pain, but by the past*. Every energetic past determinant condensed onto the symbol, and gave the sudden shock of pain a terrible increase in its energy, providing it a guilty symbolic meaning from many sources at once, and hence, the conclusion can be drawn: The destructive effects of Mind Body Syndrome are attributable to the process of symptomatic and symbolic construction, whereby a painful stimulus is redefined symbolically, and its energy increased by way of condensation. To this, one must simply add the *chronic* element (Hanscom, 2012, p. 6), and the conditions for *deeply reinforced* Hebbian learning have then been satisfied. I.e., if the situation were repeated many, many times, the pairing of each past unconscious determinant with its symbolic representation in the physical pain, would be reinforced sufficiently to create Long Term Potentiation (LTP) in the neuronal system: the product of a repeated pairing—*learning*, at the neuronal level (Gazzaniga et al., 2009, p. 357, 358, 362). Here we have the mechanism whereby the actual memory of real physical pain will be triggered by emotional causes.

The situation is now revealed without any mystery: we *should* see exactly what we *do* see: the brain in such cases demonstrates a pain response both learned and real, real pain, identifiable in an MRI as exactly that (Hanscom, 2012), is now caused by the actuation of the pain circuit entirely by emotional triggers. Carla Shatz summarized Hebb's law in the phrase: "Neurons that fire together, wire together." Once a Hebbian pairing has been established, in my work with re-polarization theory, I have found over and over, that a *nondirectional neural pathway* is always evidenced, by which I mean, once established, causality can trigger the pathway from either direction—which in terms of our current example indicates the pairing can be energized either from symbol to determinant, or, from determinant to symbol. The pain should therefore, once triggered by a determinant, correspond to that found in the initial onset of symptoms, as it so often does (Hanscom, 2012, p. 7).

Guilt, super-ego and simultaneous masochistic identification:

Although I muted the presentation of the determinants, which would in the normal case be unconscious, I was careful to use substitutions which preserved the symbolic meanings. The only exception is the word "pig," which in every case was not actually used, instead, a most unflattering term associated with the ancient Greek figure Baubo is rightly indicated by this substitution. As you review the material and assign the proper meanings to the determinants, you will see that little distortion or disguise is present, and the analysis is plain. The fist raised to Fate or God is just as one would expect, a displacement so obvious it is detailed and made plain within the symptom itself! As is so very usual, the idea of God or Fate is but a projection of the parents (Freud, 1930, p. 126). These resentments are so very old, and hence, so very potent!

The frustration which always plays such a prominent part in the formation of neurotic symptoms is at the fore (Freud, 1912, p. 231). The *root complex* is Oedipal, the hatred slightly askew from the normal, which usually falls entirely upon the father (Freud, 1931, p. 235), my case placing the blame for castration also upon the mother, as my "delightful" stepfather was added later to the family at her request, my kind father cast aside in his favor. The other complaints about my work being ignored are simply more current incarnations of these old wounds, my expectations of being acknowledged in my unresponsive family now displaced onto an indifferent world, from the initial object of an indifferent parent. The comment about "the blade put to your eye," and the bluster about "Fear Me," as well as the unflattering term used in place of the word pig, are typical reversals of the passive into the active. These reversals are reactions formed against the castration threat wielded phylogenetically by my constantly raging stepfather, which again, is hardly concealed at all. Now, we can deduce the common elements so poorly hidden in the example: This impotent rage is rage primarily against infantile objects, and so, carries both a deep and highly energetic cathexis, and a primary attachment to super-ego, which is an introjection of those parental objects (Freud, 1930, p. 129; 1939, p. 117). Super-ego, in turn, is formed around a kernel of masochism, of guilt, as we have seen in the Freud (1930), and, in a paper available for download at—

www.thejournalofunconsciouspsychology.com

as, *Who Fired Prometheus?* (Norman, 2013). The conclusion is clear—there is a *core of guilt* in these cries of victimization. The victim, however just and right his cause, always suffers damage to his self-belief and knows, however erroneously, that he himself is somehow to blame. This, in our example, is a function of the *quantitative* excess of feeling as it plays out in the stage set by our historical evolution, as my *Prometheus* paper and the Freudian theory spell out. So beneath the sadistic outer structure of the tantrum, is a deeper level to the symptomatology expressed—guilt, and so: masochism (Freud, 1919, pp. 193-194; Norman, 2011, p.116). The symptom is in part, a punishment. *The sadism is redirected against self* into a fit most painful and physically damaging. As super-ego is formed through the process of introjection, beneath the appearance of an imaginary object under derisive sadistic reprisal, *is a concurrent identification of self as an object worthy of sadistic reprisal* (Freud, 1930, p.129)—the symptom itself a guilty masochistic expression, a self-punishment, as is typical in many hysterical, some schizophrenic and most examples of obsessive symptomatology (Freud, 1905, p. 122; 1911, pp. 1-82; 1915, pp. 181-185; 1923, p. 55; 1930, p. 139).

So I hypothesize that guilt has a prominent role to play in this syndrome... perhaps, a central one. The symptoms of pain may in some part be created to satisfy the guilty demands of conscience. This strange statement is not so impossible and obscure as it might appear. To see the intensity of my reactions, and how this presupposes me to develop this syndrome is to ask, *why have I not contracted Mind Body Syndrome?* As a former obsessive with a plethora of wounds from my upbringing I should be a prime candidate. Go to this address from Dr. Schubiner's "unlearn your pain" website to assess your personal vulnerability:

http://www.unlearnyourpain.com/images/upload/deciding_if_you_have_mind_body_syndrome.pdf

Was the chronic period of pain insufficient in duration to create LTP? Perhaps. However, I believe the answer lies elsewhere. I believe, that I surely would develop the syndrome, but for my self-psychoanalysis, which has restructured my personality. The factor of guilt, had in the main, created my OCD, and to cure the disorder, the guilt was removed. I believe it is the absence of guilt, along with the most severe reduction to the toxic cathexes associated with my unconscious content which is responsible for my not developing the syndrome myself.

To see the intensity of my responses is to raise an eyebrow or two at this last statement, but it is precisely this which is my point: The unconscious of the obsessive in every severe case, is filled with the very most hyper-energetic unconscious content. The obsessive is sick, as a function of his hyper-punitive super-ego, which by way of guilt, represses his unserviceable unconscious content, that in the main, is comprised of various proportions of sadistic wishes, death wishes, masochistic wishes, and perverse developmental formative material; a condition which if left unattended, leaves the sufferer progressively more and more ill, until he is no longer able to function (Freud, 1915, p. 156-157). The level of hate in the unconscious of an ethical man, is far greater than the level in a less developed man (Freud, 1923, p. 54; 1924, p. 170). Repression is the key to the culling, which forms the ethical facade we demonstrate. To know first-hand, the fantastic amount of sheer hate and sexual energy in the mind of the OCD sufferer, is to know, this symptomatic cluster: obsessions and rituals of protection, purification, doing and undoing, avoidance and penance, are products of "symptomatic necessity." By this I mean, that to disband the symptom, is to create little advantage for the sufferer. If the case is severe, the cause remains, and is now, no longer alleviated by the partial energetic discharge allowed the repressed wishes by the active symptomatic structure (Norman, 2011). The obsessive, once deprived of his obsessions, is still quite ill. The unconscious content will be like a hungry dog, waiting for its chance to attach onto a trivial bit of unattended material and form a new symptom. If not, the drain of repressing such highly energetic stores of ego dystonic cathexes is equally certain—the subject with severe OCD treated with CBT will need use all his energy just to maintain the repressions, and life will be left with little libido to grace experience (Freud, 1908 p. 193, pp. 203-204). *One would be constantly on watch for the formation of new "negative/obsessive thought patterns,"* as the cause, has never been addressed, the treatment being centered around removing the *effects* instead. For the sufferer of severe OCD, I insist, only a full psychoanalysis will cure him...the drugs and therapies which lie short of this most severe remedy, are but a thin tattered bandage to place upon a gushing wound. It is this which has me question the probability of the happy outcomes reported by Dr. Schwartz, as represented in Dr. Doidge's fine book (Doidge, 2007, p. 174).

However, although there is much to be found in common between OCD and Mind Body Syndrome, they are not the same. The severity of the imbalance in the OCD sufferer is far greater, and even in the case of OCD, there are gradations in the severity of the problem. For this reason, we can expect that Mind Body Syndrome may well be alleviated by means which are somewhat less severe than the depth of cure necessary in the more intractable cases of OCD.

From history to healing: of catharsis, abreaction and dissociative-repression:

As is so often the case, if we are to understand a new problem, we must look to history. The key to unraveling the mystery, is made plain as we look toward the distant past, and cast our gaze backward a few thousand years. The mind works by particular mechanisms which have been in evidence throughout our recorded cultural history. Long ago, the mental illnesses with which we are so familiar, were treated with "cathartic" practices, such as the Dionysian rites, the rites of Hecate and the Mountain Mother (Cybele), and the Corybantes. In these rites, we see madness, cured by way of "taking you out of yourself" (Dodds, 1973, p. 77), a phrase which we will see, may be taken all but literally. These rites all had many similarities, and, reliable testimony from Plato, insures us that by whatever means, they did work, and often healed the afflicted to a greater or lesser extent in various cases (Dodds, 1973, p. 79). Dodds indicates the psychical mechanism of these curative rites as "cathartic," by which he means: ". . . it purged the individual of those infectious irrational impulses which, when damned up, have given rise, as they have done, in other cultures, to outbreaks of dancing mania and similar manifestations of collective hysteria . . ." (Dodds, 1973, p. 76). This ancient cathartic cure, achieved its magical healing result by way of using music, to induce a sort of trance state, which permitted the release of emotions: ". . . a catharsis by means of an infectious "orgiastic" dance accompanied by the same kind of "orgiastic" music—tunes in the Phrygian mode played on the flute and the kettle drum. . . the dancers were "out of their minds," like the dancers of Dionysus, and apparently fell into a kind of trance" (Dodds, 1973, p. 78). It was believed that each disorder had "ears" for a particular tune, each associated with a particular rite (Dodds, 1973, p. 79). The mental problems were not well categorized, and seemed to span the breadth of depressive and particularly, hysterical illness, an inference I draw from the Plato, which states the conditions treated as, "phobias and anxiety conditions arising from some morbid mental condition" (Plato, as cited in Dodds, 1973, p. 78).

To understand the exact mechanism of these ancient cures, we must trace the modern lineage of psychoanalysis backward to its source: Breuer's cathartic method. In Breuer's method, an hysterical patient is placed under hypnosis, and their symptoms cured by way of a regression, where repressed affect which was reactive, is allowed full expression. This process, known as *abreaction*, traces the neurotic/hysterical symptom back in time, and discovers the root symptomatic cause to be a choking off from expression of reactive affect, an affective repression of reactive elements which can be alleviated in its pathogenic influence by way of hypnotic regression and a fully expressed release of those feelings. The hysteric is sick, from his or her "reminiscences"... *repressed* memories, *repressed* reactions and fantasies (Freud, 1893-1895, p. 7), which once allowed expression in abreaction, cease to cause illness. Referring to the modus operandi of Breuer's cathartic cure, Freud states, "It brings to an end the operative force of the idea which was not abreacted in the first instance, by allowing its strangulated affect to find a way out through speech; and it subjects it to associative correction by introducing it into normal consciousness (under light hypnosis) . . ." (Freud, 1893-1895, p. 17). This mechanism, the hypnotic accessing of pathogenic unconscious content, and abreacting of said content to affect cure of hysterical symptomatology, can be neatly summed in the equation:

hypnoid state + abreaction = cure

We can now see, that the ancient cathartic method, is but a less well directed version of the more modern cathartic method. The role of music in these ancient rites, is to create a hypnoid state, a trance, by virtue of which, the participant may then access his or her unconscious store. The trance referred to, is indication of just such a state of hypnosis, and the mad dancing, with its ritual cries and indications of "possession" (Dodds, 1973, p. 77, 78), complete the picture of abreaction. The ancient cure, works just as the modern one, although in a less direct way, as the symptomatic source memory is not clearly recognized in consciousness. So, we may state: The ancient Greek rites cured mental illness by way of a partial abreaction, a partial catharsis of repressed material, where its energies are tapped and drained, although the source impressions likely remain unrecognized as to their particulars in consciousness. In the most condensed form: The ancient Greek rites work by means of hypnotic unconscious access and catharsis via partial abreaction. I say *partial* abreaction, as the energies are expended, but the source material is not subjected to the normal conscious processes, as in the case of Breuer's method.

Next, we will discover the last piece of the puzzle in the mystery of Mind Body Syndrome, as we examine the development of psychoanalysis emerging from Breuer's cathartic method. Freud soon noticed that not all patients could be hypnotized, which along with other drawbacks in hypnotic treatment, convinced him to find his famous alternative which is universally applicable—free association (Freud, 1900). This technique of unconscious access, free association, is in turn, derived from creative writing, a text by Borne, "The Art of Becoming an Original Writer in Three Days," playing the greatest role (Freud, 1920, pp. 263-265). I myself quite outside of this essay and its scope, have noted that good creative writing is almost entirely an unconscious affair (Norman, 2011). Indeed, the quotations from the Borne essay from 1823 (reprinted in 1862), which influenced Freud, as Freud admits, are all but a complete statement of the method of unconscious access known as *free association*, demonstrating quite clearly that an author's literary creations, are unconscious creations, and that by accessing the abilities one uses to compose creative literature, one accesses unconscious processes. As a writer I can assure you, that a very particular state of mind is required to write well. It is all but impossible to write quickly enough to keep up with the stream of emerging thoughts. One never censors one's thoughts—quite the reverse. Instead, one releases one's mind, spills everything out onto the page with no thought or intentional direction of the process. (I have found that all such conscious direction is to be added *first*, and the creative process then allowed to take place with no conscious direction whatsoever). The inference is clear: the state of mind invoked in creative writing, is hypnoid. Now, Dr. Hanscom's statement, which seemed so inexplicable and incomplete, that one creates a "physical space" for the thoughts one writes out, and that this is "somehow" curative (Hanscom, 2012, p. 120), can be understood to mean: *as one writes without censorship, the associative conditions are met for unconscious access*. Writing, accesses unconscious content. All of psychoanalysis is based on free associative technique, which works, for this very reason.

Not surprisingly, we can find examples of illness and cure in the Freud, where the etiology is a fairly precise fit for Mind Body Syndrome, and others which also demonstrate the same mechanism of cure, although the etiology may in some small way be slightly askew. A case of leg pain originally of organic origin, its intensity of presentation increasing once paired with psychical determinants, and in the same

patient, another symptom of recurring pain paired with psychical determinants, and their cure, can be found (Freud, 1893-1895, pp. 147-149). To read Freud's words on the cathartic treatment and its progress make the fact utterly plain:

"The pain that was thus aroused would persist so long as she was under the influence of the memory [of the determinant]; it would reach its climax when she was in the act of telling me the essential and decisive part of what she had to communicate, and with the last word of this it would disappear. I came in time to use such pains as a compass to guide me; if she stopped talking but admitted that she still had a pain, I knew that she had not told me everything, and insisted on her, continuing her story till the pain had been talked away. . . During this period of 'abreaction' the patient's condition, both physical and mental, made such a striking improvement, that I used to say, only half-jokingly, that I was taking away a certain amount of *the motives* for pain every time and that when I had cleared them all away she would be well. She soon got to the point of being without pain most of the time..." [emphasis added] (Freud, 1893-1895, pp. 148-149).

Please note the emphasis I have added, which makes clear the relation between the determinants, and their triggering energetic contribution to the symptomatic constellation.

[This insight is in no way to be construed as a defining mechanism for the severe contractures, neuralgias and paralytic phenomena associated with conversion hysteria, which in my estimation, might be well interpreted through psychoanalytic means applied to vital papers, eg., (Feinstein, 2011), as stemming from "counter-valent" wishes (Norman, 2013) projected from orbitofrontal and anterior cingulate regions and the basal ganglia into distal and other somatic areas, to co-opt the motor end of the system, by way of replacing the cerebral source (the motor cortex) and its innervations.]

I hope I have now drawn the conclusion plainly enough: The *modus operandi* by which Mind Body Syndrome is affected by uncensored writing, is one of a hypnoid state created during the writing process, which allows access to unconscious content and its subsequent expression, in the same way as free association, creating a partial abreaction, and thus, alleviating the symptom. The chance of one discovering the very most basic and deeply repressed ego dystonic determinants by simply spilling one's thoughts onto the page outside of a directed analytic therapeutic structure such as psychoanalysis proper, is small—so the abreaction is sure to be but partial...a mere *reduction in the energetic cathexis*, rather than a full conscious admission of the deepest repressed levels of symbolic determination. So, the cure recommended by Dr. Hanscom (2012) is sensible enough, if incomplete at this juncture. A reduction in pathogenic unconscious energy which triggers a pain memory via Hebbian learning and LTP has been achieved, although not a complete one. For this reason, this partial answer must now be supplemented with another technique.

Throughout the ages, a type of man has held a revered and respected place in human society: the sage. This man is not like the rest of us, he is at peace, unperturbed, as a smooth pond, its surface as glass even amongst the worst turmoil life has to offer. The chief method used to create the sage is ancient and specific: meditation. The

psychological mechanism whereby meditation achieves its effects is clear with a bit of basic analysis. Here is my take on meditation from my book, *Mind Map*:

"As is common among many traditions one meditates and opens one's mind up to the full tumult of thought and emotion, releasing the bound up flow and its tide of thoughts and feelings, like a freight train this thundering river of feeling and thought is opened up to and invited, but *not touched*, not looked at, not fastened on to. It is looked away from and allowed to pass, allowed to come, and then eventually after years of practice at ignoring it, the river comes no more! Why would it? How rude! Sorry. Okay, what have we here but a model of repression! In his paper on repression Freud wrote that "*the essence of repression lies simply in turning something away, and keeping it at a distance, from the conscious*" [his italics] (Freud, 1915, p. 147). This ability to look away from pain is repression, this is the hallmark of maturity, to be calm and take all in stride, the active unconscious [an aspect of unconscious functioning which actively reduces the intensity of internal experiential presentation] is working at the height of its potential and all is quiet—mature—repressed. The point is that meditation works, it works to increase the repressive facility..." (Norman, 2010).

Meditative practice reinforces the repressive facility by developing *a particular type* of repressive function: *dissociative-repression*. Dissociative-repression is a term I coined (Norman, 2011, p. 113) to refer to a repression which functions by affective dissociation, as is so common in OCD, where an event is not forgotten or repressed, but the affect with which it is associated is. This can be a pathological response, or, a mental adaptation both healthy and useful. Once the pathogenic levels of unconscious cathexes have been reduced, we find health awaits, even though the reduction is but partial, if, we develop our ability to *dissociate our responses* from the emotion which remains.

I might have chosen my words in the above quotation with a bit more care, as the sage does not exactly "ignore" his thoughts, he permits them freely, and *does not respond to them* (Doidge, 2007, p. 171; Hanscom, 2012, p. 134). In this way, the thoughts are freely expressed, and the affect which they engender is placed *at a distance from consciousness*—which as we know means that affect is repressed. In this way, once partially reduced in its cathexis, we can be free of the pathologic influence of our unconscious content by keeping the dystonic *affect associated with our ideas at a distance*. Meditative practice allows unconscious content, (once reduced in its cathexis through partial abreaction), to remain inert, rather than interactive in symptomatic creation. This reduction in pathogenic activity is a function firstly of abreaction, fostered in the hypnoid state associated with uncensored writing, then, dissociative-repression, whereby the affect associated with ideas is dissociated from the expression of those ideas in consciousness, through meditation. Once the unconscious content is reduced in its energetic intensity, the repressive system can be influenced by meditative practice so as to contain (repress) the potentially pathogenic cathexes which remain, via dissociative-repression.

In conclusion: Mind Body Syndrome is a non-standard diagnosis, which is worthy of inclusion in the pantheon of recognized disorders. In this syndrome, an MRI indicates the presence of pain in cerebral imaging, although no physical cause is present

(Hanscom, 2012), due to the creation of a "pain circuit" between psychical determinants, and the experience/memory of chronic physical pain. I hypothesize from symptomatic analysis that Mind Body Syndrome is spontaneously formed as a product of condensation (Freud, 1900), whereby numerous determinants, which are unconscious in the normal case, attach onto the current presentation of physical pain as onto a symbolic nucleus. Once invigorated with the summed cathexes (energies) of these determinants, it is but a matter of chronic repetition to create the conditions for a deeply reinforced Hebbian learning, and LTP. As the neural pathways connecting the symbolic nucleus of the pain, now recorded in memory, and the determinants, are formed and reinforced, a "pain circuit" is created, which is nondirectional in its causality. It is by this mechanism, that the *actual experience of pain*, can be created apart from any current physical cause, but can be triggered entirely by an escalation in the psychical tensions associated with any of the determinants. I also hypothesize a predominant role for *guilt* in the creation of this syndrome. Guilt functions to redirect sadistic feeling inward, and, creates masochistic symptomatology as the *quantitative excess* of affect stemming from infantile sources associated with super-ego exceeds tolerable limits. Thus, the symptoms can be interpreted as both a sadistic expression and a self-punishment via dual identification—a product of the formative process of super-ego: introjection. This syndrome, can be effectively addressed with a combination of cognitive behavioral therapy which includes the writing out of one's uncensored negative thoughts, and meditation. These techniques function to release energy from unconscious stores by way of the induced hypnoid state which is endemic to the process of uncensored written expression, just as in psychoanalytic free associative technique, which is historically rooted in the unconscious aspects of written creation. The process of *partial abreaction* is introduced through these means, and functions to reduce pathogenic unconscious affective cathexes. Once reduced by way of partial abreaction fostered through the unconscious functioning of creative activity and its attendant hypnoid component, the remaining unconscious content may be made inert, by way of *dissociative-repression* induced through meditative practice. Indeed, it is now clear, why the following statement must be true of those in physical pain, who wish to create the circumstances which lead to the greatest chance of successfully healing: *Those who write, heal, and those who do not, suffer*. When one considers the processes of symptom formation, condensation, abreaction and dissociative-repression, it seems illogical to suppose otherwise.

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**Re-Polarization Theory: From Native Psychoanalysis to Sublimation—The
Practical Reconstruction of Modern Personality** (as published in *The Journal of
Unconscious Psychology*)

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Abstract:

Re-polarization theory is an extension of Freudian transference theory which suggests that all of reality is defined as a symbol is defined, via transference. This transference is mediated as to the affective valence distributed to define reality from limbic and other primary sub-cortical sources by the neocortical mnemonic store—by the past. The neocortical store can be reconsolidated, specific mnemonic content re-polarized, so as to create a new mental topography; exchanging a system based on the paradigm of sublimation by repression, for the more efficient sublimation by integration. This is accomplished through the destructuralization of super-ego, and, the manual engagement of fundamental brain circuitry first detailed by Schore, so as to alter on the most basic level, our "experiential template" which defines reality through various levels of resistance, allocated in a stratified structure. This same circuitry is what underlies Bion's alpha function, which although ineffective in a non-directed therapeutic application, finds immediate and profound utility once directly utilized to undifferentiate specific fixated unconscious content. The processes of active and reactive re-polarization and their utility are discussed, as well as a method to utilize an "alpha function key" in order to undifferentiate and integrate potentially pathogenic cathexes from events such as molestation and rape.

Introduction, super-ego, reality and transference: sublimation by integration vs repression:

The ontogenetic contains the phylogenetic. This dry, abstract statement holds the key to the mysteries of the broken human condition, and, the solution to the problem which is us. As one looks over the span of the last few thousand years, social conditions can be seen to emerge whereby our longevity as a species was assured, while the human condition itself became intolerable, and neurosis, a viable alternative to the civilized life, to which we are all entrained. In ancient Greek culture the essence of modern man, his conscience, his super-ego, can be observed in its formation, as well as the attendant neuroticism which the guilty topography of modern personality presupposes, as a culture based in shame, is exchanged for the more potent poison, and becomes a culture based on the real thing: guilt (Dodds, 1972, pp. 28-63). The internal inculcation of the punitive aspects of the father—introjection and the formation of super-ego, are a recent event in our phylogenetic story, and have a clear parallel in individual developmental ontogeny (Dodds, 1972; Freud, 1923, 1925j; Norman, 2013 Prometheus).

Although the psychology associated with potentially pathogenic super-ego structures has long been known (Freud, 1930, pp. 123-131, 1933, p. 80), the work of modern pioneers in the neurosciences such as Schore, Solms and Panksepp, have added key elements, which along with some unexpected consequences resulting from the latest advances in psycho-pharmacology, have permitted new insights. This paper will detail an extension of Freudian transference theory called re-polarization theory. By utilizing symbolic key images, brain circuitry can be engaged, neuronal activity in specific limbic/orbitofrontal circuits rebalanced to favor dopaminergic predominance and the presynaptic modulatory activity of endogenous opioids. In conjunction with the specific methodology of Native Psychoanalysis, life injuries, even those such as rape and molestation can be healed, and the faulty structure of modern personality itself—may be *permanently removed*. In this way, a new, more efficient mental organization may be created, one based on the principle of *sublimation by integration*,

rather than sublimation by repression, which stand in relation to each other much as fusion does to fission, in terms of their comparative efficiency as methods of energetic production. Now, the inefficient, immoral and unhealthy structure of modern personality may be replaced with an ethical alternative, which *fosters* sublimation, and utilizes our human energies directly, rather than repress them in guilt. The time of the "modern man" has ended. Now, there is hope.

I wish to direct the reader to a paper (Norman, 2013 Prometheus), that is also available for download from the archive at www.thejournalofunconsciouspsychology.com entitled, "*Who Fired Prometheus*," which offers a more deep and thorough examination of the following topics concerning the ontogenetic, economic and phylogenetic aspects of super-ego, portions of which I will excerpt here in a cursory fashion:

Indeed, I was so very surprised to discover the source and dynamic implications of my own conscience, that I wrote the following in my book, *The Tangible Self*:

"Although castration is big in psychology, it seems absurd to the ordinary healthy person. I never thought about it. A non-topic. Perhaps once a decade there would be talk of gelding a bull and the word would come up. No one ever spends even a single moment concerned with the idea. It seems nothing short of asinine to make so much of it as they do in psychology. Castration? Nonsense! Imagine my surprise to be presented with the contents of my unconscious and to observe thousands and thousands of scenes, so many scenes from every period of my life, and what do I see?—acres and acres of unbelievable super-energetic fantasies about or involving only one thing: Castration!" [Norman, *The Tangible Self*, pp. 77-78.]

One can read of the purpose of these images, and how they serve to form the super-ego, which is inheritor of our Oedipal complex:

". . .we can tell what lies hidden behind the ego's dread of the super-ego, its fear of conscience. The higher being which later becomes the ego-ideal once threatened the ego with castration, and this dread of castration is probably the kernel round which the subsequent fear of conscience has gathered; it is this dread that persists as the fear of conscience." [Sigmund Freud, "*The Ego and the Id*" in *A General Selection From The Works of Sigmund Freud*, p. 233.]

And we can identify the masochistic/passive /feminine implications revealed in the analysis of *Prometheus Bound* offered in part two of the Prometheus series:

"...the castration complex always operates in the sense implied in its subject-matter: it inhibits and limits masculinity and encourages femininity." [Sigmund Freud, "*Some Psychological Consequences of the Anatomical Distinction Between the Sexes*," in *The Standard Edition of the Complete Works of Sigmund Freud* (vol. 19), p. 256.]

So the question presents itself, from whence comes this ugly dread, this internalized punitive barbarism with which we are all threatened, and how did it come to find

purchase within each of us? The answer is to be found in the record of human history, and the trail of laws and myths which follow in its train. This image is now a part of our inherited phylogenetic and instinctual template: Its aspect now a ripe possibility waiting to be brought to ontogenetic fruition, a masochism as ripe fruit, swollen and turgid, an ugly fruit in need of but a tender breeze to fall to earth and disperse its poison. In his most worthy book, *The Greeks and the Irrational*, E. R. Dodds, a superb Greek scholar and philologist par excellence, draws the strings of history and psychology together for us. This ugly imprint has been nurtured over thousands and thousands of years. Its exact source is clear to discern with Dodds's careful examination of the historical record.

"The head of the household is its king . . . and his position is described by Aristotle as analogous to that of a king. Over his children his authority is in early times unlimited: he is free to expose them in infancy, and in manhood to expel an erring or rebellious son from the community . . . as Zeus himself cast out Hephaestos from Olympus for siding with his mother." [Dodds, *The Greeks and the Irrational*, pp. 45-46.]

However, as early as the 6th century BC, the situation had begun to change, and as social conditions began to improve, and the father's authority became less and less *absolute* in the face of these new social conditions leading to increased personal freedom, the strict authoritarian structure of family life began to loosen. Now, what was a *shame* based dynamic, one based on *external* threat from the father, becomes a *guilt* based dynamism, one based on an internalized threat, an *internalized* moral structure in the true modern sense of the word emerges: super-ego. This is demonstrated by the need for laws introduced by Solon, and later, by Plato, to safeguard the now threatened patriarchal family structure. [Dodds, *The Greeks and the Irrational*, p. 46.]

Super-ego uses severe repressions to create by *internal* means, what were behaviors, inhibitions and restrictions previously brought about by *external* patriarchal threat. Dodds fleshes the idea out as follows:

"The peculiar horror with which Greeks viewed offenses against a father, and the peculiar religious sanctions to which the offender was thought to be exposed, are in themselves suggestive of strong repressions. So are the many stories in which a father's curse produces terrible consequences—stories like those of Phoenix, of Hippolytus, of Pelops and his sons, of Oedipus and his sons—all of them, it would seem, products of a relatively late period where the position of the father was no longer entirely secure. Suggestive in a different way, is the barbarous tale of Kronos and Ouranos . . . the mythological projection of unconscious desires is surely transparent—as Plato perhaps felt when he declared that this story was fit to be communicated only to a very few . . . and should at all costs be kept from the young." [Dodds, *The Greeks and the Irrational*, pp. 46-47.]

Here is a synopsis of that myth. Please note the Oedipal and castration themes. From, <http://www.deathreference.com/Ke-Ma/Kronos.html>:

"According to the Greek poet Hesiod, in his *Theogony* (c. 750 B.C.E.), Ouranos ("Sky") mated nightly with Gaia ("Earth"). When their children were born, Ouranos hid them in Gaia's inward places. Painfully swollen with offspring, she wrought a huge sickle and asked her children, six brothers and six sisters (the Titans), to punish Ouranos. Only her youngest son, Kronos, agreed. Giving him the sickle, she told him where to hide. When Ouranos next lay on Gaia, Kronos grasped him with his left hand, the sickle in his right, and cut off his genitals. From the drops of blood that shed on her, Gaia conceived among others the Giants, and from the severed genitals, which fell into the sea, a white foam arose from which was born the love goddess Aphrodite.

Now followed the rule of Kronos. He married his sister Rhea, who bore him three daughters and three sons: Hestia, Demeter, Hera, Hades, Poseidon, and Zeus (the Olympian gods). But Gaia and Ouranos had foretold that Kronos would be over-thrown by a son, so he swallowed his children as each emerged from the womb. About to bear her sixth child, Zeus, Rhea asked her parents how to save him. They sent her to Crete, where she hid him in a cave on Mount Aegaeon. She presented Kronos instead with a stone wrapped in swaddling clothes, which he thrust in his belly. Zeus grew apace and in time forced Kronos to yield up his children. Once reborn, the gods waged war on the Titans, whom they overthrew, and Zeus replaced Kronos as ruler."

(Please note also, that some versions of the myth repeat the reversed wishful castration theme, and Zeus also castrates his father in turn).

Now from the Dodds:

"And when Plato wants to illustrate what happens when rational controls are not functioning, his typical example is the Oedipus dream. . . it seems not unreasonable to argue from identical symptoms to some similarity in the cause, and conclude that the family situation in ancient Greece, like the family situation today, gave rise to infantile conflicts whose echoes lingered in the unconscious mind of the adult." [Dodds, *The Greeks and the Irrational*, p. 47.]

And lastly Dodds assembles the entire picture for us in these words:

"The psychologists have taught us, how potent a source of guilt feelings is the pressure of unacknowledged desires. . . the human father had from the earliest times his heavenly counterpart: Zeus *pater*. . . Zeus appears as a Supernatural Head of the Household. . . it was natural to project onto the heavenly Father those curious mixed feelings about the human one the child dare not acknowledge. . . that would explain very nicely why the Archaic Age Zeus appears by turns to be the inscrutable source of good and evil gifts alike. . . as the awful judge. . .who punishes inexorably the capitol sin of self-assertion, the sin of *hubris*. (This last aspect corresponds to that phase in the development of family relations when the authority of the father is felt to need the support of a moral sanction; when "You will do it because I say so" gives place to "You will do it because it is right.") [Dodds, *The Greeks and the Irrational*, p. 48.]

Here in this historical transition from an external shame based ethical structure, to an internalized guilt based structure, in this *internalization* of the patriarchal threat (introjection), we see the creation of our modern ethic, our conscience, our masochistic capitulation: our super-ego. This historical basis for our phylogenetic inheritance can be brought to light and assessed as to its healthy or pathogenic contribution by way of economic analysis, and clinical example.

. . . Once we clearly see the way the phylogenetic impression is brought to bear and made to resonate by current situational developments in upbringing, and, a precise account of the economic effects of this ugly historical precipitate are made manifest in specific example, the dismal, current picture of modern personality and ethical structure will be complete. . .

. . . The theory is interesting in that it predicts that the strength of our super-ego in its punitive aspect, is not entirely determined by the force of the punishments which have aroused its formation. Rather, as it is a masochistic structure invoked to control our aggression (amongst other instincts in my view), its force is a function of our own feelings of aggression and resentment toward parental discipline, quite independent of any moral implications drawn from the act for which parental reprimand has been drawn. This means that conscience, our sense of personal and social justice, is created as an interactive phylogenetic/ontogenetic function of masochistic and aggressive economy within a social context, not as a function of any moral pretext. Our morality, is by the nature of its very construction: immoral.

Here are a few sections from the Freud which clarify and support this unusual notion:

"The first requisite of civilization, therefore, is that of justice—that is, the assurance that a law once made will not be broken in favor of an individual. This implies nothing as to the ethical value of such a law" (Freud, 1930, p. 95).

"The tension between the harsh super-ego, and the ego which is subjected to it, is called by us the sense of guilt; it expresses itself as a need for punishment. Civilization, therefore, obtains mastery over the individual's dangerous desire for aggression by weakening and disarming it and by setting up an agency within him to watch over it, like a garrison in a conquered city" (Freud, 1930, pp. 123-124).

And as to the effect of super-ego in equating wish and act, and, the resultant loss of mental economy and functioning:

"Here, instinctual renunciation is not enough, for the wish persists and can not be concealed from the super-ego. Thus, in spite of the renunciation that has been made, a sense of guilt comes about. This constitutes a great economic disadvantage in the erection of a super-ego, or, as we may put it, in the formation of a conscience. Instinctual renunciation now no longer has a completely liberating effect; virtuous continence is no longer rewarded with the assurance of love. A threatened external unhappiness—loss of love and punishment on the part of the external authority—has been exchanged for a

permanent internal unhappiness, for the tension of the sense of guilt" (Freud, 1930, pp. 127-128).

"...the original severity of the super-ego does not—or does not so much—represent the severity which one has experienced from it [the object], or which one attributes to it; it represents rather one's own aggressiveness towards it. If this is correct, we may assert truly that in the beginning conscience arises through the suppression of an aggressive impulse, and that it is subsequently reinforced by fresh suppressions of the same kind" (Freud, 1930, pp. 129-130).

And as to the role of the phylogenetic in contributing to this outcome:

"It can also be asserted that when a child reacts to his first great instinctual frustrations with excessively strong aggressiveness and with a correspondingly severe super-ego, he is following a phylogenetic model and is going beyond the response that would be currently justified; for the father of prehistoric times was undoubtedly terrible, and an extreme amount of aggressiveness may be attributed to him" (Freud, 1930, p. 131).

I wish to direct the reader to a paper available for download from the archive at www.thejournalofunconsciouspsychology.com entitled, "*The Quantitative Unconscious*" (Norman, 2013 quantitative), part of which is included under the heading "Appendix A" in this paper, and all of which is to be found later within this text, which offers a more deep and thorough examination of the following topics concerning symbolism and the delegation of affect to experience, which I will review here in a cursory fashion.

We need but remember that it is *super-ego* which in most cases, causes ego to *create repressions* (Freud, 1933, p. 69), and that it is the return of the repressed which is the mechanism of neurotic and psychotic symptom formation (Freud, 1896, p.170 [first usage of the phrase]) to see, that as super-ego exerts its formative influence upon personality it creates the very *conditions for neurosis*. Indeed, Freud (1904) summed the basic goal and function of psychoanalysis in these words: All repressions must be undone (Freud, 1904, p. 253). Affect provides *Quality* to experience (Freud, 1900; Norman, 2013 quantitative), and therefore, affect is the true subject of consciousness (Solms, 2013). With this in mind, one can see that reality as we define it, is a *sublimation* of affect into experience, a qualitative symbolizing (defining) of experience (Norman, 2013 quantitative) from *limbic sources* as in dreaming (Stickgold, 2001)—a *transference* to provide experiential quality and definition to reality, much as we symbolize trivial unsaturated memory traces (Freud, 1900, pp. 563-564) from day-world experience in REM dreaming through condensation and displacement, etc., (Freud, 1900; Norman, 2013 quantitative). A personality structure which *represses* its drives, memories and instincts so as to resolve conflict, and create the conditions for experience—delegates its affective stores to define reality *from under repression* to cathect an *experiential sublimation*, a symbolic affective definition of reality via transference. This is the model for modern personality: ***sublimation by repression***.

Please note how similar this structure is to nuclear fission as a power source: we see a division of "the nucleus" of personality whereby the most basic psychological elemental

constituents, *consciousness and the affects*, are split apart. The result is a structure which is unstable and inefficient: the affects, instincts and drives now repressed into the unconscious, and although they do their job from under repression, create experiential definition and allow sublimation as well (Freud, 1905), those same affects, instincts and drives, and the memories, fantasies and thoughts into which they are infused, also become potentially pathogenic and threaten to pollute the very essence of consciousness itself, as they continually attempt to invade consciousness and breach repression to form debilitating neurotic and psychotic symptoms via the return of the repressed—a dangerous and degenerative influence which is analogous with that of nuclear waste. To split things apart does create energy, but, it is inefficient, and carries hidden toxic baggage. Once split off, rejected and repressed, our affects become toxic.

Freud's papers on sublimation were lost (Freud 1915, p. 106). We do have a few references where he notes both the functional relationship between repression and sublimation, and also indicates that sublimation can also be achieved by means other than repression (Freud, 1905, p. 238-239, 1910, p. 54). This paper provides an *alternative structure*, a model of personality which is not based on sublimation by repression, but instead, is based on ***sublimation by integration***. As we have seen, the efficiency of personality structured around the principle of sublimation by repression is limited. The energetic distribution afforded by sublimation by repression is akin to a wasteful isometric exercise which pits most of our primal energies against our morality (super-ego) in a repressive struggle, leaving little energy left over for sublimation into experience, as the main energetic expenditure is used to maintain unconscious containment of the repressed. As one becomes more and more civilized, he or she must repress more and more of their basic drives, affects, thoughts and emotions, leaving the depleted subject with little libido to grace experience (Freud, 1908 p. 193, pp. 203-204), and, the constant threat of symptomatic degeneration from the return of the repressed. This deeply inefficient model of mental topography which has been created as a function of a phylogenetically reinforced masochism (Freud, 1930, p. 131; Norman, 2013 Prometheus), finds a healthy, efficient alternative in sublimation by integration. Indeed: "all repressions must be undone," is not only a motto of psychoanalysis, it is also the model of sublimation by integration as well. Unlike sublimation by repression, sublimation by integration re-unites, fuses together the nuclear elements of personality, *unites* our consciousness, drives, instincts and affects, to accomplish its ends and define our reality with ultimate efficiency, while *disbanding the basic conditions which create neurotic and psychotic illness*. Sublimation by integration removes the same repressions which break down to cause neurosis, and hence, affords a psychical structure around which personality might be rightly redesigned. In brief: Sublimation via repression and sublimation via integration are related in efficiency, toxicity and output, as are the modes of fission and fusion in their attributes as energy sources. One is more easily accomplished, but is dirty, toxic, and hypocritical to claim itself efficient beyond its cost.

Before I continue on to approach the source of the problem, I would like to take a moment to explain what must appear as an impossible concept which I have glossed over: the notion of experience being somehow akin to affect and dreaming. {Please see appendix A for a technical discussion of this issue: the system of affective assignment.} The implications of this idea are far-reaching, and allow us to see the role of affect in the course of "primary process" thinking (Freud, 1900, 1915*e*, p. 186-

187) as it underlies all of experiential presentation and internal mentation. I had mentioned {see above and appendix A}, the role of trivial unsaturated memory traces in dream formation is to provide a ready (unsaturated) nexus onto which a *transference* of various determinants can be condensed (Freud, 1900, pp. 563-564). I have also stated that this is somehow akin to the process by which we give quality and definition to reality. Indeed, I wish to advance the somewhat obvious notion that experience, in both the "normal" and the aberrant cases *is defined by transference*, defined by primary process thinking, by associative thinking. The only difference between the neurotic and "well balanced" cases, is in neurosis and psychosis, the transference is distorted, and so, becomes visible (Norman, 2013 Langan). The primary processes, are however, the affective and associative underpinnings of all experience, and many theorists have understood their evolutionary and ontogenetic significance to greater or lesser degrees.

MacLean has advanced his famous simplification of brain structure and processes, *triune brain theory*, which admits of evolutionary interpretation, as the conservation of evolutionarily prior structures is associated with a functional contribution to the overall cognitive result: the basal ganglia as the neural substrate of reptilian protomentation; the limbic system as the neural substrate of mammalian emotomentation; and ratiomemnation as a function of more advanced neocortical thinking (Wiest, 2013; MacLean, 1990). Solms (2013) has clearly recognized the primacy of affect sourced in lower brain structures as it relates to conscious mentation, and defined the ancient periaqueductal gray in its primary relation to consciousness. Panksepp (1998) has also taken evolution in hand to deduce through experimentation and analysis that the more ancient brain systems and structures are those associated with REM dreaming, rather than Slow Wave Sleep, implying a dream proto-consciousness which was once primary consciousness, may well functionally underlie the more recent evolutionary cognitive result. Bion also understood the importance of dreaming as it relates to health and experience, and that we are all, if we are healthy, dreaming all the time (Bion, 1992, p. 52; Brown, 2011, p.164). To illustrate this idea, that dream formation, symptom formation and our proper definition of reality all gain structure and quality by identical primary "associo-cognitive" processes (Norman, 2013, Langan) and, assess the role of "the past" (represented in the physiological substrate of the neocortical mnemonic store) in *mediating the affect* assigned from subcortical sources to this definitional transference [so as to affect "mental solids" represented in the cortex (Solms, 2013)], we need but indulge in a simple thought experiment. Here, look, you can see...we condense, we "*dream*" everything into being as a function of the past:

Two subjects are asked to participate in a study on consciousness and reality. One is healthy, and has had a loving home life. The other is neurotic, and has had a disturbed upbringing. Both are shown the same photo of a yellow butterfly. The two hypothetical associative chains are listed below:

Healthy subject A: Stimulus...butterfly. Associations: Butterfly—yellow—sun dress—mother—warmth—love—perfume—smile—sun

Neurotic subject B: Stimulus...butterfly. Associations: Butterfly—yellow—sun—son—mother—bitch—cut—kill—sad

Note: Just as in the primary process construction of dream symbols, it is the associative primary processes, those of *condensation* of many determinants which in their sum, once *displaced* onto what then becomes a symbol, give definition, *Quality*, to that object. Reality is defined by way of symbolism...by way of *affective assignment* [appendix A](Norman, 2013 quantitative). That affect, assigned from limbic and other structures, is mediated by the past, which finds its physiological corollary in the neocortical mnemonic store. I propose, that the neocortical store can be reconsolidated, particular portions of its contents made preconscious/conscious through the processes of *active and reactive re-polarization*, and hence, restructure the psyche to function along the lines of sublimation by integration. To accomplish this, we must examine the primary contributor to the repressive processes: super-ego and its reactive elements. Super-ego and its reactive elements are, in the main, unconscious structures, so first we must address the matters of repression, resistance and access to unconscious content.

5-HT and repression: The key Indoleamine—the unconscious gateway: of civilization, creativity and hell

Today, we are in a unique position. For the first time in pharmacological history we have achieved a level of specificity which has hitherto been inaccessible, and many hands are to be shaken and bows taken. SSRI drugs have specifically targeted the re-uptake of a single neurotransmitter, 5-HT, and made a new level of neuro-chemical specificity, and individual targeted therapeutic activity available to millions. So, let us assess this new discovery, which I can attest by my personal experience, is most efficacious. As a sufferer of debilitating OCD for many years, you can rest assured in the knowledge that these drugs do work, and are effective in preventing of the symptoms of OCD. Those who claim that these potent drugs are ineffective, and have no use or benefit, *are lying to you*. The drugs work...period. A skilled clinician, should you be lucky enough to find one, can prescribe them in the correct dosages to control your symptoms. Those will be high doses. Now that that is settled, you should also know another fact: Those studies [examine who funds studies] and sources, which claim these drugs are easily withdrawn, and the resultant symptoms are fairly short lived, most definitely and assuredly, *are lying to you*. Please know the fact: SSRI drugs administered in the proper high doses for disorders such as OCD over long periods, cause permanent damage to the repressive system—

Repression is 5-HT dependent (Norman, 2009, 2010, 2011).

That dry statement, "Repression is 5-HT dependent," has consequences and specific implications, some unexpected, which have changed, in ways both positive and otherwise, the entire landscape of psychology. Now, old and vital questions have been answered, and the question of the existence of unconscious fantasy (Talvitie & Ihanus, 2005) and its influence on behavior and the transference have finally been laid to rest (Norman, 2011, 2013 nine/non-elliptical). We will soon examine some of the unexpected fruits of this new pharmacology and look plainly at what were once, the forbidden unconscious contents of our human hell, from whence both creativity and madness spring, and devise a method to pierce the unconscious veil. But first, I will begin with a general assessment of the specific ontological manifestations and neuroscientific mechanisms involved.

The various transformations of illness which parallel the reduction in repressive functioning as SSRI withdrawal occurs, are necessary symptomatic products of the return of repressed material to consciousness (Freud, 1896, p.170 [first usage of the phrase]), and demonstrate the common defensive and purposive mechanisms of neurotic and psychotic illness (Freud, 1896; Norman, 2010, 2011, 2013 nine/non-elliptical). This surprising result is surprising, not because it supports the Freudian idea of all such illness being manifestations of defense rather than random imbalance, but, because the usual barriers which favor one illness over another, the "predispositional" factor itself, seems to have been cast aside (Norman, 2013 nine/non-elliptical). This is easily accounted for if we remember that this is an artificial neurosis/psychosis, not a typical one, and hence, must be assessed on its own footing. The mechanism by which it and its transformations are created, is clear: a relative reduction in 5-HT in the synaptic cleft due to the resumption of normal 5-HT re-uptake, and a resultant wholesale reduction in repressive function. With repressive function permanently impaired, what were predispositional influences favoring illnesses which are dependent upon high levels of repressive functioning such as OCD, are now exposed in their internal construction, repression peeled back, and the core of hysterical illness laid bare. The resultant hallucinatory hysterical psychosis, demonstrates little symbolic distortion of its reactive components, which may be assessed quite directly.

This psychosis, which can be reverse engineered to allow us access to undistorted unconscious content in normal cases, has specific concurrent manifestations regarding perception. Repression and the unconscious have subsumed under their functioning, not only a temporally "passive" role (retroactively defining reality) *in relation to the level of perceived input* of externally derived experience, functioning not only in the familiar role as a receptacle for containment, affective dampening, dynamic removal and allocation to experience of *preexisting* internal (interoceptive) unconscious stimuli such as unconscious fantasies, thoughts or memories via transference, but also an active one as well. This active real-time repressive function whereby all of perceptual experience has its energetic incoming presentation reduced, *actively repressed* in large measure into the unconscious *as it happens*, I have called: The Active Unconscious (Norman, 2010). Although the concept was conceived before I read the Freud, this is a more functionally connected and useful extension of Freud's stimulus barrier (Freud, 1920, p. 27). This reduction in the ability to partly repress the full force of *external* experience (exteroceptive increase), which runs in close tandem with the concurrent loss of ability to repress the influence of our *internal* perceptions stemming from the unconscious (interoceptive increase), form the full measure of repression proper, and are inexorably joined, rising and falling together in their level of functioning in direct and dependent relation to the increase or decrease in systemic levels of 5-HT.

There is ample neuroscientific evidence to support and explain this mechanism, by virtue of which I myself have been transformed from an extrovert who wanted only more and more intense stimulus, performing before larger and larger crowds, into an introvert, a man who is overwhelmed by natural beauty, weeps openly and often, and feels a sunbeam on his flesh with the same shuddering amazement I used to gain only by way of the most extreme and daring behavior. It is as if the very most basic and fundamental of psychical relations has been altered, and not in any subtle way! The idea, that SSRI drugs are specific in their action, is both laughable, and utterly

mistaken. These drugs target one of the most evolutionarily ancient systems in the brain, as is evidenced by the central location of the serotonin producing nuclei, which dispense 5-HT to no less than 15 receptor types (Panksepp, 1998, p.111). The list of behavioral functions which *do not* involve brain serotonin is quite short, and can be represented by a single digit: Zero. Yes, 5-HT is so basic, its functions so diverse, we can say: 5-HT is involved... *in everything* (Panksepp, 1998, p. 103). The psychical effects of serotonin depletion and supplementation are no mystery, and neither are its general systemic effects:

Jaak Panksepp, founder of the burgeoning discipline known as Affective Neuroscience, has made one of the most profound, direct and reliable contributions to our knowledge of human and animal neural affective dynamics, from both evolutionary and biological perspectives. This careful and detailed researcher, has by way of experiment and observation come to certain conclusions about the role of brain serotonin in brain processes and behavior.

Firstly we read in Panksepp (1998) [citation form altered], "There are good reasons to believe that this system mediates a relatively homogeneous central state function. All motivated and active emotional behaviors including feeding, drinking , sex, aggression, play and practically every other activity (except sleep), appears to be reduced as serotonergic activity increases (Coccaro & Murphy, 1990; Jacobs & Gelperin, 1981) (Panksepp, 1998, p. 111)." The fact that 5-HT has *some* receptors which increase anxiety, is in my view, not at all inconsistent with the role of 5-HT mediating repression, as anxiety, is in many cases the causal instrument by which repression is instated (Freud, 1926; Brenner in Rickman, 1957; Norman, 2010, 2011). We read a general description of the effects of brain serotonin on mental stimulation of both interoceptive and exteroceptive origin, which makes some good sense of the relation between 5-HT and repressive function both "passive" and "active" as previously described.

Description from a diagram of 5-HT pathways (Panksepp, 1998): "Serotonin. Function: reduces impact of incoming information and cross talk between sensory channels (p. 107)." As to the resultant behavioral modifications when brain 5-HT is reduced, (which closely parallel those of REM deprivation): ". . . such animals are behaviorally *disinhibited*: they are more active, more aggressive, hypersexual, and generally exhibit more motivational/emotional energy. . . In short, they appear to be manic. (p. 141)." And lastly, we read:

"In general, it seems that one higher cerebral function of brain serotonin is to sustain stability in perceptual and higher cognitive channels. When this constraint is loosened by a global reduction of 5-HT activity, the probability of information from one channel crossing into another channel is increased. Thus a mild reduction in brain serotonin activity may be an important ingredient for the generation of new insights and ideas in the brain, while the sustained reduction of serotonin might lead to chaotic feelings and perceptions, contributing to feelings of dis coherence and mania.

In sum, perhaps it is this loosening of sensory-perceptual barriers between different brain systems that characterizes dreams, hallucinations and the florid phases of schizophrenia, as well as normal creativity. . . it is worth noting that just as low brain serotonin characterizes the dream state, it also promotes

heightened emotionality, both positive and negative. It is a neurochemical state that leads to impulsive behavior in humans (Halperin et al., 1994; Linnoila, et al., 1983; Roy et al., 1988), even ones as extreme as suicide (Asberg, et al., 1976; Brown et al., 1982; Coccaro, 1989). Probably the most striking and replicable neurochemical finding in the whole psychiatric literature is that individuals who have killed themselves typically have abnormally low brain serotonin activity.” [Panksepp, 1998, p. 142]

I hope the exact and full implications of this statement are becoming more clear: "Repression is 5-HT dependent." In less technical language you can imagine brain 5-HT, its particular manifestations and effects to be better summed in this less precise but more descriptive phrase: 5-HT is the lid on hell. So now that modern pharmacology has removed the blinders, and allowed us direct access into the forbidden ugliness which is within all mankind, this hidden fuel of his ascension and decline, for all of sublimation and depravity are found within this secret—*let us look*. We will see the main of Freudian theory, this hideous and unflattering picture of inner reality... is essentially correct. However, the situation does not unfold quite as the effects do with animals, and indeed, an SSRI withdrawal subject would wish for a blessed mania to quell their pain, for unlike animals, we have super-ego, and super-ego is masochistic, as a punitive garrison set up within personality (Freud, 1930, pp. 123-124; Norman, 2013 Prometheus). When we add a punitive super-ego wish to an id wish with reduced repression we have the exact description of the dynamic which creates hysteria proper (Freud, 1915, pp. 180-185). I hope it is now becoming clear to the reader, why, SSRI withdrawal encourages *hysterical hallucinatory psychosis*. The next paper in this series will spell out the exact method for transforming SSRI withdrawal, and the permanent repressive damage it entails, into a blessing which yields an endless supply of energy and directs this uninhibited storehouse of discharge toward higher purposes, and the supreme happiness of a libidinally cathected experiential sublimation of astounding beauty. The happy result in the severe SSRI withdrawal case, is a steady state mania with continuous sublimation functioning as a substitute symptom to utilize the continuous state of uninhibited mental discharge brought about by longterm damage to unconscious functioning. That result is, however, a long way off from the initial unhealthy construction of modern personality, which is created via a very particular state of topographical imbalance. The way toward a personality structured around the paradigm of sublimation by integration, must first, proceed by way of removing repressions, and those, are often held in place by ego activity carried out at the behest of super-ego (Freud, 1926, p. 91, 117-118). I will strongly encourage the reader to read the Prometheus paper (Norman, 2013 Prometheus) available at *The Journal of Unconscious Psychology* web archive for more depth regarding the development and implications of the masochistic super-ego, and, the nine essays and Native Psychoanalysis paper (Norman, 2011; 2013 nine/non-elliptical), for the description of the SSRI withdrawal experience written soon after the fact, under the title of: The Engine of Creation.

So what contents lie in the unconscious of a modern man? How were they formed? How do these tensions contribute to the mental dynamic, and, what structures encourage the result? Is there a way to pierce the unconscious barrier which does not involve madness? Read on, as we lift the lid on hell, and discover the reason, we are down there, and...the way out.

The reactive elements of the castration complex, and the open emotional posture:

All things in the mental construction are formed upon the lattice of those structures which preceded them. One might say, ontogeny contains phylogeny, ie., there is a demonstrable, structurally conservative phylogenetic evolution of the individual both organic and psychical, evident in the course of individual development. The identification of the specific mammalian heritage evidenced in our deeply interconnected and embedded primitive affective circuitry, such as the RAGE system (Panksepp, 1998), provides a physiological groundwork for what has hitherto been but instrumentally valid psychology. As Freud (1913, p. 325) hesitatingly had to admit the possibility that hate may be the first emotional potential of man, we see embedded within our inherited human systemic structure, specific systems that evidence stereotyped endogenous behaviors, which are of course, value neutral and useful, in so much as they provide responses which further our ends in the world. Although a general alarm and pushing away of invasive stimulus is evidenced soon after birth in the frantic display of life's *first and most severe overstimulation* [perhaps the source impression of Freud's erotogenic masochism?], a specific object has been preselected to receive a measure of rage, in the proper course of events: the mother.

Once left too long on its own and separated from the mother, the infant will begin to demonstrate its distress and cry out, and upon her return, it will make its unhappiness known in a display of protest rage. This primary situation within which attachment relations evolve, is a massive, even archetypal affective regulatory developmental factor (Hopkins, 2013, pp. 46-47; Panksepp & Watt, 2009, p. 93). This rage interferes and contradicts the nurturance the infant requires and is soon quelled, the escalating cries of the infant soon engaging the PANIC system and the choking reflex (Klein, 1993; Panksepp, 1998, p. 275) as part of the interactions between the factors of separation-distress/Panic and Grief (SPG), and the evocation of subsequent RAGE and FEAR systems (Hopkins, 2013; Panksepp, 1998). It is hypothesized (Panksepp, 1998) that the cessation of its cries, a depression, is evolutionarily beneficial and presupposed so as to prevent an infant from signaling its location to a nearby predator. This same circuitry involved in protest rage, the RAGE system, is evidenced in many aspects of behavior, and Panksepp (1998) believes, that it is engaged at low levels to create the manifestations of frustration, which it is well known, is the precursor for aggression proper. Once placed in the service of the formative processes of super-ego, this circuitry evidences specific qualities and purposive transformations which merit our close examination.

Please remember at the core of super-ego is an introjected morality, a masochistic structure, and, that masochism is the primary representative of the death instinct (Freud, 1933, p. 105). This psychical structure, super-ego, is a main instigator of repressions (Freud, 1926, p. 91, 117-118). Those later reinforcing structures and impressions with which super-ego is secondarily associated, as you will see, simply repeat and add cathexis, as secondary representatives which harken back to the primary punitive aspects of the more basic formative impression. For this reason, an understanding of the dynamic which forms the primary impressions that give rise to super-ego is essential. Once we understand this, then, it will be possible to deduce a methodology whereby we may reconsolidate the primary mnemonic neocortical store to eradicate this structure, release the repressed contents of the unconscious, and harvest

those energies, while depriving the neuroses of the basic topological structures and tensions necessary for symptomatic creation.

A few examples will clarify the development and purpose of the reactive elements of the castration complex. This first example is the core, the primary memory around which super-ego has been structured. I will again encourage the reader to read the embedded copy, or download the Prometheus paper (Norman, 2013 Prometheus) from *The Journal of Unconscious Psychology* web archive for a detailed analysis of these structures.

Please examine this example of the formation of super-ego, and take careful note of the relationship, or lack thereof, between any morally reprehensible action, and the guilty destructive result: masochism. A series of specific reaction formations is key to the masochistic structural formation—

My step-father is in a poor mood. I am young, ~ age three to four. I hear the antacid tablet clink on the plate as he removes it from his mouth to shout at me. I am berated for no reason whatsoever. Although I have done nothing, and was most careful to avoid any such reproach, an accusation of chewing improperly with my mouth open is made at a shout, and I burst into tears and run from the table into my room. Now the formation of super-ego begins:

1. I am weeping uncontrollably, and need my mother to comfort me. I am choking and gasping and can not stop crying. I repeatedly shout, "Mommy, mommy, I need you."
2. She does not come to my aid. The feelings of abandonment and loss of love are overwhelming and must be answered and quelled. As no help is forthcoming, the following reactions are set into play:
3. The feelings which are reacted are:
 - a. Mother, I need you.
 - b. Mother, I am hurt.
4. To stop the intolerable anguish, the passive emotional states are reacted into active ones:
 - a. Mother I need you becomes, mother I am dominating you.
 - b. Mother I am hurt, becomes, mother I am hurting you.
5. Once the passive suffering is transformed into active fantasy, and the hurt I was experiencing becomes a fantasy of hurting, of sadism, the tears stop. Now I am fantasizing about hurting my mother, who did not comfort me, and allowed my step-father to abuse me, and, the suffering and weeping stop, now replaced by thoughts of sadism and hate.
6. It is the *economic* factor, the *quantitative* factor which is key (Freud, 1915, p. 181), and once the sadistic thoughts become hyper-energetic, they create a new cognitive dissonance: guilt. A dissonance which would be tolerated asymptotically at a low energy level, becomes pathological once the intensity is increased past a point. The phylogenetic factor enters into play here. When we feel hatred, intense hatred for a loved object, the result of this ambivalence, so very peaked and reactive in its

oppositional feelings, is guilt. When we strongly hate that which we love, we become guilty! To add this guilt to the sadistic stream, masochism is then formed. Sadism + Guilt = Masochism (Freud, 1919, pp. 193-194; Norman, 2011, p.116).

7. Here is the imagery symbolizing the guilt: I am howling in agony, my arms sloughing their skin like melt wax, my back hollow but for a necrotic pudding of feces and meat stirred with bones protruding as a crown of lamb sprung from the sunken hollow of my back, guilt and the knowledge that I am not loved, and am evil, and should suffer to know this, just as I am suffering, and so, I should know it: I am evil and unloved.
8. Now the result is the knowledge that I am a rotten person, so very bad, and of so little worth! I am so very sorry, so sorry, so sorry! This child wants but one thing: To accept the guilty definition of himself, he wants but one thing: *To be punished*. [The painful conglomeration of symptoms are in fact, a punishment, a super-ego wish.] In this, we see conscience for what it is: a masochism.

Please remember that no guilty act whatsoever caused this unhealthy conflagration of events, which were born out as a phylogenetic resonance, a preordained masochistic reaction as ripe fruit, a masochism waiting to be harvested, sown long ago by an abusive patriarch, now plucked from the branch to sicken, all as a function of the quantitative excess of feeling, not borne upon any real guilty action! [Norman, 2013 Prometheus]

Please note the function of the reactive elements is two-fold: 1. the sadism is brought forth to answer my feelings of abandonment and loss of love, feelings which extend toward my mother. Those feelings of *affection and need*, these feelings of love, trust and dependance upon the mother are the source of great conflict in the situation of abandonment, and so, they become dissonant, and are transformed by reaction. Please note the somatic presentation, which was an isometric shuddering, a vibration of great strength as the hate caused the body to pit muscle group against opposing muscle group to burn off the excessive tension, tension resulting from the excessive affective cathexis of aggression which is spent upon the self as impotent rage with none but an IMAGINARY object. 2. The reaction into sadism is, once energized past a certain level of cathexis, reacted once again, now directed toward the self as masochism. So we can see, that the reactive elements serve not only the purpose of redirecting aggression, but also, an even more primary function: to absorb libido/sexuality. These elements transform, by way of regression (to the anal sadistic), the burgeoning erotic basis of maternal attachment into hatred, and so, eliminate the incestuous impulses from the Oedipal situation, along with their aim inhibited affectionate component. I will flesh out these ideas below. For now, think of libido as undifferentiated systemic potential issuing from the ascending activating system so as to create cortical tone (Kaplan-Solms & Solms, 2002, pp. 264-267). This undifferentiated potential, can be directed toward any number of functions, but it is finite in its quantity. If one series of circuits and reactions is engaged, others must be disengaged. The repression of libido can be thought of as a regressive systemic reallocation of limited energetic resources—an idea with far reaching consequences.

[I hypothesize: The consequence of these reactions is a narcissistic wound: the reactive elements of the castration complex causing detachment from the mother,

functioning in similar ways in the cases of male and female development. It appears a narcissistic wound is at the center of the transference neuroses, as super-ego is formed around threat, and, is the instigator of the very conditions of repression, and hence, neurosis. The defenses aroused, are in the male, as we have established, a function of the castration threat—the narcissistic wound par excellence. In my *Tangible Self* (2011), I have deduced a similar situation may well be at the center of female moral development in *some cases*, the idea of genital mutilation connecting the two together, functioning as an active castration threat, establishing a direct parallel. In cases more in line with the typical psychoanalytic picture (Freud, 1924, p. 178), where loss of love takes the place of the castration threat, again, a narcissistic wound of great threat and pain is created. I hypothesize: The effect of the loss of the mother's love forms a primary narcissistic wound in the female, akin to the case of the male, and, that the developmental purpose is on one level the same—to remove libidinal cathexes attached to the mother from the Oedipal situation. Here is how Balestriere (2011) summed the idea referring to a patient unable to cathect experience resulting from a wound in the relationship with the mother: "... absence, coldness or decathexis on the part of the mother may prove mortally wounding to the girl's narcissism. That bitter disappointment may lead to a counter-cathexis that freezes the loving tendency toward the mother and indeed, potentially at least, every kind of loving tendency. Wounds in the homoerotic tendency that supports narcissism can lead to massive defenses being mobilized, this setting up a void, an emptiness; hence the futility of any kind of cathexis, including- and above all- the narcissistic cathexis of the self." So I propose, that throughout this paper, the term, "the reactive elements of the castration complex," will refer not only to the psychodynamic situation thusly aroused in the case of the male, but will also refer to the systemic defenses aroused to absorb libidinal cathexis toward the mother in the context of the Oedipal situation in the female. Those may be identical to the somatic reactive responses in the male, as I hypothesize in my *Tangible Self*, or, utilize different reactions, to achieve the same result: removal of libidinal attachment to the mother. These defenses, these reactions in both cases, will be referred to as: "the reactive elements of the castration complex." I hypothesize, that in the cases of the male and female alike, the reconsolidation of the punitive developmental memories associated with the loss of the mother's love, will serve to rightly restructure personality.]

Examine this later example of the reactive elements of the castration complex as they function within the context of a social setting (Norman, 2011; 2013 nine/non-elliptical).

The original memories reveal exactly what you would expect: super-potent introversion hallucination where the entire body shudders constantly in rage and hate. The scenes are sadism. Some early mild prototypes from kindergarten and first grade were aimed at Mark C., a boy who enjoyed hurting my arm on the jungle gym. The fantasies were of breaking his arm back at the elbow on the jungle gym, and went from there. As my stepfather added his tantrums of impotent rage to my psyche, a sense of deep insecurity about how events could spin out of control and I could be blamed was answered with the same tonic—more hate. I never possessed any optimism or spiritual buoyancy—I always possessed will...will for ten. The hyper-punitive conscience was soon to follow to repress the hate and sadism. Such powerful energies! So ill and conflicted to bury them! Once repressed the road to obsessional neurosis is wide open, the predisposition clearly defined. The ambivalence toward

parental objects also extends to a point of particular origin. The reversal of positive for sadistic cathexes is first found in these years, and in this regression to the anal sadistic set the stage for obsessive illness.

Note the implicit castration symbolism, the injury *to my arm*, which triggered the reaction. Just as one would expect, the castration threat, the passive position is reacted into sadism, and the injury actively returned by way of isometrically expressed, severe, shuddering rage, manifested in impotent fantasy against an internal object. Please take careful note of the somatic presentation. The term introversion hallucination, refers to:

“This hallucination which is not an hallucination as such, but the flowing backward of the ego into the world of fantasy in the mind's eye, this world of the id, the wishes once symbolized, **or not**, and so charged with enormous primal energy calls out to introvert the ego, to engage the ego within the world in the mind's eye as if it were real. This is the current to introversion found in SSRI withdrawal, an hallucination that is a super-energized dream, a “supersexualized” replacement gratification very close to or directly representing the id, into which the ego enters as if it were real. In the case of severe SSRI withdrawal, this is the primary danger: an introverted hallucinatory state leading to the psychotic *identification* with sadism, masochism or other unconscious material which threatens to swallow the ego. . . The state of introversion hallucination which is an experience by way of submersion into fantasy and the intensity of its presentation, is a hyper-energetic extension of introverted daydreams. Daydreams also demonstrate the combined cathexes of ego and id onto a fantasy which in the case of introverted daydreams in a normal person is often a low energy dream-like compromise formation with some fraction of direct unconscious content, but in our case of introversion hallucination is highly energized and in its entire, was formerly unconscious. In the case of introversion hallucination a hyper-cathexis of once unconscious fantasy is achieved as the ego adds its libidinal constituent to that of the id to achieve the hallucinatory introversion. *Here, in introversion hallucination, a confluence of libidinal cathexes is introverted.*” [Norman, 2011]

Now we must examine the development of these structures over time. Keep in mind the familiar fact that frustration leads to aggression, and, the number of times which a frustration is inflicted, is a demonstrable factor in the eventual level of frustration (and hence aggression), which results (Dollard et al., 1939; Panksepp, 1998, pp. 191-192).

Please read this excerpt concerning the development of reactive unconscious structures from my *Tangible Self* (Norman, 2011).

The development of reactive unconscious structures

“. . . As I examine the once repressed contents of the myriad of fantasies, the replacement gratifications that were not available to consciousness during my upbringing, a clear trend in the development of the reactive structures is evident. After the hyper-punitive conscience developed the sadistic elements of personality were repressed. The full lifelong sum total of these reactive psychical formations was available to see en masse, all simultaneously energized and visible in introversion hallucination during the worst of the

withdrawal. Likewise, I can now access many of these memories at will. They exhibit progressive and linear modes of development in their construction and design as expressed over time. To be more plain, if one looks at, let's say, 300 unconscious replacement gratifications from a typical year period, they will follow certain themes which will be expressed over and over. A certain wish, a need, will be addressed and answered again and again. This element, this single common thread which gives the motive force for all 300 separate various incarnations is the primary determinant. A primary determinant from the family dynamic unites all fantasies from any period. This unmet need or injury from development will find hundreds of separate means of actualizing a single expression in meaning. The means of expression in sadistic reactive fantasies, and in other conglomerations also, in fact I will go so far as to say I am certain that in almost all unconscious presentations (excepting painful traumatic and specific mnemonic impressions) all present as super-sexualized ideations. Here is the definition of that term from Mind Map: "...'super-sexualized fantasies'—fantasies which contain the sexualizing of other activities, and sexual expression of hidden wishes, some sexual some not..." Now the initial incarnations of these fantasies at times but not always bore the mark of sexual sadism, slow voluptuous torture, but that was not always the case and lasted only through the very earliest years. These early fantasies were conscious. I gave vent to them freely in thought. Most were power displays as were all the later ones in ever-escalating fashion, but some of these very early fantasies were different, of a clearly sexual and sadistic nature in the usual sense. After that and forever outward their quality and more so their intensity changed, and they were repressed. These later fantasies were not of a voluptuous or sexually sadistic nature, never slow torture, only an exhibition of sheer power insisting that the primary demand be met. The frustration these fantasies responded to was severe, and the presentation of the images is explosive and super-violent. A demand to answer the primary injurious determinant is issued, and after it is refused, a superexplosive retaliation ensues. That is the basic form of 295 of our group of 300 repressed fantasies. But you may have noticed that this no longer seems "super-sexualized." That is because the sexual tension characteristic of libidinally charged sadistic fantasy has vanished. The fantasies, and there are thousands along this line, all demand the primary demand be met, and as soon as it is not the violence begins, always a super-rapid annihilating display of power, never a voluptuous sexual pattern of small advances and retreats, only super-explosive violence—but this violence is inevitably and invariably directed towards the genitals. Clearly this is the ultimate penalty and the ultimate threat.

Symbolism does occur within the sphere of the unconscious, but it is utterly obvious and not used to repress or conceal as in dream formation which is an ego/id compromise formation. Unconscious symbolism proper, the language of the id is obvious and often enough its purpose is not to conceal but the reverse, id symbolism serves the very opposite purpose: to intensify and multiply intensity and increase clarity, to emphasize. An act will be supplemented with redundant symbols of the same act so as to increase its intensity. As a chain of fantasies goes on, an explosive super-violent genital mutilation will be paired with its symbolic equivalent, so the next fantasy also removes/mutilates the eyes. The next may do all that and also remove and/or

break the fingers. The next will do all that but remove the hands as well and then the toes, then the feet, etc. The id need not hide from itself, it uses symbol to make obvious condensations and transfigurations which can not possibly be missed, and uses symbol primarily to increase its cathexis, increase the energetic power of the fantasy through symbolic multiplication [overdetermination]. These escalations in turn correspond to escalations in personal frustration.

. . . Imagine my surprise to be presented with the contents of my unconscious and to observe thousands and thousands of scenes, so many scenes from every period of my life, and what do I see?—acres and acres of unbelievable super-energetic fantasies about or involving only one thing: Castration! This is the supersexualized element. Although the fantasies are of power or explosive acts of violence in retaliation or commands of mastery, the penalty is always the same. But I have spoken falsely and this distinction is indeed my point—a mistake in wording has blinded us. In all but two cases out of thousands—castration alone never takes place, something much different which includes embedded within it the act of castration does: genital mutilation. Male and female subjects in fantasy are treated identically. This threat is universal in its horror, not gender specific. It is always genital mutilation which is threatened: the mutilation, or as is far more common the removal of the entire genital apparatus of either sex.

The progression of these reactive fantasies over time has something else to teach us. In every case, a theme is established. This will be in response to an external frustration of a primary constituent, an unresolved tension in the family dynamic. Then through childhood and adolescence as the family dynamic continues over and over again to inflict the same injury, the fantasies increase their energetic presentation. A cascade which escalates the complexity and increases the energy of presentation follows. The result is a string of more and more energetic fantasies on a given theme. A new particular injury to the ego is likely to establish a new theme, but in many cases due to the consistency of the family dynamic, the particular circumstance, although different, will typically still express the same old unresolved pattern of consistent family conflicts which are never addressed, and so always assert themselves to create the same old injuries in new ways.

So numerous instances which each in and of themselves might amount to little, are compounded one upon the next to increase frustration. Each of these injuries, these irritants to the ego, may be small, something a bit of rage and/or better yet tears and time might fix, but compounded together the cumulative unresolved frustration can become enormous. The locus of the coalescence of the injuries to the ego will be around the primary familial determinant, a frustration or injury from the family dynamic which is repeated over and over. The cumulative level of frustration is key.

As the fantasies express the increasing cathexis of energy in the tension which the family dynamic leaves unresolved and reinflicts over and over, the fantasies carry more and more energy and the frustration and this increasing energetic cathexis is symbolized in an escalating increase in the violence of

expression. The end of one of these chains of escalating fantasies will display the very most clear example of energetic overcathexis of energy as super-severe "overkill." This term borrowed from the language of criminal psychopathology is most appropriate. Indeed, I will assert that anyone who has had occasion to observe the contents of their own unconscious directly, will scarcely be able to proclaim criminal psychopathology a mystery. In fact, psychopathic criminals are an open book, that is to say, they are directly representing unconscious acts, sometimes distorted in the transference, but to a great degree not! To see the unconscious is to see criminal psychopathology. One may look to the unconscious of one individual to see a preponderance of one sort of aberrance or perversion, and to another for a various preponderance of constituents, but I assert all are available in any unconscious, although in vastly different intensities of presentation and proportion. I offer this hypothesis for the unblushing among you. A teasing test of honesty. Can you accept this possibility? Are you that honest?" [Norman, 2011]

Now we must take a look at one of these unconscious reactive fantasies which were available to see in SSRI withdrawal induced hallucination, each associated with a period of my life, as an active, potential symptomatic cause, always spinning away in the unconscious in unconscious fantasy. Here is a key statement from above:

The fantasies, and there are thousands along this line, all demand the primary demand be met, and as soon as it is not the violence begins, always a super-rapid annihilating display of power, never a voluptuous sexual pattern of small advances and retreats, only super-explosive violence—

The key is the primary demand...in EVERY case, in every one of the thousands of examples, it is the same, as this injury, my father's constant degradation of my worth, raging to relieve himself, has been inflicted hundreds, or perhaps thousands of times, but is never addressed—leading to ENORMOUS frustration and sickness. The father is rarely the subject. The subject is bound to a rack made of iron. Before I remove the genital apparatus and place it in the throat to kill, the demand is always the same: "SPEAK!!! IS THIS FAIR??? WHAT HE DID—IS THIS FAIR??? WAS THIS RIGHT?? WAS THIS RIGHT??" Then the internal object fails to admit it, and the violence begins. In this low energy example, hundreds of blows at a ten foot arc are struck with a machete, the pubis is then removed and placed into the mouth to kill via suffocation. Although very gentle in its presentation, this gives a soft and comfortable idea of the violence of it all, which is significantly greater in the very most calm examples. The energy of presentation is astronomical, and corresponds to the level of frustration.

Please note how the hatred absorbs all sexuality and kind feeling of attachment, doing its job exactly as it should.

The reactive elements of the castration complex act as a ballast-resistor, absorbing all types of libido and burning the energy off in impotent fantasy accompanied by vibratory isometric muscular discharge. This is accomplished via regression. The symbolism of this regression from the phallic to the anal-sadistic is obvious as it is disturbing: What would be an Oedipal wish of sexual tenderness, is regressed to

sadism—the knife/machete is symbol of the penis, infliction of the wound symbolizes copulation, and the death, orgasm.

Please note how complete the reactive structure is, the inability to breathe, choking and unable to stop crying, the panic circuitry based on the breathing/suffocation reflex, ringing like a suffocation alarm, this painful aspect is reacted into the fantasy just as the phylogenetic castration threat wielded by my raging step-father, who my mother invited into my life. The penalty inflicted invariably returns both aspects, the removal of the genital, and suffocation, which in most every case are combined into a death wish as specified in the example. This core complex, the castration complex, around which super-ego is formed [Sigmund Freud, “*The Ego and the Id*” in *A General Selection From The Works of Sigmund Freud*, p. 233.] must be removed, if the repressions are to be lifted which form the economic tragedy, the guilty disaster which has squandered us all. Imagine the waste. To keep most of one's energy bound into frustration and hate, and then to keep this massive energetic expenditure hidden as it turns and spins, wasting our precious stores of limited energy in pathogenic unconscious fantasy. This ugly threat, the threat of castration stemming from the father, need not be reacted into hate, ruining the subject and wasting his precious energies in worthless unconscious impotence. It can be removed, and ethics, may replace a reactive repressive morality born under hate and threat. Before I provide that information, and discuss the neuroscientific implications of this unfortunate moral structure and the happy solution, we will need to find a method which will allow us access to what should be unconscious material. How were these memories and fantasies brought up into the light of day? They should be unconscious! SSRI withdrawal creates the conditions for hallucinatory demonstration of unconscious content in painful, dangerous illness. Is there a method or technique which can afford unconscious access, without the dangers of hallucinatory psychosis? Yes, there is.

The Open Emotional Posture:

It should be clear to the reader at this juncture, that the consequences of maintaining such potent sums of enormous energy under repression can amount to nothing good. My personality presented as a kind man, particularly to women, who I had always shown the greatest respect. The anger was submerged in shallow water, a reptile lying in wait. Personality, is a lie of omission, as I discovered much to my horror and amazement in SSRI withdrawal, as the full sum of repressed reactive contents were disclosed. These contents were repressed, for one reason: they were painful to the ego...to me. The repressed unconscious contains its store of ugliness as a matter of defense, so, we can see that one need not expect anything pleasant in the unconscious, as if it were pleasant or uplifting, it would not need be placed under repression to begin with. Repression and the part of the unconscious formed from it exist for one reason: to remove painful thoughts and memories from consciousness. Every repressed unconscious thought causes severe pain, and this is how we will access those thoughts—by their painful signature. However, many of these thoughts have been placed under repression not due to any inherently painful quality of the thought or memory, but because the thought has been re-polarized, its affect converted from pleasure to pain by the addition of a reaction formation (Freud, 1905). With this in mind, it is sensible to understand that as we access unconscious material, the pathway toward such material is marked by pain, but the energies we may then access, may well be of an entirely different quality. Only *our observation* of the process creates

dissonance. (This will mean much later). The energies we will discover, are in fact value neutral, and can be re-polarized once again, the reaction formations removed to allow the thought to become integrated into consciousness. For now, the situation stands as one of repression and pain, so we will use the current state of affairs to find our way toward their undoing.

The reader should understand that free associative technique is more easily learned, and has greater utility in more situations than the open emotional posture, and, the two should be used alongside each other, and often enough, used together. The open emotional posture is much more rapid, and it is linear, rather than elliptical. To maintain the open emotional posture during normal waking activity is enormously advantageous. In and of itself, the OEP and the information regarding the symbolic triggering of dopaminergic/opioid activity associated with Schore's ventral limbic orbitofrontal circuitry, alpha function and the experiential template...these few ideas alone may help very many, and require but minutes to understand and use. The benefit is immediate. The OEP will dramatically increase creative function, and should be maintained at all times. This is the beginning step toward creating the new integrative personality type. Although the OEP is established by allowing a painful stimulus to guide the way into the correct emotional posture to relieve repression, the energetic release it fosters is all encompassing. When used in a directed fashion as in my *Tangible Self* (Norman, 2011, 2013 nine/non-elliptical), repressed memories from abuse, molestation, and all of childhood become accessible. If the route to a memory becomes blocked, simply switch to the slower method of free association and pierce the resistance by this more circuitous route. When the resistance again becomes too great, a construction must be used (Norman, 2011). By utilizing these three methods in alternation and combination, memories under the very deepest repression can be directly accessed, or, reliably constructed. Often, after a construction has been used to remove debilitating symptoms, some weeks or months later the actual memory may be retrieved using the OEP, and the construction verified. In every case without exception you will discover the memory to be a perfect match for your construction. This is not surprising, as the symptoms *never* disband if the construction is flawed, and always respond to only a precise match to the objective facts, *never a subjective conglomeration of any kind*. As to constructions the invariable rule is: Accuracy = Efficacy.

If you are serious about this, you must read *The Tangible Self*, and the "nine short essays" paper available for download at *The Journal of Unconscious Psychology* web archive: [www.thejournalofunconsciouspsychology.com] outlining the basics of native psychoanalysis as a non-elliptical technique (Norman, 2011, 2013 nine/non-elliptical). To establish the open emotional posture, first, the subject must find within themselves, a painful memory or thought. The closer to a real repressed thought the better, so the idea chosen must be deeply disturbing and sad, so much so, that it is almost impossible to tolerate. This is akin to an unconscious ideation, although of course, much less painful. Allow the memory to freely enter the mind without resistance, and then, do not resist the feelings in any way, but instead, learn the habit of opening up to the pain, rather than resisting it. This will create the necessary conditions, and a piece of hysteria will emerge—*tears. That is the key*. If no weeping can be brought forth, the OEP has not been established. True pain, just as in every single unconscious ideation, is essential. The unconscious contains nothing but pain and suffering, so pain is the light we follow to the hidden depths. Soon we will change

the state of affairs, but for now, know it: pain is the way toward the depths. Eg. As you think of the death, or the injury, the sorrow of failure, the suffering so great it can not be withstood, you now know, you will not resist but will become again, and will allow this suffering to emerge without restraint. Become open and unresisting. This and this alone—*is strength!* Soon, the tears will flow as water, the pain released and flowing down your shuddering cheeks, the salt and sorrow as drops of light flowing over your parched world, as rain and salt wept from a burst cloud, weeping in purity and light, never to resist again—Now, allow the pain to increase and increase, never resisting in any way—Release—everything! *To withhold, is cowardice!*

Soon, after the flood, the pain will spend itself, the contractions allowed to come, never resisted, and then, the rain will slowly drain away, as mist and dew is our pain once spent. So allow it all, release this one pain and...*never resist again. Remain open, in just this emotional posture*, never resisting any feeling—ever! Allow all the world to spill out from within you and know it: emotion, affect, libido, is the energetic source of all thought (Norman, 2010). Feel everything—*know everything*. This is our credo, we who are unafraid—we who are worthy. Now that you are open to all of your pain, never close up again, and behold...all of pleasure, all of feeling is housed here, in the hidden places, those places which we will now bring to light, and plainly see—in innocence. The open emotional posture is achieved by opening up to a pain, and allowing that pain to be released without restraint or resistance. Then, maintain that same emotional posture, for all of life. This one change, this one complete reversal of modern personality, will bring astonishing results. Creative and intellectual activity will flourish.

You are now open to the repressed, open to every happiness, *every energy* which has been hidden and shamed, as now, you are open to the unconscious. Remember: the repressed unconscious contains nothing but pain. Move toward your pain, allow it through, and find the hidden energies of the unconscious (Norman, 2009, 2010, 2011).

Please read the entire of the nine essays and native psychoanalysis: a non-elliptical technique (Norman, 2013 nine/non-elliptical) available for download at *The Journal of Unconscious Psychology* web archive, for the full presentation of the following, which will serve to illustrate the directed usage of the OEP as a memory retrieval technique. The better one becomes at using the OEP the more quickly one can access deeply repressed unconscious content. The technique is also useful in combination with free associative technique: remain in the open emotional posture, and rather than utilize the language as specified below, one simply free associates. The OEP greatly enhances free associative technique, and creative function, which is in the efficiency of its dynamic, proportionally related to proximity to the repressed (Norman, 2009, 2010). Creative ability is increased as a function of increased proximity to the repressed. So read below, and observe the role of language in the process. Also note, that an image, or a strong feeling may also be used in place of the language. (This indicates that although the Freudian (1915) metapsychological notion of a hypercathexis of word and thing presentations creating the conditions whereby something may become conscious, is efficacious, although not precisely necessary as a conclusion. The correct inference is that words act as an associative nexus between the unconscious and preconscious whereby the hypercathexis is established, and,

images associated with the particular unconscious aspect, or strong associated feelings, may do the same.)

“Perfection in musical expression, performance and composition had over the course of many decades become my entire existence, all the rest of my life having been sacrificed to serve those ends. So what is it that makes one an obsessive, a type of obsessive—a perfectionist who achieves the goal, one of the highest standards who builds the cross, gets on it and nails himself in place...perfectly? I have found the answer. I had succumb to the enormous creative tide now available to me from exposure to unconscious material and written a book, a novel entitled *Ever Deeper Never Better*. This is both a happy and an unhappy fact. I now have the unenviable task of presenting the work, or some description thereof, to hundreds and hundreds of disinterested literary agents. My wife is kind enough to help. She is not an obsessive, and by my standards at the time, she thinks little of making an innocent mistake, and so, is somewhat haphazard about checking an email query to one of the 500 agents on the list, all of whom are sure never to even read my precious submission. Blair, my wife, mistakenly only sends part of the sample off to one of the hundreds of literary agents. I am watching and notice her mistake. Something in me snaps, boils to see it. I go into an uncontrollable frenzy of reproach. Here we see the signature of Native Transference clearly: overreaction. Although there are hundreds and hundreds of literary agents, I react as if it were a life and death matter. A sample of my thoughts: My back begins to hurt as the desperation and panic, the gravity of the error sinks in! I can not stop my fury at having been shamed! The overreaction is out of all proportion and is unstoppable in its compulsive, constant, insistent drilling—something must be done! That night I sleep little. The obsession is absolute. My back! The shame! How could she! If it were me, I would be engaged in weeks of endless self-reproach for such an error! But she sleeps! This goes on for a few days.

Here I found an intuitive idea: what I now call Native Psychoanalysis. I knew I had to find out what was so very wrong with me, and could sense how to find it. I had already found relief in the Open Emotional Posture and used this skill to try to find the cause. I went looking for the earliest time in my life when I had displayed that symptom. I used the Open Emotional Posture and language to do it. This is the first and the most primary of the numerous memories I have now recovered.

Language: As I am pressed to the ground in a squatting position from the back pain, I cry out, "It's like pieces of obsidian, hard and black, like chips of sharp pressed shit poking out of my back!" I see in my mind the pattern of the imaginary eruptive protrusions projecting from my upper back.

Language: At the peak of my rage and reproach I shout over and over, "No filthy mistakes! No more filthy mistakes! Don't you know there are penalties for that?" When I say those words, "No more filthy mistakes!" I was pressing and raging with such energy that the words all but lit up. They summed the entire feeling and were the key. I went looking for the first time I could remember acting like this, the first time I remembered feeling this way. My back was killing me and I needed relief. I was all too happy to look at my pain. To move toward it, that is the key. I couldn't find it. Nothing. I looked for the next one back, instead of looking to childhood, I opened my mind to my pain using the Open Emotional Posture after thinking of the language, "No more filthy mistakes." I let the words disappear as I opened the mind with the

Open Emotional Posture and there it was! I was practicing drums and missed a note and exploded with the words. I remembered the whole affair. Again I cast the net and let the words come into my mind then fade and I thought of my last breakdown and how it had destroyed my *Time Travel and other illusions* cd and the feeling was exactly the same: Shame! Next I tried again and went many years back to thoughts of some painful events which were long ago well forgotten but now jumped into my mind. The filthy mistake was letting myself be used, of being stupid when I was younger and the mistakes and the shame that cost. The feeling was identical. Here I wanted to stop, as if that were the end of it, the earliest impression but that was resistance! It had to be! I still hurt and was still obsessed. So back again I cast the loop, used the language and let it fade as I opened the mind to my pain and now, I am close! My age is eight or seven and my friend Reggie is playing my drum practice pad and looking at the music on the stand. He is not doing it properly! "Reggie! You idiot! Stop that! No filthy mistakes!— Idiot!" Wow! That was a real memory! I was a mean little kid! But I still hurt. So back again, I bait the hook with the language, let it fade as I open my mind with the Open Emotional Posture and invite what may, and now it is I who am masochist before my will, a severe will cutting into me as always, cruel beyond measure. I am six or seven, and this scene has many replays, oh so many versions! I am practicing and can not get the notes right. "Idiot! Aaaaa! No filthy mistakes! No errors!" I am livid and shaking with frustration and mom says, "You don't have to do this if you don't want. It's okay." "No! I will get it right!" There are many of these, mostly I am alone, or fail to recognize anything beyond the sphere of my attention, but the feeling and the language are all but identical. But I am still sick, the imaginary black chips poking through the skin of my back—so I have not found it. Again, I remember the words, the fish hook, the language, "No more filthy mistakes," and then let it fade and open my mind. Now a scene of such clarity, so old and yet so pristine and crisp in its visual presentation fills my mind. I am in the tile bathroom. My nurse, a dear blessed woman who has stood so well and been proven so caring throughout so many retrieved memories, is there. I am sitting. She is holding my soiled underwear open before me, holding it open so I may see the marks I have left. Two vertical stripes, one broad one narrow, are clear to observe. She speaks, "Honey, no more of this. No more filthy mistakes." Her tone is serene. I am flabbergasted! My back is better! Suddenly the idea is so repellent I am getting worse! Then I remember that I am not this small child, I am a forty-six year old man, no longer a child! Now the symptoms are gone! I do not care about the trivial error my wife has made! My back is fine! I am well! Soon, we will see why." [Norman, 2011; 2013 nine/non-elliptical]

Now it will be necessary to analyze a piece of neurophysiology in order to find a foothold on the pathway toward an understanding of re-polarization theory.

Analysis of Schore's dopaminergic ventral sympathetic, and noradrenergic lateral parasympathetic limbic circuits, and their relation to alpha function:

Schore has discovered a piece of neuroscience which along with some symbolic analysis, has allowed me to entirely alter the balance of my world. I will admit here at the start, that I am no fan of the intersubjective processes and the subjective approach to mental illness and health. I have studied it, and have yet to eliminate even one real symptom with these ideas. Read (Balsamo, 2011) and discover why I am so deeply unimpressed. However, not all of the ideas of Bion are beyond demonstration, and

some few practitioners of the intersubjective method are most skilled and highly knowledgeable of many techniques (Brown, 2011). Some patients require such a method as they are simply not suited for free association, and one can see new therapeutic alterations emerge in competent therapists to accommodate these situations (Kaplan-Solms & Solms, 2002, pp. 120-126). Indeed, I have been able to make clear demonstrable sense of the intersubjective idea of “borrowing” alpha function (Brown, 2011, p. 165), evidenced in certain dreams which I have been able to provoke in a subject I was attempting to analyze, and more importantly, the notion of alpha function itself, which I have seen as clearly deficient in some subjects. One friend who was quite ill and requested my intervention, is a prime example: a man most highly intelligent with great mathematical competence, who outside of this one prized symbolic domain, was incapable of even rudimentary symbolic analysis or symbolic function in general, his world locked in the concrete physicality of alpha function deficient reality.

Alpha function is demonstrable, and although the intersubjective use of this phenomenon is in my opinion, questionable, the phenomenon is not. I believe Schore has discovered the circuitry, and its developmental mechanism, which parallel Bion's ideas quite closely. Its practical usage however, is entirely another matter.

Schore has discovered two circuits which are primary in development, and function in opposition to each other: the dopaminergically modulated sympathetic ventral tegmental limbic circuit, and the noradrenergically modulated lateral parasympathetic tegmental limbic circuit (Schore as cited in Kaplan-Solms & Solms, 2002, p. 234-235). The sympathetic circuit is formed, much as Bion had supposed, as a function of the dyadic exchange between infant and mother of glance and gaze, and I will add my own inference which is quite obvious and easily supported (Keverene, et al., 1989; Montagu, 1978; Panksepp, 1998, p.272) as infants engaged in the exchange of maternal glances are usually being held, that *maternal touch* and the subsequent addition of neuropeptides/endorphins also has a part to play in creating the result:

"It is hypothesized that maternal regulated high intensity socioaffective stimulation provided in the ontogenetic niche, specifically occurring in dyadic psychobiologically attuned, arousal amplifying, face to face reciprocal gaze transactions, generates and sustains positive affect in the dyad. These transactions induce particular neuroendocrine changes which facilitate the expansive innervation of deep sights in orbitofrontal areas, especially in the early maturing visuospatial right hemisphere, of ascending subcortical axons of a neurochemical circuit of the limbic system—the sympathetic ventral tegmental limbic circuit." [Schore as cited in Kaplan- Solms & Solms, 2002, p. 234]

The famous studies from the 1940's conducted by Spitz (Spitz in Bowlby, 1980; Panksepp, 1998, p. 262) may well imply the primacy of this developmentally innervated brain circuitry extends to include the most basic dependance: that of life itself. Specifically: if deprived of maternal touch and gaze, the infant may well die. The sympathetic tegmental limbic circuit is dopaminergically modulated, and can rightly be thought of as a primary manifestation of libidinal excitation and discharge (Kaplan-Solms & Solms, 2002, p. 237). It should be noted that the dopaminergic and opioid systems and circuitry which respond to create the good feelings which

reinforce socially mediated behavior, both involve many of the same areas, such as the ventral tegmental area, where the A-10 meso-limbic dopamine cells are located (Panksepp, 1998, p. 118). Neuropeptides such as the endogenous opioids including beta-endorphin which are triggered by social cues and touch, have a primary role in creating social bonds, quelling pain, both physical and mental, are key in alleviating separation distress, creating sexual reward, and addictive reinforcement (Panksepp, 1998, p. 255, 264). So we can see here, in the formation of the sympathetic ventral limbic circuit triggered by maternal exchanges of glance, sight and touch, a source of libido, an energetic dopaminergic circuit which up-mediate arousal and shapes behavior, formed presumably by way of allocating both endorphins, and those neuroendocrine functions involved with encouraging the substantial innervations of dopaminergic projections into orbitofrontal areas. Here, in the activity of the completed circuit, along with the peptide systems, dopamine and opioids serve their reward and motivational functions as social and energetic contributors.

The contrary circuit, the parasympathetic lateral limbic circuit, is to be thought of as a balance, a cut off, a competing inhibitory system to counter the rewarding energetic expression of the sympathetic circuit (Kaplan-Solms & Solms, 2002 p. 237). This circuit functions to stop our energetic libidinal expression: functional, conditional, affect regulation in response to social cues (Kaplan-Solms & Solms, 2002, pp. 234-238) and so, can best be understood as the physiological structure triggered by social disapproval: *by shame and guilt*. Both of these circuits are innervated into the orbitofrontal areas, which mediate social cues and functioning, just as one would expect (Gazzaniga et al., 2009).

These two circuits form a fundamental axis around which personality can be assessed as to its balance. Here, we see the basic essence of health and neurosis exposed at the most fundamental level. First I will assess the implications from the cause, from neurological and psychological standpoints, then from the effect, from the perspective of philosophy and ethics.

The notion of dopaminergic/sympathetic predominance:

I used to demonstrate in my personal psychology, a particular state of balance between these two competing circuits, and have devised a method, re-polarization theory, which will alter that balance. As a neurotic with OCD, I had little co-anesthesia, which means I always felt the constant activity of, and was painfully aware of, my inner visceral bodily sensations, eg., I always had a sick stomach, and poor appetite. I would vomit often. My sensitivity to loud noise was part of this common cluster of neurotic symptomatology. A state of continuous negative arousal, anxiety and irritation at a low and continuous level, were in the main, a constant I kept under control with rage, and drugs. I never experienced pleasure, unless I had achieved a huge success which would often take years of constant work, or, if I was on a drug. A small man, my tolerance for quantities of drink and drugs was astronomical. I felt no pleasure from life. I had no *interest in* life or the world, instead, I was entirely *determined*, enraged, a furious raging determination to crack the world open and splinter it to pieces—to bend it to my will, crush it and dominate it. Only this, would find my mood softened, and relieve me enough to smile. I never smiled...never. If I let my rage falter, depression would swallow me up, so, I never let it falter...not even once. I was never depressed, I was furious instead. I had little choice... life hurt too much to do otherwise.

In this description, we can see the near absence of opioid and dopaminergic activity, the libido is all but entirely repressed, *the primary process thinking bound and curtailed from expression* as is the very function of the lateral parasympathetic circuit (Kaplan-Solms & Solms, 2002, p. 237). Primary process thinking, here meaning libidinal expression itself, is forced under repression. This is the result of thinking processes which are dominated by parasympathetic/noradrenergic balance in these limbic orbitofrontal circuits, rather than a state of general activity and balance which favors dopaminergic/sympathetic circuitry. Co-anesthesia, as we will see, is a function of libidinal expression *and opioid activity*, which decrease the effects of felt emotional and physical pain and discomfort. Dopamine facilitates pleasure and systemic arousal characteristic of the SEEKING system (Panksepp, 1998, p. 156), and fosters interest in the world, and, opioids inhibit pain, both emotional and physical, and in the case of those such as beta-endorphin, they quell separation distress, and shift the peptide system toward pleasure and calm, and away from the effects of the competing peptide which facilitates negative arousal and stress: corticotrophin releasing factor (Panksepp, 1998, p. 112). The vital functioning of the ventral sympathetic limbic circuit in distributing dopamine to facilitate what Schore labels, "elation," (Schore as cited in Kaplan-Solms & Solms, 2002, p. 236) is curtailed by the parasympathetic lateral limbic circuit, which responds to social cues and circumstances (disapproval) that invoke guilt and shame. So a state of general psychical balance across the entire of life experience, our reaction to changing circumstances is created in no small part, as a function of our interpretation of life events which flows from the contributions of these two circuits in their respective affective predominance. If the parasympathetic circuit is predominant, the subject will have little libido to grace life experience, and will have their energies in the main repressed into the unconscious, affection and libido re-polarized and made unconscious, perhaps regressed into hatred, as in the examples above, from my case. If a state of sympathetic balance is predominant, the subject will have low anxiety, a high sense of pleasure and reward from life experience, and find all of life to be rewarding, pleasurable and inviting. Before advancing a vital neuroscientific experiment which will make this most basic and informative axis of personality available to quantitative assessment, I will first detail a sure hypothesis, which my a-priori successes have amply supported countless times.

Ethics vs. morality—Of ethic and threat: empathy vs. obedience

As the infant progresses through the initial 18 month period during which the sympathetic and parasympathetic limbic circuits are fully formed, the infant masters several stages of differentiation. It is now accepted through the work of Klein (1952) and empirical demonstration, that a developmental/behavioral correlation at the age of four months, exists between infants categorized as attachment secure or disorganized, "dis-coordinated" [disorganized in the sense of being unable to properly integrate the intermeshed and exclusive psychical manifestations of separation RAGE and FEAR as they conflict and inhibit SEEKING and CARE] (Hopkins, 2013, p. 47). The infant at this stage singles out the mother as a separate object which is essential for CARE, and that this fact is then made evident by the manifestations of separation-RAGE and stranger-FEAR, which become manifest at 7-8 months of age (Hopkins, 2013, p. 47). To observe first hand, the interactions between mother and infant, the effect is obvious to casual observation: *the mother's face is the infant's entire world*, once

indistinct as an object, now, *once engaged in the exchange of gaze, touch and glance, only semi- distinct from himself*, her face responds to his affects *and anticipates as if part of himself, as if the world itself were a loving extension of the infant*, a responsive and inclusive extension of himself.

Here, we see the essence of all which is of the higher in man, the heart of hope itself, the nexus, the first and most primary impression of *identification with the world*. Note that I make no mention of the less important distinction, identification with mankind, which is a small and far less important aspect of this most vital and needful result, the essence of human hope, identification with the entire of the world, identification with all things, the fount of the highest of all traits, the fount of ethics themselves—Empathy. Here is how I put the idea in my Prometheus paper (Norman, 2013 Prometheus):

“I propose that this series of circuits in the brain, in their development or lack thereof, correspond to the potential empathetic capacities of the individual. In the affective dynamic of these two circuits we see the essence of ethical development, which is not borne upon the back of threat, *which is a dissociative factor*, but is created here, in the structures which are responsible for empathetic dynamism: The sympathetic circuit allowing what is surely a reward of pleasure and libido as self is experienced integrated into the world, this circuit using a dopaminergic neuromodulator, and the parasympathetic circuit which uses noradrenergic neuro-modulation, a response to shut off our pleasure as a feedback mechanism sensitive to social conditions of rebuke and reproach (shame). Between the two circuits, we see the orbitofrontal cortex connected to the limbic system, the OFC operating in its familiar role as a mediator of social cues and response. In this dynamic opposition we may even see, on the most fundamental level, the functions of libido and repression—*anxiety serving its psychoanalytic role as a repressive agent, brought on by an increase in noradrenergic modulation of the "parasympathetic lateral limbic" circuit to repress our pleasurable drives, when they conflict with the feedback we receive from the world and others.* I propose: These two circuits working in tandem are the neural substrate upon which empathy, and so, ethical conduct and sentiment are founded.

There is considerable support for this idea within current neuroscience. This support comes from two avenues: 1. Studies of people with brain lesions and damage to the orbitofrontal areas, and, 2. Studies on "Antisocial Personality Disorder," or APD. Studies detailing the physiological changes and characteristics endemic to APD, a condition estimated to affect 65 to 80 percent of the prison population (Gazzaniga, et al., 2009, p. 629), indicate a volumetric reduction in the prefrontal grey matter, and reduced glucose metabolism in the orbitofrontal cortex of the subjects as revealed in PET (Raine, 2002). This condition is demonstrated by Raine, to be a product of not only genetic, but also environmental factors. In studies involving patients with damage to the orbitofrontal cortex, the patient is unable to properly monitor and assess the responses of others, and so, the patient with OFC damage will believe they have done well, and be quite proud of their interactions in social situations, even though those interactions were inappropriate (Beer, et al., 2006; Gazzaniga, et al., 2009, p. 605). Ergo: The proper development and

function of the neural circuitry connecting the emotional (limbic), and orbitofrontal regions, and those prefrontal regions themselves which are volumetrically altered as a function of environmental and genetic factors, are crucial for proper affective functioning and reality testing. Plainly: If the "alpha function" circuitry is faulty, and the OFC is not doing its job, ethical development and social function are impaired.

This allows a specific neurological/psychological prediction: In those cases where a reliable personality inventory or other trustworthy test indicates the heightened presence of Empathy as a fundamental constituent of personality, a positive correlation will be demonstrated between the character trait of Empathy, and the robust innervations and demonstrable structural development and functional activity of both the dopaminergic "sympathetic ventral tegmental limbic" circuit, and also, the noradrenergic "parasympathetic lateral limbic" circuit.

Now we must remember that all of our experience of the world is subjective, colored and defined not by the particular experience itself, but in how we interpret that experience or perception. Think of how one person will find beauty in a desolate desert landscape, and another, an empty and barren view most uninviting. Perhaps here, we have found a non-genetic developmental clue as to the mystery of optimism and pessimism, the expectation that the world will or will not be a welcoming place, whether it will be responsive to our needs, or cold and refusing of them. Here we may have a piece of the puzzle shrouding the source of ethics and morality as well, for throughout history laws and rules, many most pungent and barbaric, have attempted to enforce and create ethical sentiment and behavior as a function of external threat, to poor result. Think of the Twelve Tables of Rome, with its code of mutilation, so deeply symbolic of castration and the threat of the father, casually proclaiming how much a creditor may cut from the debtor's body: "si plus minusve secuerunt, ne fraude esto" [If they have secured more or less, let that be no crime] (Nietzsche, 1989, p. 64), or our own capitol punishment—both so deeply ineffective! It seems that ethical sentiment and behavior are not born under threat, but instead the entire of ethical law is but manifestation of a single simple principle: *Empathy*. Perhaps we have found the source of empathetic feeling and hence, ethical action as well, might both be born in this golden moment, here where the world is the self and the self the world, and so, we can dispense with any external "golden rule" or "categorical imperative" proclaiming our actions must be reducible to a moral maxim, or equal to what we ourselves would desire. How could one desire to hurt or exploit the world, once connected to, and inseparable from it? How could one consider such a thing, to harm the world is to harm ourselves! The canon of ethics: threat and rule are ineffective because the truth which foster them is no longer available to *feel*. It is clear that morality and ethical conduct are not a function of threat, but of internal security, healthy connection and balance...ethics are never created as a function of threat and rule, they are born from within. Ethics are a manifestation of health, a function of happiness. It is conscience itself, our modern "morality," super-ego itself, functioning as a masochistic, punitive and threatening agency which has caused the dissociation around which we have all become so deeply unethical, so very..."moral." Empathy is ethical, and so—

–Empathy is amoral. Our modern ethic is an ethic of obedience, an internal structure crystalized around the threat of castration, forming an immoral, and deeply unhealthy dissociation.” [Norman, 2013, Prometheus]

So I will ask you to make a sharp new distinction in your mind between the notion of morality, the basis of modern personality, crystalized around a masochistic structure (super-ego) which is based upon obedience to the father under the threat of castration, and the concept of ethics, which are created as a function of identification, of empathy. These two structures are often inversely related. Ethics are amoral. Morality is often unethical, and pathogenic. Morality... will make you sick. Remember: it is guilt which instates repressions, *and the return of the repressed causes symptoms*. Morality encourages nothing akin to ethical behavior, which is independent of the idea of submission and obedience to authority. Please read the embedded *Prometheus* paper for a demonstration of the difference, as a hypothetical character is transformed from moral predominance, to ethical predominance. Note how obedience and immorality are exchanged for a situationally specific ethical response. [It is to be understood at this juncture, that most of the ugly platitudes with which we are indoctrinated into this culture, are but advocations of immoral submission to the superior will of the father, such as, "A man's got to do, what a man's got to do." What war, what immorality against self and/or others, what base stupidity free of empathetic consideration has *not* been justified under this immoral maxim? Every one, in every war, believes "God" (a projection of the father) is on their side...now you can see why. Ethics are situationally specific, morality is blind, dumb and obedient...in a word—fearful.]

So how are we to encourage the better result? Is there a way to alter our perceptions and basic personality so as to become ethical, and increase mental functioning by transforming the structure of personality from a moral, repression based paradigm, to one of ethics, and sublimation by integration? Yes there is. Please read below, and follow these last few necessary steps, before I reveal the answer.

A necessary piece of neuropsychological engineering:

First, I will advocate a simple piece of neuroscience, which would greatly aid the assessment and treatment of neurotic illness. If psychology is to claim its place as a real hard science, its instrumentally demonstrable practices must be supplemented and supported by objective quantitative assessment (Norman, 2013 quantitative). For this reason, the following test should be constructed, and serve as an objective baseline for determining the balance of this primary source circuitry involved in the very most basic and fundamental activities of affect regulation.

Although much work in cognitive neuroscience has been accomplished regarding the affective value assigned to facial expression (Adolphs & Tranel, 2004; Blair et al., 1999; Killgore & Yurgelun-Todd, 2004), and, much work has been done which reduces the idea of empathy to that of human imitative response involving mirror neurons and responses to human bonding with other human objects (Gazzaniga et al., 2009), this is a false, narrow and egocentric definition of empathy, which is *properly* understood as a state of world/environmental identification, of which other humans are only a small and less significant part. This empathetic identification is formed as a function of the overall functional development, and, active balance between the

sympathetic and parasympathetic limbic circuits, which create alpha function, yield the general optimistic or pessimistic tone of personality, and correspond to the potential level of neurotic predisposition, manifestation, and co-anesthesia. For this reason the following test should be constructed to assess the overall state of functional activity in this system, and categorize its prevailing affective balance as reflected in these fundamental competing circuits and their relative dopaminergic/noradrenergic—sympathetic/parasympathetic activity.

Once situated in an fMRI, MEG or PET, one has the subject look at a series of faces and scenes, each with a distinct affective element, or no such element: i.e., some faces are negative, some positive, some neutral, just as the scenes of cityscapes and nature, etc. As each person has individual prejudice and different affective definitions for *all* stimulus, this test is a baseline marker for that subject. (The addition of a personality inventory and/or test for neuroticism at this point will provide a basic snapshot of personality type and its correlation to the overall state of sympathetic/parasympathetic balance in these primary circuits, and further clarify the results). One then observes the state of activity in the system, and assesses the circuitry as it delegates affect to the various stimuli. If the dopaminergic circuitry is predominantly activated, an up-mediated SEEKING response is demonstrated and one may infer the subject has a positive state of active systemic balance; and conversely, if the subject demonstrates little libidinal dopaminergic activity, and the parasympathetic circuit is predominant, we have demonstrated the reverse, that little libido is delegated to experience, and that super-ego or another dissociative factor (such as social degradation/cruelty causing adaptive libidinal/empathetic dissociation) has obtained a place of dominance in the psychical hierarchy. This single cluster of factors, this parameter: *the overall state of functional development, balance and activity of these two circuits*—may well be the single most telling axis around which the entire of personality might be assessed. It is possible to positively alter this most primary affective axis of systemic function and balance.

The alpha-function key, the methods of re-polarization and the experiential template

There are now, but three more steps to tread, before we can begin to knit these many threads into a coherent system, whereby the most fundamental and unhealthy aspects of personality may be altered. Firstly, we must analyze the formative impressions which have created the conditions for the formation of this counterbalanced affective regulatory circuitry. It is possible to MANUALLY engage the formative mnemonic impression, and provide both increased opioid activity and subsequent dopaminergic up-mediation, exactly as one would expect. As we age and grow, life experience layers itself relentlessly upon our memory, and hence, the feelings attached to any object, such as the mother, vary and change as the composite of our experience in memory grows. It is therefore impossible to access such an old memory, by imagining the face of the mother or nurse, as these people are exactly as all experience: symbols (Norman, 2013 quantitative; appendix A). Since the affective definition, the condensed symbolic definition of the mother has altered over time to include so very many more impressions than the original formative one gained from the age of zero to eighteen months/two years, we must access this memory not by way of direct memory retrieval, which is an unlikely prospect for any image from such an early period, but instead, must access the memory by creating a symbolic construction which is aimed

exactly at the FEELING of the experience, and in so doing, create a "sympathetic resonance" within the psyche, akin to the principle in harmonics known as sympathetic vibration. The idea of the mother has changed, but the *feeling* of this primary experience, has not, and can be accessed using the language the mind uses to communicate within its own province: symbolism (Freud, 1900). A rightly constructed symbol, like a lucid dream, uses the mind's native intra-systemic language, the language by which conscious and unconscious may share expression: symbolism, to directly access the memory in just the way the memory would be represented, symbolized, in consciousness. The following image will engage the formative impressions which fostered the developing sympathetic tegmental ventral limbic circuit, and so, I will refer to this image as, "the alpha function key." (As will become evident, this circuitry does possess the transformative attributes Bion ascribes to alpha function (Brown, 2011), although its functional utility as an embedded transformative process, is greatly increased through a specific and directed approach. Indeed, alpha function DOES transform mental illness, although if left to randomly transform symptoms, it is of little use. Alpha function becomes therapeutically useful as a rapid and functional means of undifferentiated energetic transformation—*only if applied to specific fixated unconscious content*. Then, it works quite rapidly.)

Please remember the neuroendocrine changes of the formative process, are initiated through *mutually exchanged gaze and glance* between mother and infant, where the mother's responsive face becomes the child's entire world...he looks, she responds, and in this reciprocating circular visual circuit, a semi-undifferentiated state of world and self-identification which fosters empathy within the infant, is created. The feeling is serene, ultimately safe and warm, the result is an optimistic playful energy which finds the entire of experience and thought—*interesting!* Irresistible is really a better word.

Here is the image, which must be directly entered into in the mind's eye as if into a dream, to be effective:

Can you picture it? The sun pouring down upon your face, shining and warm, golden and loving is this light, a light you are folded into, and have created, shining, pouring back up into the arch of heaven, spilling from your glad face, and again down to fill you, the trees nodding as you dream them, the sky golden and warm as you have poured it—and back around—for it has dreamt you...now as the world, of the world, nourished and warmed, our circle complete, a circuit of golden warmth and light spilling the world into being and returning again, unto you, and again, you unto it...and all the world is eternal, safe, now and again nourished and nourishing, the earth and life, now and again, but a single warmth, a round, a circuit, a circle of happiness, pouring down and returning, warm and sweet, the world now glad and warm, complete, born out and eternal, the human circle glowing, as life spilled round into warmth—and golden light.

This image will allow us access to the brain circuitry which creates reward via dopamine and opioids, and so, will foster Hebbian pairings we will use to re-polarize experience. However, the utility of this idea is far greater than that, and extends to include several modes of functioning which are highly transformative, and quite unexpected. Next, I will quickly spell out the *four basic means of re-polarization*.

1. Reactive re-polarization: this is a psychoanalytic procedure, where reaction formations are removed to access unconscious repressed content in consciousness. [There are of course, some occasions to rightly *insert* such reactive psychical dams as well.] A reaction formation is an opposite or punitive idea which is attached to a wish to change its valence, and cause its repression (Freud, 1905; Wolman, 1996). Think of a child enjoying itself playing with its feces. The mother says, "NO! That is shameful—DISGUSTING." Now the opposite of the pleasurable wish, disgust, is paired with the pleasurable behavior, and the child feels disgust in consciousness instead of pleasure, and represses the wish/behavior. As we will be removing reaction formations, this is referred to as "reactive re-polarization."
2. Active re-polarization via Hebbian learning: A painful event can be actively re-polarized by attaching positive valence to an alternate structure which is then substituted for the dystonic ideation in consciousness. The process of Hebbian active re-polarization is potentially both rapid and highly efficacious, as well as, quite dangerous. Please read the cautionary instructions in the sections below very carefully. This procedure heals quickly, and can cause permanent damage if used improperly. Follow these instructions to the letter, or do not attempt this procedure!
3. Active re-polarization by regressive neocortical mnemic reconsolidation: In this instance, the word regression is to be taken as a noun. A regression is a direct present identification with a past experience. To experience a regression, is extraordinarily painful. It is however, the most sure method of achieving permanent change. Dr. Doidge's fine book written for a lay audience, *The Brain That Changes Itself*, contains an excellent example of a regression (Doidge, 2009, pp. 234-237). Regressions can, as in the case in the Doidge book, be encouraged as a function of the psychotherapeutic psychoanalytic situation, and so, can be encouraged by using the memory retrieval techniques I have described, and, can also occur spontaneously as a result of severe stress, and occur more easily, in cases of SSRI withdrawal, where repressive resistance approaches zero. I have created regressive identifications in my own case both spontaneously, and, by way of directed effort at *removing resistances*—after years not so much actively seeking, but *remaining open to* repressed thoughts and memories. Often, it is clear what must be found, and a construction will light the way. The most reliable means to find this elusive phenomenon, is simply to open up before your pain—use the OEP. Keep open at all times, invite the unconscious, move toward your pain, without resistance, and all the inner world will soon spill out before you. Resist nothing: this is the pathway to higher functioning.
4. Active re-polarization via undifferentiated alpha function transformation: The source formative impressions of the "alpha function" sympathetic limbic circuitry offer attachment points both active and passive, which function as points of similarity allowing condensation (Freud, 1900) in symbolic/symptomatic formation. This allows the displacement of energetic fixated cathexes en masse onto the dynamic activity of the circuitry, which acts analogously as an oxygen scrubber in a spacecraft that converts unbreathable air into oxygen, by converting the pathogenic fixated impressions' toxic ego dystonic cathexes into primary semi-undifferentiated energy, ripe for healthy experiential sublimation. This functional re-polarization, utilizes the transformative property of "alpha function" applied to specific pathogenic unconscious content, so as to rapidly remove specific symptoms, at the most basic causal level. Here, we are attaching specific pathogenic fixated content onto the formative alpha function key impression, displacing and transferring those pathogenic energies into the dynamic circuitry aroused, sublimating those fixated

energies into the dynamic of that symbolic expression, and thereby, returning the cathexis to a near undifferentiated form—*now sublimated into our primary impression of the world itself*. In this way, fixations of all sorts, even those created by severe sexual trauma, can be integrated into consciousness and act as an energy source to enrich the sublimation which creates experience, and in some cases, liberate those energies necessary for the achievement of higher mental functioning.

The experiential template: This is the final idea which along with the others that have preceded it, must be understood to grasp the whole of re-polarization theory in applied practice as described below. Re-polarization theory is an extension of Freudian transference theory. Please recall, that just as in a dream, where unsaturated memory traces are defined, *endowed with symbolic meaning by way of transference* (Freud, 1900; Norman, 2013, Appendix A), so is affect distributed to give *qualitative* meaning to waking reality, just as in a dream, by transference and condensation. It is affect which must be assigned from lower structures to give meaning, quality and perceived "reality" to cortically represented mental solids (Solms, 2013). Affective assignment, along with object identification, produce reality (Norman, 2013 quantitative, and 2013, Langan). This means, that all of reality in both the cases of the neurotic/psychotic, and, the case of the normal, are defined *as a function of transference*. This transference which provides definition to all of reality, is formed as a function of an energetically differentiated composite structure, a stratified conglomerate which *mediates* the affect assigned to cortically represented experience from lower structures. Think of the entire of our past experience (the neocortical store) along with the predisposed patterns of systemic activity evolutionarily conserved into the structures of the affective systems, as comprising an "experiential template," through which all of reality, both inner and outer, is defined. This stratified structure, is therefore, semi-plastic and adaptive: because along with systemic hardwiring and response, the neocortical store is continuously added to and reconsolidated (Stickgold et al., 2001)—unconscious plasticity being the very notion upon which psychoanalysis is founded upon: "All repressions must be undone." Remember, Freud (1915) discovered that it is *not* a matter of transcribing an unchanged unconscious cathexis from the unconscious registry to a conscious one, but that the very unconscious ideation, the unconscious cathexis itself is altered, what we now refer to as—*reconsolidated*. There is support for this idea in modern neuroscience (Schiller et al., 2010; Zellner, 2013). This mnemonic reconsolidation, alters the transference, via alteration of the experiential template, by which reality is defined. Please remember our example of the condensed definition of reality as represented in two subjects viewing a butterfly, one subject balanced, one neurotic. The external stimulus is the same, only the affective definition assigned to it from the sum of affect associated with past experience, only the resultant experiential template is in variance. That template can be changed.

The template is a topographically stratified, energetic/(cathectic) *mediating* structure. That means that there are three factors which determine the effect of any one element on the resultant transference: a. the level of elemental cathexis, of energy associated with any one element; b. the valence of the element; c. the level of elemental placement in the stratified topography. So if we wish to increase or decrease the effect of any one element or a series of elements, we can alter the valence of the structure, alter the quantitative level of cathexis of the structure, or change its placement in the template topography, ie., bring it closer to consciousness or move it farther away, to

increase or decrease its effect on the transference. We can also alter the basic active repressive element, super-ego, through the reconsolidation of those longterm mnemonic impressions which are formative in creating super-ego, and change several variables at once, exchanging repression for integration, and affecting the entire template from all three directions simultaneously: changing valence, quantitative cathexis, and topographical distribution at a single pass, in reactive re-polarization, as super-ego is the primary reactive, repressive structure—a reaction formation set against the contents of the id (Freud, 1925, p.134). In this way, the basic structure of modern personality can be disbanded, and replaced with an experiential template structured around the paradigm of sublimation by integration.

A preliminary note: Before I surrender the first example, I wish to note that there is a potential hierarchy of utility to these notions, and that many subjects, whose condition is *less severe*, might benefit from using pieces of these ideas to affect their situation as needed. I.e., if you are ill with a *serious condition* like OCD or conversion hysteria, you are fooling yourself to imagine that partial adherence to the method will suffice, it will not. As with psychoanalysis: partial acceptance and partial rejection of the ugly truths and methods of Freudian psychology renders the method ineffective—the overall systemic integrity of the method of psychoanalysis must be respected if it is to be effective (Freud, 1933, p.138). However, if you are not *seriously* ill, a partial truth may be enough to heal you. With this in mind, it may be sufficient to simply engage the alpha function key, and increase the cathexis of this primary affective contributor, thusly reaping the increased opioid and dopaminergic benefits. Keep the image in your mind's eye and enter into it as into a dream, thereby increasing its cathexis and placing it higher in the stratified mental topography, augmenting its prominence in the experiential template and subsequent transference from two fronts. After a half hour or so, let the image fade and become preconscious, then revisit it as often as you need to maintain the benefits. Those of you who are moderately alpha function deficient may benefit from this simple therapeutic effect, and increase co-anesthesia, along with the transformative aspects of alpha function, upon a concrete, somatic reality.

Regressive re-polarization of super-ego: psychical doubling, mnemonic reconsolidation and sympathetic dopaminergic predominance—the new paradigm.

The following regression was not an isolated incident. To fully reconsolidate a formative memory which is so very fundamental to personality with such great phylogenetic support as the structure of super-ego, requires some thirty to forty regressions. However, a great deal of therapeutic benefit can be obtained with but partial reconsolidation. Some of these forty regressions were brought about entirely as a function of opening the mind to the events during daylight hours. The onset of conversion symptoms, uncontrollable weeping and paralyzing neuralgia in the mid and upper-back with hallucination were identical in all cases. The original memory was recovered using native psychoanalysis, first as a dissociative repression: a memory without its associated affect, and months later, the affect was added to complete the picture of regression proper. It should be noted that the main bulk of these regressions were in fact, brought on at those hours when 5-HT was at its lowest, and so, repression was most greatly reduced: between midnight and 2 or 3 AM. Often, the memory would emerge as a dream, and upon waking it would continue

uninterrupted as an hallucination with conversion symptoms. The key is to bring the memory as close to consciousness as possible, and of course, this takes months of being open to the memory to lower resistance, until it becomes, at long last—accessible. The psychologist moves toward his pain, invites his suffering toward himself, ever so slowly...on dove's feet.

Regression and psychical doubling:

It has long been noted by psychologists and patients alike, that even in the most severe and disturbing psychotic illness, a small fraction of the ego still remains, undistorted and observing. Often Freud found, the patient, once cured, will note this, and find themselves embarrassed by the fact, as if they should have been able to cure themselves, the symptoms somehow a fake, as all along they were in some diminished capacity "still there" as an observer. The physician in such cases is right to assure the patient that this is often the case, and that the illness could not be defeated by knowing this, and there is no blame assessed from this common occurrence. Part of the ego remains undistorted as an observer, often, even in the most severe cases. This paper and journal are devoted to self-psychoanalysis, and so, this fact is key. We who heal ourselves must find help, *in ourselves!* Has anyone ever helped you but you—ever—even once? Of course not! Fortunately, we need them—*not at all!*

As the conversion symptoms take hold, they are accompanied by tactile hallucination, the feeling of bones protruding, sprung from my back like a crown rack of lamb, and the visual/tactile hallucination of the skin sloughing from my arms like melt wax symbolizing the guilt. At this point I am pressed at first onto the ground from the back pain (conversion symptom) and then, forced into a position curled up on the floor on my side in a posture like a shrimp. Weeping uncontrollably and choking, I cry out over and over..."don't you love me? Mommy, mommy, what did I do...don't you love me, why don't you love me, why?? etc." At this point, the formative impression of super-ego is before us, and the situation must be taken into hand as follows: One must find the small fraction of the undistorted ego, and inhabit it simultaneously in an act of psychical doubling. Now, you are two people, the child, and the missing parent. We simply replace the unkind reality of parental uncaring, with the needed aspects of support which were missing, and reconsolidate the formative memory, or to be more plain: we change the past. The child is as a child, and knows no more than that. The undistorted ego, must address the issue FROM AN INFANTILE PERSPECTIVE. Penalty was inflicted, an accusation of doing WRONG, and this is primary. The issues are two, a. loss of love, and b. penalty for DOING WRONG (castration). Address these directly. You do *not* say, "you are right." This has no effect. To the child you say: He (the father) was wrong, not you, HE was wrong. I love you, you, you! I love *you!* You can say, "you are right," but it will have no effect, only a negative proposition toward the father is effective. HE *was wrong*, not you. Both of these negative statements are vital. The child must be loved, and not made to hate itself, and feel guilt, and the need for punishment. Remember, guilt and the need for punishment, in short: super-ego, is the structure which functions to *remove libidinal expression* by engaging the lateral parasympathetic circuitry, not only within the Oedipal context, but the context of all of experience—in relation to everything. To alter this punitive structure and alter repression, is to establish sympathetic predominance and lay the groundwork for sublimation by integration, and hence, gain

the rewards life has to offer. The definition of reality, is born of the affect we do or do not assign to experience, and so, we can see, reality is created within. Hold the child, tell it that the abuse was wrong, and that you love the child, and do not hate and blame it. Love this child, and give it reason to live and then, that child will have reason to love life, rather than rightly hate the entire of it, and all those within it just the same. Nothing is as basic as this. Hurt the child, and the child will hurt you. Love it, and find love in return. Who does not already know such a thing? I am sure I do not refer to you personally, but I will state: The answer is clear: *there is not a modern parent alive who knows it*. Well look, and learn!

So the result should be no surprise. I was a bright guy most of my life, an A-/B+ sort of mind. My disposition was one of will and weight, sheer determination and rage, never buoyancy of any sort, only WILL...force. Now that the experiential template has been thusly altered, my past has been changed, the mnemonic store reconsolidated and the events which made me so very ill and repressed have been re-written. Before, I had a narrow spectrum of interests and a narrow speck of ability with which to pursue my interests. Most of the fuel for thought and experiential enhancement, libido, was repressed, and I displayed symptoms in substitution for my libido—I was modern. Now, I am interested in everything! I have taught myself to type, learned Freudian depth psychology on my own in precise detail in but a few years, become editor of a top psychology journal, along with teaching myself brain anatomy, cognitive neuroscience, and now, neuropsychanalysis, and all the while, I am continually writing philosophy books, psychology books, poetry books, papers, and novels! Who am I? I have become a new sort of person, a person who is so very light of heart, and can not help but create! I have become: an Emotive Rationalist! I hope the proposition is clear: modern personality is based on morality and repression, and this structure creates: *illness, and, stupidity*. To be modern is to be less than you can be...a lot less.

Now, when I engage the alpha function key, the image is potentially different. It assumes a characteristic brightness in the mind's eye, and then, I repeat the phrase, "He was wrong, not you." Now, the image becomes so bright I can all but feel the sun, my heart is light *and I laugh!* Laugh! Ha! I even smile, and know this my friend—I never smile! Never. *I am entitled to the mother's love, and, I have received it. This is what the guilt removed my rights for and my access to: the mother's love*, and that as you know, is the entire world—nothing less! To rebalance this thing, is to change—everything. [Ie., The valence of the formative cathexis is altered, the pathogenic super-ego cathexis is quantitatively reduced, and the entire of libido is now made available in conscious quantitative excess, aided in no small part by the formative alpha function key being topographically elevated into the conscious/preconscious strata.] My stomach is settled (co-anesthesia), the day is warm, and my mind is racing with new ideas! How light is the day, as a boat of cork and light, so does my life float upon this world, now and forever, free from guilt, free from our sick curse—morality. To change this thing, is to find the love which was withheld to make you sick and cruel, and to finally be well, warm and complete...*to be loved*. It is for lack of this, and nothing else—that we know human misery. You, and *you alone* now have the keys which will yield its undoing. No one else is willing, capable or worthy.

So let us rejoice! Strength is creativity and lightness, authority, is laughable, ugly and unconvincing. Ethics never obey. Let us create a new world instead!

Re-polarization by active Hebbian pairing of alternative structures.

It is possible to use the alpha function key to directly influence experiential and mnemonic valence. Although effective and rapid, this approach is potentially quite dangerous, and must be approached with caution and care. It is tempting, to pair an injury with the alpha function key and directly adjust its valence, let's say, to change the somatic expression of a rape, or even to alter our reactions to verbal abuse. This is a bad idea which is fraught with dangerous consequences, as I have discovered. If one attempts to directly apply active re-polarization to a painful stimulus in memory, to achieve good results, remember the following: *Hebbian learning, LTP, creates a causally nondirectional associative structure*. If one applies the key, the target mnemonic image may alter its valence, causality flowing in the correct direction, or, more likely, the energy from the alpha function key will transfer in the other direction, causing an escalation in the dystonic valence of the symptomatic structure, not a reversal of valence. For this reason, it is wise to hyper-polarize, to energetically enforce an alternative structure, rather than re-polarize a dystonic current valence. An example will clarify:

I write a philosophy column for a newspaper. The paper changed hands, and the new editor is passive-aggressive. She inserts errors into my work, feigns that I will be able to look over her changes and put matters right, then, ignores my corrections, and places the unapproved error ridden text in print. To a passive-aggressive, this is easier than just firing me, as I will make a fuss and walk off, and she need not be the heavy. Oops! Sorry! Needless to say, after the tenth such "error," I am not convinced. After I walked off, the image of the woman would not leave my mind. I could not stop imagining certain particular brutal acts of retaliation, which served only to injure *me!* Sadism without an object is but masochism, self-punishment, and I decided to attempt to influence matters using re-polarization theory. First, I engaged the alpha function key, and paired it with the images of sadism in an attempt to shift the valence of my hatred. The effect was astounding and not at all what I intended. Causality flowed the wrong direction. The images became more and more grotesque and intense, until a full fledged sexual-sadism emerged. Very seductive, ill, and dangerous. I immediately terminated the key image, which was acting as an undifferentiated power source for the punitive imagery. *The answer is to hyper-polarize an existing alternative structure, simply enforce its existing valence*. Rather than try to change my feelings toward the editor, I decided to REWARD myself for *keeping* my word, and producing unflawed work, rather than PUNISH the editor who lied, and ruined the work. The effect was as expected, and soon, I had provided myself the self-esteem that life had stolen. Over and over again, the same caution has demonstrated itself valid. Just as sadism can be encouraged, so can masochism. To attempt to alter the valence of *your reaction* to a wrongly applied punishment, is a fool's endeavor which will create reward attached to your reactive sadism, should you display that reaction, or, will be paired with the actual *pain of mistreatment itself* (if that is the reaction displayed), and is sure to produce full blown masochism, just as will any attempt to directly and actively re-polarize feelings of failure with reward, which will create an appetite for more failure so as to receive more reward. In each case, the result may be what you

intend, or, it may be causally reversed, and serve to enforce the illness. Pay close attention.

Re-polarization of sexual traumata: Reaction and wish formation within the context of somato- psychical determination

The daemon: Morality and defense in sexual trauma

The idea of morality is particularly important in matters of sexual trauma. The very defenses themselves which at one point sustain and protect with morality, soon become a source of the greatest sickness and continuous peril. To breach the impossible “catch-22” which surrounds sexual abuse, the lynch pin which holds the entire matter fast, morality itself, must be completely discarded. This is no easy task, as it is our morality which has sustained us through the storm, and it seems unnatural to trample and remove that which harbored and sustained us. Unlike many of my techniques which both promise, and deliver, rapid cure for severe symptoms—this does not. This is a slow and steady path, a creeping and heavy thing, but in the end, the result is a complete reversal of the situation, and we might even find courage enough to suppose that the massive energetic build up in the unconscious of the rape victim, may even become an advantage, as those copious accumulated energies are used in integration rather than repression, so as to power sexual sublimation into experience and foster the achievement of higher goals which are denied to those less highly energetic in their unconscious endowments. To look plainly upon an ugly thing, and simply observe, is to be without reaction, without morality. This is the ideal state of analysis. Freud (1912) encouraged the matter as follows: "I can not advise my colleagues too urgently to model themselves during psycho-analytic treatment on the surgeon, who puts aside all his feelings, even his human sympathy, and concentrates his mental forces on the single aim of performing the operation as skillfully as possible (p.115)." We simply look, and see:

The road to integrating an ego dystonic cathexis into personality is fraught with pain and danger. To accomplish this thing, and cure the damage of sexual abuse, we must firstly establish absolute points of separation, and be entirely free from the influences of those who would take advantage of this process. Next, the subject must be made to understand the necessary psychical dynamics, the unconscious processes which **MUST** in every case occur in response to these events, and having observed this necessity, to then place their experiences in this context. In this way, the beta-screen (Brown, 2011), the intractable defensive "physicalizing" of the event can be overcome, the events made plastic, and the now conscious cathexes reclaimed *directly on the somatic level* via alpha function. Our morality is a daemon, spelled in the old style, for in the past, the ancient Greeks saw that a daemon was not good or evil, it could be either...a daemon was a demi-god, a daemon was potentially either good or evil, they were first and foremost one thing alone: powerful. So it is with our morality, our hate. To understand this thing, we must look plainly, without morality. Please observe with cold unreactive dispassion the following two examples and see the *psychical necessity* born of the somatic responses. The road out from under our pain and the morality which holds it fast, is that of an unconscious and somatic knowledge: the knowledge of somato-psychical determinism.

Keeping in mind, what we have learned about the role of the reactive elements of the castration complex in absorbing libidinal cathexes of all sorts, and, the somatic presentation of those elements, please read and analyze the following:

A subject is drugged with 500 micrograms of LSD and manually restrained. Along with some other drugs, it is hoped that the subject will remain conscious, yet demonstrate sufficient confusion, to yield sexual response while not recognizing the particulars of the situation. The effect is poorly aimed, and the subject resists. Now, the subject sees and knows. His tumbling dream, is no longer a dream, and his bodily responses are interrupted in a particular way. The automatic physical, somatic process of sexual excitation which the manipulator hopes to exploit, is no longer at access, as the subject has terminated all tumescence. He sees the situation and his body responds with pure hate, with the reactive elements of the castration complex. Now, the body mirrors the formative impressions of super ego—the hate and rage which terminate libido and absorb sexual and affectionate libidinal cathexes— but with even greater intensity—the body shudders like a paint shaker, vibrating in pure hate, now without image or fantasy, only soma vibrating in isometric tension—all sexual response has been terminated and repressed. Here, our daemon, hate, has proven its power, and saved us. However, an unconscious analysis demonstrates what pathology **MUST** be left in its wake. Before I conduct that analysis, please consider this alternate example:

A subject is drugged with large quantities of benzodiazepines to encourage unconsciousness and hypno-accessibility. Once unconscious, LSD is applied to increase excitation and unconscious access, and allow perverse ideations, somatic impressions, and suggestions to be placed into the unconscious, and destroy the unity of personality, so as to create psychosis and perversion to be exploited. Over the course of several days, perverse acts are performed upon the semi-conscious subject along with perverse hypnotic suggestions.

As we compare these two examples as to their resultant unconscious dynamic, we find a surprising result. In example number one, the subject interrupted the natural somatic response pattern of tactile excitation, tumescence, and orgasm. The result is quite plain and necessary: a wish **MUST** be left behind—the unconscious wish to complete the act which was interrupted. There can be no other result. The interruption of excitation demands release, and this wish must be left behind, repressed as a function of defense. That which was interrupted, leaves an unconscious wish for completion. The second example is even more obvious, as the perversions placed into the subject's unconscious act in just the same way as a function of the repetition compulsion. Once an instinctual state has been achieved, *the instinct to repeat the state becomes a drive: the repetition compulsion*. This elasticity which wishes to return to a previous form, this inertia of the psyche, is found as a primary element in the dynamic structure of neurotic symptoms, which in the main, evidence the need to return to, and repeat, earlier states of development, in the present (Freud, 1920, p. 36). An interrupted drive leaves an unconscious wish for its completion, just as a perverse impression leaves an unconscious wish for its repetition.

So we can see, in both cases, a wish is left behind as a matter of somato-psychical necessity, as a matter of soma interacting with *psychical determinism* (Freud, 1901, p. 242). By virtue of the very topological structure of the mind and the dynamics that

implies, these wishes MUST be created in response to these somatic situations. That, is what I mean by somato-psychical determinism.

It is this revelation which will eventually free the subject, and allow them to accept the events, and the wishes into consciousness. Of course those very wishes, are the source of the greater portion of illness inflicted by molestation and rape. Next, I will detail why that is true, and demonstrate the effect of this fact as expressed in the reactive moral symptomatology known as homophobia, which can be easily analyzed and categorized. Please read the following carefully, for a misstep here, could end in real tragedy.

First, we must learn a little more about exactly how perverse activity destroys the structure of healthy personality.

Perversion as virus: a self-replicating parasitism

As we mature, we move through several well known and well documented stages. These unserviceable developmental pieces of the eventual complete puzzle are known as the component sexual instincts, and, it is these infantile building blocks of our complete sexuality which are the basis of the perversions. These are rightly detailed in the Freud, and I encourage you to read it. I will briefly summarize these concepts as follows: A split off piece of sexuality, a developmental piece which has not become part of our unity, and has become the sexual aim in itself, is called a "perversion" (Freud, 1910, p. 45). By this I mean, that as we develop, we go through developmental phases where each step along the way, is characterized by a specific erogenous zone, a zone which acts as a genital (Freud, 1905, pp. 125-243; 1912, pp. 229-238; 1938 [1940], pp. 152-156). First the oral, then the anal, then the phallic, allowing for the factor of much residual and simultaneous expression...then after latency, *in the best case*, all are united together under the auspices of healthy unified genital sexuality. When a stage of development is *lingered too long at*, the sexuality becomes fixated there, fixed at this stage. Often, these impressions are repressed, and an unconscious fixation is formed. These fixations are each in their type associated with different neurotic illnesses. OCD for instance, is associated with highly energetic fixated sadistic and/or masochistic unconscious content—specifically: *fixated at the anal- sadistic phase of pre-genital development* (Norman, 2011, 2013 nine/non-elliptical). (Remember: Unconscious content always is specific. If you feel angry, you are not angry in any abstract way, never, that is an illusion of repression—there is a specific fantasy with quite specific activities taking place which provide by way of transference, the feeling-tone for your experience. Unconscious content is always specific.)

So as we mature, we develop through many stages, each with a specific sexual aim centered around a potentially perverse erogenous zone, should that activity become the sexual aim itself, in maturity. A fixation is formed as a piece of this developmental structure is *lingered too long at*, and becomes such an aim. If this fixation is repressed, we have the basis of a neurosis, and if not, a perversion is formed; the neuroses and the perversions standing in clear and direct relation as positive and negative of the same fantasies, those being conscious aims in the case of the pervert, and unconscious aims causing symptoms as they assert their influence

from the unconscious in the case of the neurotic (Freud, 1905). Hence the Freudian axiom, *The neuroses are, so to say, the negative of perversions* (Freud, 1905, p. 165). Please read my *Tangible Self* (Norman, 2011), and, the nine short essays and native psychoanalysis paper (Norman, 2013 nine/non-elliptical) available for download at *The Journal of Unconscious Psychology* web archive for more information on the unconscious dynamics of neurotic symptomatology.

With this in mind we must understand but one more thing to assess the effects of perverse activity upon healthy personality. As we have established, the unified structure of healthy sexual maturity, is composed of a great many perverse and unserviceable aims which have been united together under the auspices of healthy genital sexual expression, as is evidenced in the free expression of these perverse aims as component pieces of healthy sexual expression in so called normal cases (Freud, 1905).

Now, we must remember the primary process and other descriptive rules of unconscious operation, which are associative and non-linear:

"The cathectic intensities [in the *Ucs.*] are much more mobile. By the process of *displacement* one idea may surrender to another its whole quota of cathexis; by the process of *condensation* it may appropriate the whole cathexis of several other ideas. I have proposed to regard these two processes as distinguishing marks of the so-called *primary psychological process*." . . . "exemption from mutual contradiction, primary process (mobility of cathexes), timelessness, and replacement of external by psychological reality" (Freud, 1915e, p. 186-187).

With this information the result becomes clear: perverse activity acts in the unconscious, so as to attract similar formative perverse component wishes in associative condensation, and by way of energetic displacement, to create highly energetic perverse unconscious structures, which due to their increased energetic cathexis formed by way of unconscious processes, assert themselves upon consciousness as new sexual aims either forming neurotic symptoms from the unconscious, or, by creating new perverse activity in manifest thought and/or behavior. Perverse activity breaks apart the healthy sexual unity, attracts energy from perverse developmental content, and once those ideations are thusly fortified, establishes new aims, like a virus which corrupts the host cell's DNA to create more of itself by co-opting internal processes. This is not theory, it is fact. Please read my *Tangible Self* (Norman, 2011, pp. 52-63) for an example.

Now it should be clear to the reader why many sexual predators find success in "turning" a healthy subject to their..."lifestyle." The very activity itself, breaks apart healthy sexual unity, and replaces it with highly energetic and perverse aims, formed and supported by unconscious processes.

The result: There are, on the most fundamental level, two possible outcomes after repeated sexual abuse. 1. The subject becomes perverse. 2. The subject becomes neurotic/psychotic. It is of course, possible, although unlikely, that the subject can successfully repress the aftermath of their experience, but this is both unlikely, and

would most probably leave the subject with a severe loss in mental economy (Freud, 1917, pp. 453-454).

To pierce the repressions and reclaim the specific mnemic events and wishes to consciousness, is no easy matter, and must be approached quite carefully. The process will manifest in two basic stages: symbolic analysis, and, somatic reactive restructuralization of ego processes via alpha function. Before this process can begin, the defensive structures which shield personality must be eliminated, and personality itself, in the main, disbanded.

Presentation of the beta screen, reactive dynamism, homophobia, paranoia, and symbolic analysis:

Before I begin to discuss the topic of symbolic analysis, which will be far too briefly addressed, I must comment on the initial and intractable presentation of this condition, a condition of what I will call somato-psychical defense. The subject will defend themselves from truth, healing, pain and change, in a specific way with two main attributes: 1. Somatic intransigence and reactive supplementation of the beta-screen, and, 2. The paranoid transference. Let us look clearly and plainly at this intransigent and concretized symptomatic structure, and deduce the only safe and effective method by which it might become plastic, malleable, and conducive to alteration and healthy redesign.

The reactive structures which shield the subject from the intolerable state of their reality as it asserts itself from within them, creates a beta screen (Brown, 2011), a somatic block which causes a seemingly impossible obstruction to healing. I have discovered that this beta screen serves to somatically reinforce the psychical repressive structure by way of reinvigorating the energy absorbing reactive elements of the castration complex. Repression must be constantly reasserted to remain effective, and the upward drive of the repressed is proportional to the accumulated energy of its cathexis. The enormous collected energy of the repressed increases exponentially by way of the unconscious processes themselves, requiring continual repressive activity to keep at a distance. This reactive hatred, was quite naturally, an expression of hyper-potent reactive rejection of the wishes which were attempting to become conscious. The structure which resulted, was highly concretized, dangerous, reactive, and intransigent. The purpose of the structure was to reinvigorate the reactive somatic signature of the reactive elements of the castration complex, so as to absorb the passive sexual cathexis, and keep consciousness clear of this dissonant psychical toxin. Each day, in musical practice of the very greatest intensity, my drumming afforded the opportunity to initiate and maintain the defense. To say that I would play with vigor and intensity is an impossible understatement. I attempted to burst my circulatory system with the intensity of my musical expression, and could eventually maintain a shuddering state of utter violence, for many, many hours at a stretch. My constantly vibrating body, like a paint shaker, shuddering for hours, at levels of intensity which I now know were specifically created to remove wishes, force them from my mind with pure somatic hatred, and, were a direct attempt to answer my ever growing self-hatred with stroke. If asked of the rape, I would become enraged and recount the events with such hatred, that my red face would soon approach blue, my body shuddering in spasms of hatred. This somatic concretizing of

the experience reinforced by behavior from all sides is evidence of the first factor, *somatic intransigence and reactive supplementation of the beta-screen*. My body, recreated the reactive elements of the castration complex in their somatic expression for hours each day, a somatic and concrete response. Although the rape was unfair, the fact remains, that after decades, if the processes were conscious, my hate should fade, like any trauma (Freud, 1893-1895). But morality is now as always, sheer farce! The responses and my moral rage did not fade, but increased, indicating unconscious processes were at work. Remember the unconscious is *timeless*, and associative. So the hatred increased over time as it had to, to maintain repression of an increasing unconscious cathexis, the unconscious wishes always becoming more intense over time as a function of unconscious topography and dynamism itself.

I was raised to be very tolerant of homosexuals. My upbringing emphasized the equality of all such choices in lifestyle. After the rape, my disposition...changed. The symptoms produced were utterly distinct, super-intense, and quite dangerous. A massive and demonstrable change in my attitude toward homosexuals was produced. When I heard of the murder of a homosexual who was foolish enough to proposition the wrong patron at a bar, I was insane with hatred for the murderer—but not in the way you might expect. The homosexual was bound to a fence, and beaten to death. To understand the degree of energy *and the level of hazard* in this symptom, you need a sample of my thoughts:

I heard of the way the homosexual was killed, and exploded—“What?? Did they love this filthy fag?? Why was there no hatred for this filth?? Why? Why were the eyes left in the head, Why? Why were they not split and cut?? Why?? Why were the fingers still attached to the filthy hands?? Why?? Why were they not each broken back and removed?? Why were the genitals left intact—not mutilated and cut away?? Why? Did they love this filthy fag?? The feet! Why were they not cut open, flayed, the wounds opened up, and then the feet, cut away? Why was the genital not torn loose and placed within the mouth to choke and kill....why??? Why was there such tenderness for this vermin? *Why was there no hate?*”

If you would have suggested to me, at that time, that these responses were out of balance, or formed as reactive symptomatology to represses passive wishes fostered in the rape, well... I truly do pity you! If you would have dared to suggest that these outbursts were functioning as defense, functioning to remove passive sexual wishes from my consciousness, wishes created by the rape itself, I would have killed you. I am not in any way exaggerating. You would bloody well die to have said such a thing to me. I would have attacked you right there, and beaten you clean to death. That, is a *paranoid transference*. I needed that defense, and to breach it would have been cruel, stupid, and deadly.

Paranoia has a complex etiology utilizing both heterosexual and homosexual dynamism, however in many, even most cases, it functions primarily as a defensive cluster of symptoms designed to block homosexual cathexes (Freud, 1911, 1915, 1917, p. 424; Norman, 2011, pp. 80-86). As the purpose of my homophobic hatred was to remove and absorb the passive sexual excitation created in a homosexual rape via somatic invigoration of the reactive elements of the castration complex, we can deduce without question that homophobia is a subtype of paranoia, and hence, is defended with a paranoid transference, one of the most dangerous and intractable of

all psychological phenomena. So how are we to approach a situation so dangerous and well guarded by somatic intransigence and reactive supplementation of the beta-screen, and, the paranoid transference?

The key to destructuralizing the defense, is in understanding the psychological and somatic necessity of the unconscious dynamic and the necessary result: wishes. The subject, once equipped with the sure knowledge of somato-psychical determinism, and how the situation he or she was exposed to *must* create these effects, is thereby relieved of moral responsibility for this unfortunate result. Only then, can the defense be circumvented by symbolic analysis, and eventual somatic reactive restructuralization of ego processes. Eg., the woman who was violently raped, is sure in many cases to display a sexual excitation in response to scenes of violent rape. This is no mystery and carries no blame or moral consequence, it is exactly as it should be, and, is a necessary consequence in every case, of exposure to this stimulus: the result of a violent rape with anal or vaginal tearing must be exactly one thing—the creation of a masochistic wish, the normal process of sexual excitation once engaged by manual stimulation having then been fused with severe *overstimulation*, the hallmark of masochism, to create a wish for this overstimulation (the repetition compulsion), which has necessarily become sexualized (Norman, 2011, pp.72-73). There can be no other result than the creation of such a wish. So now we can see, that it is the bringing to consciousness of these repressed wishes which will constitute the effective end of this treatment, as the conscious processes once properly applied to the memory, will remove its pathogenic cathexis, and return the energies to a healthy form (Freud, 1893- 1895, p. 17). Therefore—The unconscious wishes which form most all of the pathology, are kept and maintained as active symptomatic agents by the very defensive processes which protect consciousness from their intrusion. With this in mind, we can make the following highly condensed assertion: *The main damage from rape and molestation occurs through the continuous action of the defensive processes themselves.* Those processes must be circumvented through symbolic analysis and the somatic reactive restructuralization of the ego via alpha function.

Symbolic analysis: This topic is very involved, and even more vital, and I will confess that although it is my forte, I am reluctant to be too direct on this issue. Note how Freud did not analyze even a single dream in the entire of his *interpretation of dreams* to the very lowest levels of its meaning. It is too ugly, too intense and hideous to say aloud (Freud, 1916-1917 [vol. 15], p. 185). To heal here, you must become very, very good at this ugly thing: symbolic analysis. Go to appendix B for examples of symbolic analysis which stop at the level of the complex. Often, that is enough, and more depth is not needed. However, if you are looking for unconscious content associated with molestation, you must do better than that. Here are some basics, and a few things to expect:

1. Objects in fantasy will be condensed, and will have many determinants attached to them to provide the symbol with enough energy to be represented in consciousness (Freud, 1900). I am anxious at cutting down a tree (anxiety hysteria/phobia). The tree represents a sexual wish for a passive orgasm, and so, its felling represents the removal of the erection by completion of the act, and, it represents a castration threat in the same felling which is the super-ego penalty (wish from super-ego) for the passive sexual wish, and, it represents my step-father, who I wish to kill, and, my guilt for that death wish, as I feel "unworthy" of felling the tree. There are usually

four or five determinants on any one symbol, and often more. There will be one, which is predominant, and finding that wish alone, will stop the symptom in some cases. (Note: Unconscious processes do not support logical contradiction, which is represented via compromise formation and condensed symbolic expression).

2. Passive wishes manifest as religious revelation and experience as they return to consciousness. Hallucinations of God, his voice, angels caressing you, vibrations filling you and the like, are not spirits, they are passive sexual wishes forming hallucinatory symptomatology—period. Do not be fooled. It is *never* God, it is *always* the return of the repressed...every time.
3. Objects in fantasy may be objects, identifications, or both. If you are attacking a hated object in your mind, this may be sadism against the object alone, an expression of hatred alone, or, it may be an identification with the object being subjected to sadistic reprisal, or, it may contain both expressions simultaneously (Freud, 1930, p. 129; Norman, 2013 mind body syndrome).
4. Interpretation of language: Language is fraught with puns and indeterminate meanings and so, is ripe as a nexus onto which many levels of meaning and various determinants can attach in condensation (Freud, 1900, pp. 340-341). Eg., an obsessive symptom like this phrase which intrudes over and over into consciousness is to be interpreted as follows: "She lies to me." This, on the surface, refers to my mother, who is always lying to me in the sense of being untruthful. But as the words are intruding into my consciousness they comprise a symptom, and must be analyzed.

Meaning a. She (My mother) is a liar.

Meaning b. She (My mother) "lies to me" in the biblical sense, she wishes to have sex with me. This is the Oedipal wish of sexuality and tenderness.

Meaning c. She (My mother) lies, in a state like that in a tomb, she lies "tomb-y." This the death wish, that my mother lies in a tomb.

Meaning d. She lies, in the sense that *she is not a she* but a he, and lies, *two-me*, as in two of my body type. This is the homosexual wish.

5. As you recover the sexual experiences and impressions of a rape or molestation, those are likely to be passive impressions, and passive sexuality closely parallels both femininity, and masochism (Freud, 1933, p. 116). For this reason, the type of ideations will be most disturbing, as they are usually fused with punitive affect added to the impression by counter-valent sources in the super-ego. The idea is that the id wish, is passive, and has attached to its pleasurable id expression a penalty, a punitive wish from another psychical agency...the super-ego. The symptom is then, an expression of the tension between the two opposite wishes coming from two separate psychical agencies, id and super-ego (Freud, 1915, pp. 180-185), a dynamic simultaneous wishful opposition I term counter-valent (Norman, 2013 Prometheus). The manifestation of masochistic counter-valent symptomatology is particularly dangerous and disturbing. To assimilate such a passive cathexis, one goes through several stages, first masochism, then hysteria, then, integration. I will spell this out shortly with a dream analysis, and will presently state that masochistic passive wishes once subjected to counter-valent distortion appear as the following: Scenes of being bound, scenes of being cut and choked, scenes of being blinded, or blinding

oneself, scenes of being trapped and killed, scenes of being castrated or sexually mutilated, scenes of self-mutilation which encourage one to self-abuse such as striking oneself, cutting oneself, amputating a body part or suicide, etc. These are the penalties for accepting passive sexual wishes—the penalty is always the same: mutilation, castration, and death. That is the cost. Obviously, this reactive piece of personality, super-ego/ego, must be destroyed. Here is how that is accomplished:

Once the subject has accepted the fact of somato-psychical determinism and its necessary wishful consequences, then, the task begins in earnest: finding the wishes, and making them conscious. Although secondary factors, such as betrayal of a trusted or loved one will factor in, the main pathological contributor will be the wishes created in the wake of the abuse which directly contradict ego/super-ego. To get at the wishes, one must first, after having determined that they must be there as a matter of somato-psychical necessity, find the most unnatural of skills: symbolic analysis. It is interesting and necessary to note, that morality, the real and the unreal, will conspire to hide the more disturbing aspects of the memories, by directing your attention to other real events which are determined into the symbol. The easiest way to hide a factor, is to drum up the anger and disgust about another, equally real determinant. Morality is best for this deception, as one blusters about how unfair a situation is, moralizing, all the while, the problem making you sick is something perverse, a wish which is being ignored. Do not be fooled. Your moral feelings are real, and, not the thing being repressed, but, the instrument of that repression. Learn to detect all moralizing, the ugly bluster and self-pity are easy to spot, and then, know it: morality is pure farce. If you begin to moralize, you can be sure you are faking it. Begin to look for a perverse wish immediately. Morality is always the enemy in analysis, it is the instrument of super-ego. Super-ego knows, the easiest way to conceal a topic, is to raise bluster and pain about another topic, which is also real.

When one looks for a perverse wish one knows must be present, the way is usually blocked by massive resistance. The trick, is not to go after the memory, but instead, to go after the resistance.

Psychoanalysis itself went through just such a transition (Freud, 1913, p. 141-142, 1914, p. 147 [vol. 12]). Picture the event you have constructed, and then let it fade. Open the mind with the OEP. If your construction is exactly accurate, your symptoms will fade at this simple therapeutic activity! If not, if your construction is close, the memory will be encouraged toward preconsciousness, so, you now go after the source of the repression itself: super-ego. *Super-ego is a reaction formation* set against the contents of the id (Freud, 1925, p. 134). So, here we are using reactive re-polarization to remove the primary reaction formation: super-ego. This will release all sexual cathexes bound into the reactive elements of the castration complex. If you have completed a sufficient number of regressions, and super-ego has been sufficiently weakened, or perhaps, even destroyed, you are in luck! Good work, my friend, you will soon be well! You are rid of a hideous modern curse. Simply gut the weakened structure to the bone, and be free! Engage the alpha function key, and say the words, "He was wrong, not you." Now the image will glow like the sun itself in near hallucinatory brilliance, and soon, your light heart will forget what ugly thing you seek. Now you never look, but glow and love life instead! Soon, perhaps within an hour or even less, the memory is sure to emerge. The trick: go after the resistance, not

the memory. Super-ego is that resistance. Allow all libido through, destroy super-ego permanently, and be well.

Of course, it is not so simple as that. The memory, once recovered, is quite naturally—deeply repellant. The fact that it engenders sexual excitation, even more repellant than the image itself. This complete opposition of the ego and super-ego to the images of the molestation, and the even greater horror at the excitation it engenders, are factors we will use to our advantage. These painful realities are to be harnessed so as to allow us to destroy the last of the existing structure of personality, and replace it. Think of the super-ego/ego's deadly horror, as your ticket to dispensing with the last of the structure of modern personality. There are two steps to the process: 1. Symbolic analysis and recovery of the memories, wishes and fantasies from the unconscious. 2. Usage of the alpha function key to undifferentiate the cathexes of the fixated memories.

Reactive re-polarization of the experiential template via LTD and alpha function transformation: practical application of Schore's sympathetic ventral limbic circuit in cases of sexual trauma

Alpha function transforms symptoms. The intersubjective processes are based upon this truth. The problem is, that transforming symptoms, in all but the very most impaired of patients, accomplishes little. To make rapid progress and cure mental illness, the utility of alpha function leaves much to be desired, unless we apply it to the transformation of *specific unconscious content*. In this instance, the utility of this phenomenon becomes instantly apparent. Once Schore's work has been analyzed, and the source impressions (and biochemistry) his careful work implies are distilled into a symbolic key allowing us to manually activate the circuitry and its transformative function, Bion's "alpha function" can be used to re-integrate *specific* ego dystonic unconscious content. Symbolic analysis and the removal of super-ego resistance has allowed us to retrieve the disturbing unconscious content, and now, we are left with a conundrum. We must integrate this content into consciousness, but it is vile, toxic, and repellant. We are troubled on two fronts, one, the ego/super-ego is sickened to know this thing we have found, and two, even though it is now conscious, resistances prevent us from accepting the energy, which therefore, remains in its fixated form, and is highly pathogenic. Is there a way to be rid of personality and accept the energy all at once? Yes, there is.

Somatic reactive restructuring of personality—LTD and neuronal dissociation: the way out

As you locate the various images, sensations, fantasies, and other associated ideational content, it is necessary to keep the ideas conscious. This is not such an easy matter in the specific case in question, as the ideas once repressed for so many years, have collected enormous energy, each perverse aspect becoming associated with highly charged wishes and other reflections of formative developmental component instincts, which are the source of the perversions in all people. Once the pathogenic unconscious structure has condensed into it the accumulated energies of the associated unconscious elements, as the very processes which govern the "associo-cognitive processes" (Norman, 2013 Langan), the unconscious processes, ensure, the cathexis becomes hyper-energetic in the extreme. For this reason it will present in

consciousness as a super-energized phenomenon, and hence, will exert enormous influence of a distinctly unhealthy sort upon the psyche. If the subject allows the images and sensations into conscious they may either, a. reject the images with extreme force, and become neurotic in short order, or b. accept them, and as they are so very overly intense, they may present as an irresistible attractant both sexual and repellant all at once, in short, as a perverse sexual goal and definition of personality. Clearly, both of these outcomes are not acceptable, or healthy. Here, we must observe the presentation of defense, in order to find our route around.

The defenses will, throughout the course of this procedure, exhibit certain transformations. These transformations will be repeated over and over, as new content is discovered and integrated. First, symbolic analysis will yield pieces of the puzzle, and these will be shielded in pun and linguistic distortion. Fantasies will present, and each need be analyzed exactly as a dream. The better you get at this, the more quickly you will heal. I can interpret these fantasies almost as quickly as my mind can spin them out, and in all cases, a sexual wish is the driving factor, always. Soon, you will be able to knock a symptom down in but minutes. Then, the defenses which attempt to keep the material hidden will change tactics. The symbolic links, will be removed and discarded altogether, and the ends will be sought directly, by which I mean, the defense will simply engage the structure to suit its needs. If a homosexual cathexis is to be repressed, like a kid in an elevator all buttons will be pressed, all your issues irritated, the effect as a plume of ink from a frightened squid, and, the hatred on the familiar object, or whatever defense is serving the repression, will be engaged in the midst of the storm. Now, as you can unriddle the symbols, the strategy changes, and a plume of defense covers direct engagement of the reactive elements. Once you see this, and release the hatred to discover the sexuality, the next change will be in the usage of language. Now, all words will have many, many meanings which you will plainly see, and any language in the mind will become a symbol of great shame and guilt, alongside of being a symbol of the wish. This makes all thought impossible.

To break this symbolic deadlock, one discovers the key to breaking the other conundrum apart as well. In both cases, in the case of clustered symbolic defense, and, in the integration of dystonic mnemonic material, fantasies and wishes, we can use a trick from current neuroscience, to destroy the existing personality, and restructure the situation to the greatest advantage. Here, we will alter intersubjective doctrine, purposively obtain a beta element, and use it to directly sublimate sexuality into experience as an undifferentiated power source, while we gut and remove the last of modern personality via LTD. In this case of defense, both images, and, language will be revealed as defense and resistance, ie., all language will serve double meanings suspended between guilt, and the wish, and, all images will likewise, be horrid and ugly, and also, represent the wish as well as the super-ego penalty. The purpose of this cluster of symptoms, is to keep the idea of the somatic sexual experience unconscious, so, we use that somatic impression to destroy personality, and restructure it to function as one based upon the paradigm of integration rather than repression. Long Term Depression, (LTD), which may be thought of as a dissociation between a previously learned Hebbian pairing, the reverse of learning on the neuronal level, Long Term Potentiation, or, LTP (Gazzaniga, 2009, p. 357, 358, 362), LTD can be created by firing neurons apart, which were once paired to create LTP, or most simply put: LTD = neurons that fire apart, wire apart (Doidge, 2007, p. 64). This

oversimplification of the process is not too far off, and can serve as a working descriptor of the following therapeutic procedure.

Please remember, the main contributor to the damage created by rape and molestation, is the action of the defenses aroused to safeguard the subject. These defenses are products of modern personality, and super-ego. Although they once, in the form of a benevolent daemon acted to minimize damage and protect, now, they are but a relic of a deeply sick and flawed piece of our lowest inheritance from both ontogeny and phylogeny alike. This structure, would rather kill you, than let you heal, so ugly and mistaken is the way we have been assembled. You will see the truth of this statement soon enough, and for now need but understand the following procedure:

1. Using the OEP, the subject releases the PHYSICAL experience of the molestation directly into consciousness. This will be accompanied by an image of the rape. Allow this physical feeling to emerge directly into experience, allow the tactile hallucinatory experience, feel the hands and the strange sensations, feel the responses exactly as if they were being repeated, but—feel the somatic expression alone. Allow the physical feelings directly through, and look outward, not inward. Now, you can feel the exact sensations as in tactile hallucination, and, there is no language or imagery in the mind's eye, which is focused on outer exteroceptive experience. This will be both pleasurable, and, disturbing, so, do not react, simply feel everything, experience all physical sensations with no reservation, judgment or restraint.
2. Maintain the tactile hallucination. Now while remaining open—Change your focus. Engage the alpha function key. This, and this alone, is what fills the mind's eye. You will observe the effect at once, and the alpha function key will become super-efflorescent and intense, as if an hallucination or nearly so vivid. Now, open your eyes, and look out at the world. You will be amazed! As the alpha function image is a primary source of our sublimated transference which gives all the world and all of experience its definition, meaning *and quality*, just as you must expect, all the world is now fortified and infused with enormous beauty and depth! This is how alpha function can transform the entire of human misery and experience: one must utilize specific unconscious content as the source to be sublimated and transformed. Alpha function, once attached to specific unconscious content, can purify, undifferentiate, fixated perverse cathexes, and return the energies to their proper place in the structure of healthy personality.
3. The quantitative factor must be carefully attended. The brightness of the alpha function key image is a guide post, and a gauge. The intensity of a once repressed and condensed cathexis is far too great for the circuitry to accommodate before it has been partially reduced by conscious exposure, and so, one must observe the alpha image carefully for the first few weeks. As you look outward toward the world and your life, the key image is preconscious at all times, and will draw your attention to itself as perverse cathexes you have input exceed the quantitative capacity for transformation: a. you will feel giddy and begin, perhaps, to salivate, and choke. Look, and the image will be glowing far too brightly. If you wait, the beautiful image will be suddenly extinguished, and be replaced with the most ugly and horrid images of masochism and sadism, stemming from the reactive elements of the castration complex. You have over-loaded the capacity of the circuitry, and the result was that the reactive elements of the castration complex stepped in to absorb the overly intense cathexis. The solution is: As you feel the giddy sensation and the

choking, you look inward and inspect the image. If it is excessively bright, you then *immediately terminate it*, and find the image of the real memory of the perversion, and allow those images directly into your mind with no reaction or resistance. After a few moments, the uncomfortable claustrophobic feeling will pass, and then, you remain open, and direct attention back toward the alpha function key image, then outward to reality. In this way, the experiential template is restructured to integrate and sublimate the undifferentiated energies contained in the perverse unconscious fixated material.

4. As you live life in this state, you must tread a narrow pathway which will foster LTD and the restructuralization of your ego/super-ego. There has been established in our upbringing, a pairing, learning, a specific connection has been established between the idea of these perverse behaviors, and the death wish within each of us which stems most actively from the dynamism of super-ego. The specific consequences of this struggle are spelled out in brief below, and I will here only state the method, not the transitory reactive consequence. Think of your ego and super-ego as a stimulus barrier between consciousness and unconscious interoceptive ideation: like a resistor placed in a vital electrical circuit which wastes the energies. This pairing between penalty, specifically castration and death, and a perverse unhealthy wish, must be broken, so we may easily allow the unhealthy perverse wish directly into consciousness and use its energies in undifferentiated sublimation. As a sailor who must resist the sirens, as a voyager of old who must steer between Charybdis and Scylla, you must maintain a very specific course! At all times, allow the somatic experience of the rape (the wish), directly into consciousness to power, to be sublimated directly into experience via alpha function activity. You must hold this narrow course, always allowing the sensations and never hearing or looking inward, only looking outward into the beautiful world. Soon, after but a few months, the pairing between defense and death, the resistance of words and images, and the experience of the somatic wish in consciousness will be removed, the energies will begin to release from the fixation, and LTD will occur. Here, we are destroying ego/super-ego, which is itself the resistance to interoceptive stimulus of an ego dystonic character, and by directly exposing ego/super-ego to that very toxin, and dissociating its punitive nexus, we are restructuralizing personality so as to integrate unconscious cathexes into experience, by way of the destruction of particular points of connectivity within the ego itself.
5. If you will recall the Freud (1913), the super-ego does not distinguish between a wish and an act, both of which it penalizes with great destructive vigor. With this in mind it should be no surprise that a great dissonance is aroused in the super-ego at this procedure, which after all, along with the rest, means its elimination and destruction. Here, we are allowing the most highly penalized of wishes and even encouraging the process! This is a death penalty offense to the super-ego...no less. It may seem strange to notice, that as the procedure takes hold, in the day, you feel better and better, and at night, the situation may well be reversed. If you have a deeply punitive super-ego, you may experience the following sleep disturbances:
 - a. REM dreaming of masochism which spills over into waking.
 - b. Sudden bouts of sleep interruption with vocal outbursts erupting from a state of sleep directly to waking.
 - c. Sudden waking in a state of explosive rage.

- d. Sudden waking in a state of extreme masochistic self-hatred, accompanied by self-abuse such as striking oneself repeatedly in the face, etc.
- e. Sudden waking in a state of profane hatred akin to "possession." (Like example c. but many times more intense, including alterations of voice and physical presentation like those attributed to daemonic presentations).
- f. Sudden waking in "possession" by an introject, which furiously demands you blind yourself, mutilate yourself, or kill yourself.

As the conscious situation improves, the unconscious situation degrades. Expect this, and remember, the situation will fade as the cathexis of the perversion fades, and is inculcated back into the healthy structure of personality. Expect no less—we are altering and destroying a deeply inculcated structure—after all, this deeply fused sickness must be removed from the root, and its very basic essence destroyed. There is little wonder that the process is slow, painful and eventually... ultimately liberating. How very deeply struck is this sickly error! It will be helpful at this point to further illustrate the process of reintegration with a series of dreams which detail the typical progression of such an integration of passive cathexes encouraged in rape, which typically follows the series form: Masochism, Hysteria, Integration.

Two dreams:

Here are two dreams of a typical sort which demonstrate the progression from masochism to hysteria as the cathexis of a passive wish created during a molestation is brought forward into consciousness.

Masochistic dream: This dream is typical of those created soon after a repellant passive wish is brought up from under repression.

I am in a bus. The atmosphere is oppressive and it is difficult to breathe. A large ugly man with a crooked nose and a beard is driving the bus. He has a large sledge hammer by his seat. All on the bus are deeply afraid, including myself. As we look out of the window it is clear that we are traveling to a place nearby where thousands of people are suffering and being systematically tortured and killed.

They are shouting and groaning in pain, tied and bound to stakes or just bound and laying flat. Men are cutting them, hitting them with various objects, and also, shattering their heads with hammers. Those men are as the driver in appearance. We are led off of the bus, and can hear the screams and suffering even more clearly. I am bound as I protest and struggle, laid on the dirt, and the driver raises the sledge, looks at me with a blank look, and swings the hammer down with great force to burst my head into a bloody pulp, and I wake.

Interpretation: The large ugly man with the crooked nose closely resembles the homosexual who drugged and raped me. The victims are doing their part, shielding the fact that a wish is present as they act as victims should, and protest, just as I do.

The wish created as I resisted the rape is clear enough, and so is the dual valence associated with it as a counter-valent structure. (There is so very often, a hysterical core, a counter-valent core in many types symptomatic construction, from masochism to obsessional neurosis). The penalty is plain enough, this perverse wish is penalized by death, naturally. The wish itself is condensed into the same act as the murder in counter-valent fashion, and is painfully obvious as well: the burst head symbolizing the metaphorically bursting head of the penis as it discharges in orgasm.

Hysterical dream: This dream is typical of the next stage in the assimilation process, and demonstrates less punitive symbolism, indicating greater acceptance of the cathexis. The sexuality is still split between active and passive elements, and remains unintegrated. Hysterical symptomatology is characterized by the simultaneous condensation of both aspects of the bisexual current onto a single symbol (Freud, 1908).¹¹

I enter a strip bar, go to the back of the establishment and enter a room where a great many women are dancing unclad, spinning themselves around the poles they use as props. I then go behind this room and she is there, dancing. Her power is great, and all there in the room are entranced...and it is clear that she is the very most attractive and powerful female. All are hers as she moves, and it seems as if one can feel the sensations she feels. She approaches me, and the room is now empty but for the two of us, and we begin to have sex. I can feel what she feels, and know, she can feel what I feel. Her every sensation is now mine as well, and I know, she is experiencing the same, and also feels what I do.

Interpretation: The seduction of passive sexuality, and hence, its attractive nature as an identification, this wish is evidenced as the female role is demonstrated to be most powerful, and influences via passive means, all those around. Here, in the dancing girl, we see a *simultaneous object and identification*. The wish to take on the passive female role is fused with the active male role, and although both are still separate in their manifest representations, each in the appropriate body for that fractionalized aspect, they are not under punitive separation, and are beginning to fuse and unite in a complete sexuality. The passive wish created in the rape, is becoming reunited, little by little, with the sexual unity, as it was before the rape. Remember: healthy sexuality utilizes all passive and active aspects in a complete sublimation which finds attachment points in healthy ego tonic expression for the binding together of all wishes.

Summary remarks:

By using the methods in this paper, modern personality can be restructured and replaced. The energies in the human mind are not anathema to human height, quite to the contrary, they are the fuel for human elevation. To integrate rather than repress our emotions, and use the energies of the past, is to find an abundant fuel for all sublimation. The past, our pain and pleasure alike, are treasure. Never repress your

¹¹ The girl in the following dream had in reality asked me to watch her dance, and her husband, much to my surprise took me not to a theatre of the arts as I had foolishly assumed (who the heck earns money for music school dancing ballet?), but took me to a strip club, to watch me watch, as it were. I refused the implicit offer for sex, and hold no animosity toward this attractive woman, or her husband. The wish which remains is obvious, and ancillary.

pain, never. Allow it to fill you, it is not really pain, only energy, let it pass directly into your mind without resistance of any sort, and behold. Every feeling, sexual or otherwise, is a perfection. Never resist your emotions, or, you are something laughable, something restrained and obedient, something...modern. Let us become what is next. Let us become ethical, intelligent...worthy. That, is new.

Soon, all the sexuality, pain, suffering and pleasure you refuse is easily liberated and fueling experience, for *every* thought and feeling is perfection, and so, we use those aspects we do not actualize, all men and women contain all selves, and so, we choose, and never waste, but use the rest. We do not repress those wishes which are not actualized, no, we *use them* to power experience and thought.

One can not *have* the world, but, one can *create* it. All energies are pure. What I choose is my life, and the rest, becomes all of the universe. This...is hope.

From my book, *Mind Map*:

“May our emotive rationalist see that the world is beautiful and perfect as he can imagine it, an inviting puzzle laden with every energy he does not become, his life invites him to interest and is graced with the fullness of his inner world as well as its outer reflections—his worlds become him and he becomes his worlds. The world is only a thought, a perception which may be made beautiful, as is our inner world just a thought, a perception which is subject to this same "rational magic," and now the intellect too is energized and fueled to capacity, no longer starved of its fuel: emotion and every other sexual and primal energy. The mind and heart are full like a windsock in an airborne current of emotion, and the motion of feeling and the thought it powers are our happiness, so over-full, burgeoning and flush with the burden of such happiness that it must create, must spill over and become itself outside of itself, to see and become again and laugh in the moment of creation, a cackle to tease all weary things which have fled in this moment so cherished and double sweet, stolen from beneath the pouting lips of time herself. So does each moment present itself as a perfect prize, ripe and hued beyond description as a prism of our happiness. So should thought, the world of ideas and all ascending things call to every man.” [Norman, 2010]

If not every man, then perhaps for us?

Conclusion:

Modern personality is based upon the model of sublimation by repression, a topographically divided energetic separation within which the conditions for inefficient mental economy, unethical, immoral behavior, and neurosis itself are encouraged. Another paradigm, that of sublimation by integration is available, and can by contrast be assessed in its relative value, as closely paralleling the relation of fusion and fission as to their efficiency and toxic profiles of process operation. The main source of repressive and moral activity, is super-ego, which has at its center the masochistic drive: the drive towards death. This structure can be removed by way of a series of regressions, targeted at specific formative impressions, allowing a repolarization of this most unhealthy structure, and hence, constituting a primary

reactive re-polarization, as super-ego is a reaction formation. The work of Schore has clarified, made specific and useful, the work of Bion, and the actual circuitry which underlies the creation of alpha function has been discovered, along with the period of development and specifics of neuroendocrine and neurotransmitter activity, and the modulatory predominance of particular neurotransmitters associated with those circuits. Panksepp has added to this picture, the detailed beginnings of an understanding of both the underlying circuitry of affect, and also, the role of neuropeptide activity as a presynaptic modulatory mechanism. These converging pieces of understanding have allowed me to create an alpha function key image which permits manual engagement of the sympathetic dopaminergically modulated ventral limbic circuit. The attendant invigoration of this circuitry, changes the main source of our experiential defining transference, the "*experiential template*" a limbic and sub-limbic allocation of affect mediated by the long term neocortical mnemonic store, a process which defines all reality symbolically in displacement and condensation, as in dreaming. This most basic system of affective regulatory function, the sympathetic/parasympathetic balance associated with the relative activity of Schore's sympathetic and parasympathetic limbic/orbitofrontal circuits *in response to all stimuli*, should be assessed neuroscientifically in quantitative measurement of relative systemic function and development, providing a sure and vital axis of measurement in assessing this main system of affective human regulatory function.

The alpha function key can be used to foster active re-polarization of affective valence, when judiciously applied to alternative psychical structures, never to sadistic or masochistic ideations directly. It can also be used to transform the cathexis of fixated perverse ideations into an undifferentiated form—such as those created in rape and molestation as a function of somato-psychical determinism. The somatic unconscious impressions of human perverse and non-perverse sexuality can be directly encouraged into consciousness in an unhindered sublimation. This new state of affairs is created by restructuring existing personality, as both ego and super-ego act as an interoceptive stimulus barrier, which hinder efficient mental functioning. The direct inculcation into consciousness of the somatic impressions of specific highly ego dystonic beta elements, creates an experiential sublimation of great intensity, and, allows the breaking apart of the punitive associative structure embedded within ego/super-ego itself: a neuronal destructuralization of ego processes via LTD. Once it has been gutted, and super ego is disbanded, modern personality is removed. The result is a new paradigm of consciousness and personality based not on punitive fear, but on ethical functioning, based not on guilt, the threat of death and castration, but on empathy: sublimation by integration. Indeed, what throughout history has been considered a hit or miss proposition, the "higher type," can now be created as a matter of direct intention. The difference between a higher type, and a modern, is one of mental economy, mental economy squandered in guilt and repression. The time of the dull, obedient, guilty soul, the modern man, has ended. Now—there is hope.

Appendix: A:

The system of affective assignment: We only experience our perceptions, never the fictional, factual, "thing in and of itself." Perception is never directly able to access the things and events to which our perceptions refer. These perceptions must be identified, and, affectively interpreted, that is, given an emotional context by virtue of

which they can be assessed, and appropriate behavior determined. Therefore, one could say that reality testing consists along with object identification, with the giving of proper symbolic value, proper affective value to perception and experience. These ideas converge to a point. In the simplest terms, what does this experience "mean to you." Think of affect as the psychological context through which a neutral perception is defined. It is the affective meaning, the context, which gives symbolic emotional *Quality* to experience. In example: One person may have a fond adoration for his pet mouse, where another may recoil in revulsion. The mouse is the same, a neutral perceptual experience, it is the affect which we assign to it which puts it in the context of our associated experience that varies. This symbolic affective function can become deranged, as we will now see.

In "The Pain Was Greater If It Will Happen Again: The Effect of Anticipated Continuation on Retrospective Discomfort," we find the following observation: "Across 7 laboratory studies and 1 field study, we demonstrated that people remembered an unpleasant experience as more aversive when they expected this experience to return than when they had no such expectation" (Galak & Meyvis, 2011, p. 63). Note how the experience was the same, but the affect assigned to it was different, a function of a *new context* whereby a different affective value is assigned to the stimulus. Affect is the context, and so, the quality with which we endow perception and experience, and its assignment to perception is therefore a vital part of healthy balanced mental function and reality testing.

In Levens and Gotlib's "Updating Positive and Negative Stimuli in Working Memory in Depression" we find the following statements: "Compared with controls, depressed participants were both slower to disengage from sad stimuli and faster to disengage from happy facial expressions. . . . For example, biases against keeping positive information active or toward maintaining negative content in WM may underlie the ease with which depressed individuals develop and propagate a negative mood" (Levens & Gotlib, 2010, p. 654). It is clear that the system of assigning affect to stimulus is essential to reality testing.

The system by virtue of which this process takes place is phylogenetically old and complex. All sorts of affective aspects are undoubtedly stored in various anatomical neural locations and retrieved from these many various areas to create the final effect of "affect." We must watch the system work in a known metapsychological context to identify its various parts and their intrarelations. But, as we study sleep, it seems that with some psychology we may see the system of affective assignment in isolation, and gain some not inconsiderable insight into the process. For this reason I will now draw out the proper Freudian picture of the metapsychology of dreaming so it may be related to the current cognitive neuroscience.

I have found that even the very best scholarly papers often misrepresent Freudian theory by way of drastic oversimplification in order to contrast the theory being advanced against the older established theory. Please read the following from an otherwise superb piece of scholarship. In "The Cognitive Neuroscience of Sleep: Neuronal Systems, Consciousness and Learning," we find the following statement: "Freud believed that dream content was determined by a daytime experience that triggered the emergence of related memories" (Hobson & Pace-Schott, 2002, p. 686). This is an oversimplification. Freud did not state that dreams were primarily

dependent on episodic memory as this statement may be seen to imply, but instead, had found many dream sources and relations to day world experience (Freud, 1900, p. 551). The partial statement of the highly complex and nuanced Freudian theory is so brief as to be utterly misleading. Later in "The Cognitive Neuroscience of Sleep: Neuronal Systems, Consciousness and Learning," on the same page, we find this statement which fits perfectly with the nuanced Freudian theory: "Instead, discrete and incomplete fragments of narrative memory are assembled to create the new synthetic scenarios of dreams" (Hobson & Pace-Schott, 2002, p. 686). It seems that in an attempt to define the new, the old has been distorted. For this reason I will begin with a recap of some familiar psychology which we will need to keep clearly in mind in order to construct our new analysis of affect.

Please note that we have already drawn a clear and intuitive connection between the assignment of affect and symbolism. Note also that our understanding extends this chain of ideas to include the notion of context. They are all but, if not truly, identical ideas, or aspects of each other. In psychoanalytic theory, dream and symbolic construction are accomplished by certain complex and specific means. A piece of day-world residue, a trivial dissociated fragment, a memory trace is chosen as a building block for dream construction because it is neutral, free of affect and meaning, and so becomes ripe for representation in a dream, ready as a canvas to accept the many meanings via transference which will be assigned to it in condensation and "overdetermination" (Freud, 1900, p. 279, 283-284, 563-564). The less saturated with meaning, and, the closer to being a nexus for many other ideas, the better. Language, as it is itself a symbol with many meanings and puns, acts as a nexus to which many underlying determinants can attach in condensation and overdetermination (Freud, 1900, pp. 340-341). The memory trace, and there are of course many which will be assembled to form the finished dream, is then invested with meaning from many sources. A process of disguise and distortion is used to accomplish this which includes: reversal, condensation of many events into one (Freud, 1900, p. 595), overdetermination of a dream through thematic repetition (Freud, 1900, pp. 283-284) and/or overdetermination of a single symbol by connecting many various trains of thought to give it energetic value sufficient to gain representation (Freud, 1900, p. 330), displacement from one object to another (Freud, 1900, pp. 307-308), and a host of other means which symbolically represent and compound affect to achieve representation and conceal the true source of the affect delegated. These means of affective encoding found in REM dreaming function to avoid censorship via compromise formation which functions to create *distortions*. (Freud, 1900, pp. 143-144, 506-508, 595-598). It is by condensed symbolic construction and distortion that the affective sources of the symbol are attached, and also, hidden (Freud, 1900, pp. 506-508). The symbols thusly endowed are then woven into a story, a narrative, and are thereby given further episodic context, although be it a false one, in a process known as "secondary revision" (Freud, 1900, p. 488). The distortions are guided in no small part by the process of compromise formation, where the contents are distorted, censored, so as to produce a manifest dream, the meaning of which, the ego will not recognize (Freud, 1900, pp. 143-144, 506-508, 595-598). The process is called dream work (Freud, 1900, p. 277). So we have the process of symbolic construction and dream representation, a process whereby memory traces with little or no affect become suitable to be endowed with affect and woven into a distorted narrative, through many specific means. Highly complex! However I have tipped my hand as this process can be reduced to a simple but broad

quantifiable principle. To discover this quantitative reduction the neuroscience must be analyzed alongside the aforementioned metapsychology of symbolism and dreaming.

In his paper, "Sleep, Learning, and Dreams: Off-line Memory Reprocessing," Dr. Stickgold (2001) and an esteemed collection of intellectual confederates bring us the clearest somato-neurologic picture of this metapsychological proposition to date. A clear neurological definition of the trivial unsaturated pieces of memory (memory traces) and symbolic processes of Freudian theory are seen to emerge in the context of memory consolidation, even if in a schematic and reduced fashion. In certain states of psychopathology such as schizophrenia, we can observe the pathogenic assignment of affect to experience as affective assignment operates unrestrained by the higher mental functions, such as input from the dorsolateral prefrontal cortex, just as we can observe in REM dreaming, which is understood psychologically as the general prototype of psychopathology (Hobson, 2001; Hobson & Pace-Schott 2002; Pace-Schott, 2003). In REM dreaming this unrestrained affective processing is isolated and expressed in harmless hallucination. The isolation of the affective system is achieved through a series of changes in neural modulation which Dr. Stickgold enumerates as:

“More generally, the cognitive changes seen during REM may be the combined result of three physiological characteristics of REM: (i) the shift in neuromodulatory balance from aminergic to cholinergic, (ii) the decreased activity in DLPFC and increased activity in both the anterior cingulate cortex and amygdala (75–77), and (iii) the decreased outflow of information from hippocampus to neocortex (53). Taken together, these findings suggest that the brain in REM is tuned more for the processing of associative memories than for the simple consolidation of recent memory traces and may explain, in part, various features of REM dreams, including their bizarre, hyperassociative quality (95) and minimal incorporation of episodic memories (96, 97)” (Stickgold, R., Hobson, J., Fosse, R., Fosse M. 2001, p. 1055).

In Dr. Hobson's paper we find the statement nicely summed in these few words: “There is also a progressive decrease in output from the noradrenergic, serotonergic and histaminergic neurons, all of which shut off in REM, leaving the selectively activated forebrain aminergically unmodulated” (Hobson & Pace-Schott, 2002, p. 691). In this instance of systemic aminergical demodulation the intrarelated symbolic subsystem by virtue of which we give affective value to experience is observable as it encodes affect into a dream for consolidation into the mnemic system, and other various functions I will touch on later:

“This suggests that the brain sources for dream elements are not hippocampally mediated episodic memories, but cortical traces of discrete components of the episodic memories, which then presumably are combined with associated semantic memories. With dorsolateral prefrontal cortex deactivated in both REM and NREM (75, 76, 106, 107) and the hippocampal formation producing only minimal cortical output in REM (53), actual episodic memories may be inaccessible and hence irrelevant to the dream construction process. . . In REM, the central nucleus of the amygdala plays a crucial role in the activation of medial prefrontal cortical structures

associated with the highest order regulation of emotions (76, 108, 109). This adds to the deactivation of DLPFC, normally associated with higher cognitive functions (110), in REM. Thus, the brain appears to be biased toward emotional processing in this state. . . . We hypothesize that these features reflect an attempt, on the part of the brain, to identify and evaluate novel cortical associations in the light of emotions mediated by limbic structures activated during REM. This would be in keeping with the proposed role in waking of these structures in the identification of mismatches between expected and actual behavioral outcomes" (Stickgold et al., 2001, p.1056).

So we finally have a clear beginning in our search for an analysis to discover the neuroscience behind the metapsychology. A memory trace suitable for dream construction is now well defined as nonhippocampally mediated, and so, cut off from episodic memory just as one would expect metapsychologically, as the memory trace must be free of context and preexisting symbolic and affective value to be able to receive affective, limbic value and emotional definition, and act as a neutral substrate, an unsaturated nodal point with which to provide a new symbolic/episodic context. The source of the affect assigned to these free memory traces which are bereft of saturated context and existing emotive value is found through the mediation of limbic structures. Also, the purpose of these structures in providing affective definition to perception and the influence of this process on reality testing is not neglected either, as we read: "We hypothesize that these features reflect an attempt, on the part of the brain, to identify and evaluate novel cortical associations in the light of emotions mediated by limbic structures activated during REM. This would be in keeping with the proposed role in waking of these structures in the identification of mismatches between expected and actual behavioral outcomes" (Stickgold, et al., 2001, p.1056).

So I can now plainly state the quantitative conceptual reduction to which I have alluded: The symbolic processes by virtue of which we give quality to REM dreams, experience and perception, can be reduced to a quantifiable operation: "the assignment of affect to." Symbolism is a transference from concealed limbic sources, from unconscious sources by virtue of which emotion is mediated and affective quality assigned to perception. Symbolism is a function of the system of affective assignment.

Appendix B: Symbolic Analysis at the level of the complex (Norman, 2010)

.....So the last thing you need to know is this: Our illnesses are trying to help us. They contain a desire which is satisfied, or a wish which is fulfilled, or a shielding of our tender heart and however sick symptoms of mental illness make us, they are the mind's misguided instinctual attempt to strengthen and defend. To solve the riddle, we must see what the sickness does *for* us. Why do we *need* it? Once the puzzle is solved, the symptoms disappear instantly! Only the right answer works so we can prove the scientific integrity of the analysis by its clearly demonstrable instrumental value. I am my own proof. If these ideas did not work, I would be dead.

Can you solve this? This first instance is typical of the sort of eruption which plagued the recovery period from the engine ordeal. Once the ability to repress was removed my mind mobilized other primitive destructive defenses to supplant and supplement the severely weakened ability to repress. This instance of a paranoid obsessive

neurosis resulted: I have finished authoring a string of aphorisms to go in my new book. I am suddenly gripped by a horrifying thought which feels as if it has been thrown straight down into my mind, a solid terror, a certain shame and knowledge overtakes me all at once, like a bucket of hot lead dropped into my soul I am suddenly sure, I am Lao Tsu, the ancient Tao master whose works are legendary as the best and purest of eastern thought. I have never read or owned any of his work, and know but one aphorism of his but he is in me, he is me and so, I am a fake! I have not written my aphorisms, he has, I am a fraud and Lao Tsu has possessed me! I am an atheist but can not refuse this knowledge and am tortured to know it— I am a fraud, Lao Tsu! I must check—the internet—the library—I must know at once! The obsession insists and it must be known, I must find out if my work is stolen and false—a theft from the unknown pages of Lao Tsu! It must be! I must know at once!! I am a crystal goblet before Ella Fitzgerald and the feedback loop, the out of control obsessive thoughts loop faster and faster and I must understand this symbol or perish! I moan aloud in pain and begin to lose the last of my ego integrity. Very, very painful! The train accelerates to breakneck speed rattling itself to pieces and approaches the last sharp curve. Can you solve it? Why do I think this? Please put the book down and try. Hey, don't cheat! Put it down!

This incident is closely related to many which follow a similar pattern, and contain the same basic wish. I am insecure about my writing and present symptoms of introjection as if I am possessed by the ghost of a known genius, and question if I am a fake. Actually, I reassure myself to imagine my works are composed by such a genius, this sure spirit of genius, Lao Tsu, and give myself a bit of healing praise to imagine it. If they can be mistaken for the works of Lao Tsu, surely my aphorisms are worthy! In an inversion, "I am a fake," becomes praise as the obsession is followed through and the authenticity of my work is checked and then confirmed. In this way the compulsion to check adds validity, further validation to my work as none of the aphorisms are revealed to be Lao Tsu's, so the obsession offers this way to be relieved and reinforced as I discover my works are good enough for me to question if they were written by the spirit of an ancient master, but are proven original, and hence of the highest value. The doubt of authentic authorship becomes an inversion which offers praise for the authenticity it appears to doubt. I am served and assured by the compulsion to research each phrase and discover, "prove" by this obsessive ritual non-logic that I am original and worthy as each work is cleared as being my own. The obsession answers my insecurity about my work. This is the wish fulfilled, the ego strengthening provided by the paranoid obsessive neurotic ideation. [20](#) The fantasy provides me with this, although the cost it extracts is greater than the good it does. Upon seeing how I was just soothing myself, soothing my insecurity about my writing I blushed to know what I had been pulling on myself, began to laugh and cry simultaneously and was well to feel the pain of my real insecurity, a slight pain, the pain which the fantasy protected me from and answered, replace the destructive paranoid defense.

Here is another along the same lines which will be easier: I have entered a prestigious literary competition and awake in the night with a cramp in my gut to know, with certainty, I am absolutely sure that someone who detests my book, one of the professors who judges the competition has moved the corrective stickers used to remove typographical errors in my book so as to alter and desecrate the text, assuring that the next judge to read it will fail it out of the competition! I can not win! I have

been stolen from! The cascade becomes obsessive and escalates to a fury and I cry out in horror and my wife wakes up. I must walk in the night! I am going mad to know it! I can do nothing to stop the injustice, I feel him looking at the text and finding a really strong section and making it into nonsense by moving the stickers! I am helpless! I am being cheated!.....

.....The interpretation is similar in one respect: that I give myself praise to imagine I am being looked at as a worthy author, good enough to threaten and offend a professor and judge who takes me seriously enough to sabotage my work. But I also give myself an excuse to ease the pain when I lose the competition. I can tell myself, "He moved the stickers and ruined the text. I lost because I was sabotaged, not because I was undeserving of the win." To be cheated is to reserve the possibility that you deserve victory. So the paranoid contains a wish. *Paranoia is part fear and part flattery*. As I walked around in the dark, gripped by the sickness and then to see it, to understand I was too tender to lose, I needed to know they were considering me seriously and that it was not my fault if I lost. I was insecure, not privy to the true thoughts in some judge's head. Again embarrassment, a blush and tears accompanied the instantaneous collapse of the panic attack once the obsessive symbol was unriddled and its purpose, the thoughts and feelings it creates which I *need*, and those it *blocks*, were plainly uncovered. Once the meaning of the obsession is understood the symptoms vanish instantaneously! Repeatable lifesaving results.

I will surrender one more example which will be solvable most easily for those who have read *This New Day*, although enough information has been presented here to solve the puzzle for more astute readers. Look carefully at this strange inverse way of thinking, this unnatural skill which is so essential to maintaining our ascending course. Remember: this is a way of thinking, a method of looking through to the motivation which must be applied to all aspects of life and living— *our deeds are but symbols of our motivations*.

I am having a fine day until I discover that a bag of groceries has been carelessly laid aside and allowed to get wet, left unattended, never put away and forgotten, its contents have been exposed overnight. I am hysterical out of all proportion, I can not believe that these beautiful vegetables and fruits, so swollen and perfect in their season of highest bounty and health, so tenderly nurtured with such effort, love and caring have been left to rot ! like a piece of garbage! All which life has offered in them, so healthful and perfect, so tender and precious has been abandoned, disregarded and left as if it were just shit! Filth!! To rot, to stink and mold, to be scraped into a stinking pile to decay! This is nothing but a criminal act! I can not bear the thought! The crime is enormous! Unforgivable! The waste of all which is most hard won and precious! All that is good, nourishing and wholesome born at the very highest cost and brought to perfect flower and fruit, now shamelessly wasted as filth! I am enraged and wounded to see such a thing! Unbearable! I am going mad and believe I will burst to feel it further! Tick tock tick... What does it mean?

Once again the whole painful irrational obsession collapses into nothing as I understand it. This time no blush, just simple anguish as I weep to feel the full weight of the feelings blocked by the obsessive symbol. The obsession is again a symbol of the feelings it protects against. The groceries symbolize my failed career. From age six to forty-two I had one desire and drive deeply reinforced numerous times in many successful performances: I wished only to play and perform music above all other things. I single-mindedly sacrificed all of myself to the obsession, the god of music and the crowd, the fixation which led to three nervous collapses– and then seeing the engine!–before I had detached to begin reclaiming music for myself apart from the breakdowns and "the other." I wept bitter anguished tears to know what of my bounty, my health, mind and self I had burned upon this alter, never to know again but in sorrow and loss. How dearly I had paid to give sacrifice to this false fixated god–The Crowd. My music is represented by the groceries, so beautiful and nurtured at such enormous cost, so perfect and unappreciated, and I wept to know the pain directly, the pain which the obsession had defended me from. Compared to the pain and obsessive agony of the defense, the real anguish, my real pain, was a sweet nectar. The most gracious of all tears which can be shed are those from your highest pain. These are the tears which once born become the river of our happiness. Only our highest pain could hide such a thing. Once we are no longer hostage to our pain, paying out our ransom, our energy and efforts spent to withhold it, might we discover that pain is another fullness, and with it passing through us will we then know that we are the contractions, the agony and suffering we have refused? Might we know ourselves again and discover, that all of beauty sleeps, neglected and hidden, beneath a banished tear?

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Super-ego and the neuroscience of empathy: from unconscious wish to manifest behavior—a new human model.

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Abstract:

This paper will detail a new model of empathetic dynamism and affect control derived from historical, neuroscientific and psychological perspectives. The transference from unconscious sources which creates the particular subjective qualitative instantiation of conscious experience is addressed, and a new construction of personality put forward. In this way the potential endemic ethical basis of human behavior can be specified, and its unfortunate dissociation in the modern case more precisely understood. A specific example of the unconscious associative attachments of unified personality is then revealed, allowing direct insight into the basis of the hidden formative aspects of the unconscious to conscious transference to be studied in an integrated example. The startling and hopeful implications of these insights for the human condition are specified.

Introduction:

This paper will reveal the psychological and neuroscientific basis of insights which have been derived from close to a decade of personal analysis and study. It is necessarily written at points, in a style which is somewhat more laden with affect than is typical in scientific writing. This is necessary, as we are discussing affect and affective states, and one might most deeply communicate the tone of affective states to use not only analytic, but also more direct language to achieve affective resonance in the reader. For this reason, and because what follows is in large part derived from personal analysis, the first person is sometimes used. I do hope the reader will forgive these small stylistic anomalies. The following information has direct bearing on the neuroscientific and psychological basis of the most troubling social aspects and manifest pathological behaviors which plague modern man.

Some seven years past, I had developed a psychoanalytic technique named *Native Psychoanalysis* which allowed me to clear away a window of resistance and directly observe in myself what should be unconscious content (Norman 2011, 2013b). This methodology is the basis of a second technique, *Re-Polarization Theory* (Norman, 2013a) which has permitted the alteration of pathology through curtailment of the basis of repression, *super-ego*, and hence allowed repressed unconscious material to be directly accessed and past memories reformed and altered. The transference which creates the quality of each moment of experience is in part a function of memory (Norman 2015, 2016) and, to heal from damage, those memories must be changed. Within us all, is our personal history and that of our entire race. To observe the hidden interactions and effects which produce our behaviors and alter the restrictions which have been built into us as modern humans, has demonstrated to me what are the deepest foundations of human illness. These traits are second order manifestations of imbalance. It need not be so. The hope of man is in finding what has been obscured beneath a tragic and ill past. Health can be unearthed and again, just as it was so long ago, be brought to a position of predominance in the mind of man. Our hope is an

atavistic evolution.

Super-ego: of conscience, morality, ethic and illness, the neuroscience and history.

There is debate in the field of psychology about many things. This uncertainty is often the result of the nature of unconscious processes and content, which by definition cannot be observed. To have gained access to this hidden information has resolved these issues. The answers are quite plain. Unconscious content is always specific and the intersubjective notion that it is unnamable or indistinct is incorrect (Brown, 2011, Norman 2011, 2013a,b). Those mistaken views are only a wish not to see these things. There is good reason for that error; the repressed content is more disturbing than can be described. Mere exposure to it destroys ego structure permanently, and may also be used to destroy the structure of super-ego at the deepest levels (Norman 2013a). This knowledge shatters personality in a permanent way. The unconscious content revealed closely parallels the Freudian picture. The operations of the unconscious mind are specific, just as are its contents. In no case are these things indistinct.

In intersubjective psychology much is made of the idea of alpha function (Brown, 2011). Unlike the questionable intersubjective ideas concerning the unconscious and its lack of omnipresent specificity, the notion of alpha function is sound. Alpha function does have the effects supposed, and can transform memories and current experience (Norman 2013, 2013a, 2014, 2015a, 2016a). Just as hypothesized, it is created via the exchange of gaze and glance in the early mother/child dyad. I have uncovered the circuitry which supports alpha function and made a surprising series of discoveries concerning its use and effects:

- a. unlike the intersubjective approach, it is necessary to apply and engage the circuitry manually with symbolism (Norman 2013, 2013a, 2015a, 2016a,b), and then attach the function directly to a piece of pathogenic unconscious content, often USING a (physically bound untransformed) beta element [this permits direct usage of energies bound into untenable forms such as those ego dystonic pathological/perverse drives created in sexual abuse];

- b. to access the circuitry via the symbolized initial impression of its innervation (Norman 2013, 2013a, 2015a, 2016a,b), subsequently increases both exploratory interest in the world corresponding to Panksepp's SEEKING system (Panksepp, 1998), and forms manifest empathy toward all things and people;

- c. intelligence blossoms as never seen before and interest in all aspects of life and reality, sexual, artistic and intellectual, suddenly flourish, whereas previously these aspects were greatly if not completely diminished.

Modern man, is controlled, made dull and obedient, cold and empty via a homeostatic imbalance across specific circuit pathways, which has long been built into him from history both ontogenetic and phylogenetic: super-ego. First I will present a brief circuit analysis within the context of the transference, then the history from two fronts. From there a definition of ethics as contrasted to authoritative moral mandate can be derived and specific conclusions and examples provided.

Curiously, there is a very limited amount of cogent neuroscientific information

concerning the common basis of the problem: *guilt* as it is expressed across the circuitry and active anatomy of the brain. This fundamental aspect of neurosis, social control and sexual expression so deeply intertwined with the very basis of affect regulation itself, seems to be absent in neuroscientific literature and review. Strange that the most important of all neuroscience is not made available in close detail. I have derived the missing information from many sources, and may now present the highly condensed and simplified results. Please contact me for further detail.

The Transference:

The psychological notion of 'transference' is most clearly seen in the artificial therapeutic situation of psychoanalysis as the familiar transference neurosis. However transference phenomena are most assuredly not limited to this case of artificial functional pathology, but are responsible for the healthy and unhealthy qualitative aspects of perception and experience itself (Norman 2011, 2013*a,b*, 2015, 2016). Just as the neurotic in proper psychoanalytic therapy displays the repetition compulsion and his fixations in an artificially induced neurosis which defines their reality within therapy, so does the healthy case from his more fluid memory and experience project outward his or her definition of the world and experience in a flexible, dynamic, associative, non linear process (Norman 2011, 2013*b*, 2015).

This transference which binds current perception to associated qualitative valence as an affective distributional function of memory is available to observe in its *foundational* anatomical formative innervations and their resultant allocational functions as stemming from circuit architecture created in the first 18 months of life (Norman 2013, 2013*a*, 2014, 2016*a*). During this initial period of development the groundwork is laid for the core of affective expression and restriction throughout later life. This represents primary human unconscious autonomically interdigitated regulatory functionality, as extending from the foundational innervations of Schore's dopaminergic "sympathetic ventral tegmental limbic" circuit, and also, the noradrenergic "parasympathetic lateral limbic" circuit, which act in tandem to opposite effects (Schore, as cited in Kaplan-Solms & Solms, 2002, pp. 234-235, 237). These two circuits span the limbic and Orbito-Frontal regions to imbue experience with basic valence, and delegate or perhaps restrict positive dopaminergic affective expression in response to social cues, meaning shame and then guilt. This oppositional circuit balance, over all, creates either a foundational basis of repression which is associated with amygdala activation, Corticotrophin Releasing Factor and stress, or, if balanced differently toward predominant activity of the sympathetic circuit, to permit feelings of elation and explorational behavior (Kaplan-Solms & Solms, 2002; Panksepp 1998; Norman 2014, 2016*a*). These two circuits then are the foundational basis of expressed guilt, social control, sexual expression, health and happiness and, are mediated by social cues, meaning: *conditional regard*.

It is now thought that mirror neurons are the neural substrate of empathy. This is incorrect. Mirror neurons signify mere imitation, as distinct from empathy as can be seen in cases of catatonics who display echopraxia, which is based in mirror neuronal response (Bengston 2015; Rizzolatti et al., 2008). A catatonic is not empathizing with the attending physician to reflexively imitate his motions, although imitation is an obvious sub-function under a primary empathy. Empathy is akin to identification proper, and is first evidenced in the indistinct pre-individuated period characteristic of

initial limbic/OFC circuit innervation, not of the expression of the sympathetic circuitry mentioned, but in the impression of its primary innervation (Norman 2013, 2014, 2016a). This is the basis of empathy: a primary identification with the world and each other (see below). This in turn, is the very foundation of subsequent energetic circuit expression. It is this which is so sharply curtailed in the painful guilt of conditional regard: *the very basis of energetic expression, and empathetic connection*. Clearly, these are the exact basis malformations responsible for lack of caring within human relationships.

The curtailment of energetic expression as a function of super-ego, affective restriction due to what we may colloquially refer to as conscience, is the basis of modern morality stemming from primary conditional regard. It may clearly be seen from this vantage that such moral restriction is opposed to empathetic expression, and is instead aligned with *obedience to external authority*. This is a sure basis of modern afflictions such as neurosis. Modern man is controlled through, and suffers from, a permanent low-grade homeostatic imbalance created via improper and unhealthy energetic circuit allocations: Guilt. This is the locus of the problem.

Rights to caring, love, sexual contact and life itself in male and female cases, were traditionally ascribed to the authority of the father, and now phylogenetic and epigenetic underpinnings of patriarchal threat enforce pathology from unconscious sources (Norman 2011, 2013, 2013a, 2014, 2015b,c,d,e; Dodds 1973). This pathology stands in opposition to permission and rights to the caring of the mother, which once formed the initial basis relationship in both male and female cases. The feeling of human dissociation and anxious threat engendered by super-ego and authority may be replaced with a feeling of empathy and safety, warmth and relaxation. Health may replace the source of illness.

Affective regulatory analysis:

Schore has discovered two circuits which are primary in development, and function in opposition to each other: the dopaminergically modulated sympathetic ventral tegmental limbic circuit, and the noradrenergically modulated lateral parasympathetic tegmental limbic circuit (Schore as cited in Kaplan-Solms & Solms, 2002, p. 234-235). The sympathetic circuit, which I propose underlies intersubjective Alpha Function (Brown, 2011; Norman 2013, Norman 2014) is formed, much as Bion had supposed, as a function of the dyadic exchange between infant and mother of glance and gaze, and we will add an inference which is quite obvious and easily supported (Keverene, et al., 1989; Montagu, 1978; Panksepp, 1998, p.272) as infants engaged in the exchange of maternal glances are usually being held, that *maternal touch* and the subsequent addition of neuropeptides/endorphins also have a part to play in creating the result.

"It is hypothesized that maternal regulated high intensity socioaffective stimulation provided in the ontogenetic niche, specifically occurring in dyadic psychobiologically attuned, arousal amplifying, face to face reciprocal gaze transactions, generates and sustains positive affect in the dyad. These transactions induce particular neuroendocrine changes which facilitate the expansive innervation of deep sights in orbitofrontal areas, especially in the early maturing visuospatial right hemisphere, of ascending subcortical axons of a neurochemical circuit of the limbic system—the sympathetic ventral

tegmental limbic circuit.” [Schore as cited in Kaplan- Solms & Solms, 2002, p. 234]

The famous studies from the 1940's conducted by Spitz (Spitz in Bowlby, 1980; Panksepp, 1998, p. 262) may well imply the primacy of this developmentally innervated brain circuitry extends to include the most basic dependence: that of life itself. Specifically: if deprived of maternal touch and gaze, the infant may well die. The sympathetic tegmental limbic circuit is dopaminergically modulated, and can rightly be thought of as a primary manifestation of libidinal excitation and discharge (Kaplan-Solms & Solms, 2002, p. 237). It should be noted that the dopaminergic and opioid systems and circuitry which respond to create the good feelings which reinforce socially mediated behavior, both involve many of the same areas, such as the ventral tegmental area, where the A-10 meso-limbic dopamine cells are located (Panksepp, 1998, p. 118). Neuropeptides, such as the endogenous opioids including beta-endorphin which is triggered by social cues and touch, have a primary role in creating social bonds, quelling pain, both physical and mental, are key in alleviating separation distress, creating sexual reward, and addictive reinforcement (Panksepp, 1998, p. 255, 264). So we can see here, in the formation of the sympathetic ventral limbic circuit triggered by maternal exchanges of glance, sight and touch, a source of libido, an energetic dopaminergic circuit which up-mediate arousal and shapes behavior, formed presumably by way of allocating both endorphins and those neuroendocrine functions involved with encouraging the substantial innervations of dopaminergic projections into orbitofrontal areas. Here, in the activity of the completed circuit, along with the peptide systems, dopamine and opioids serve their reward and motivational functions as social and energetic contributors.

The contrary circuit, the parasympathetic lateral limbic circuit, is to be thought of as a balance, a cut off, a competing inhibitory system to counter the rewarding energetic expression of the sympathetic circuit (Kaplan-Solms & Solms, 2002 p. 237). This circuit functions to stop our energetic libidinal expression: functional, conditional, affect regulation in response to social cues (Kaplan-Solms & Solms, 2002, pp. 234-238) and so, can best be understood as the physiological structure triggered by social disapproval: *by shame and guilt*. Both of these circuits are innervated into the orbitofrontal areas, which mediate social cues and functioning, just as one would expect.

As the infant progresses through the initial 18 month period, during which the sympathetic and parasympathetic limbic circuits are fully formed, the infant masters several stages of differentiation. It is now accepted through the work of Klein (1952) and empirical demonstration that a developmental/behavioral correlation at the age of four months exists between infants categorized as attachment secure or disorganized, "dis-coordinated" [disorganized in the sense of being unable to properly integrate the intermeshed and exclusive psychical manifestations of separation RAGE and FEAR as they conflict and inhibit SEEKING and CARE] (Hopkins, 2013, p. 47). The infant at this stage singles out the mother as a separate object which is essential for CARE, and that this fact is then made evident by the manifestations of separation-RAGE and stranger-FAEAR, which become manifest at 7-8 months of age (Hopkins, 2013, p. 47). To observe firsthand, the interactions between mother and infant, the effect is obvious to casual observation: *the mother's face is the infant's entire world*, once indistinct as

an object, now, *once engaged in the exchange of gaze, touch and glance, only semi-distinct from himself*, her face responds to his affects *and anticipates as if part of himself, as if the world itself were a loving extension of the infant*, a responsive and inclusive extension of himself. Here, we see the essence of empathy: *identification with the world*. Note that I make no mention of the less important distinction of identification with mankind, which is a small and far less important embedded sub-aspect, itself associated in some small imitative part with mirror neurons, a sub-aspect of this most vital and needful result, identification with the entire of the world—*Empathy* (Norman, 2013; 2014; 2016a). It is this which we will substitute for the pathogenic content.

I hope the reader can make out the basic idea: social control via conditional regard is enforced by way of curtailment of dopaminergic (and endogenous opioid) expression associated with the sympathetic limbic/OFC circuitry, forming a permanent homeostatic imbalance which restricts empathetic feeling, intelligence, sexuality and exploratory interest in the world, and places in their stead a preemptive condition: obedience to authority. Only meeting this condition of obedience will return health and happiness to the modern human. Intelligence and empathy...hope itself, this ancient basis of life formed long ago in the early interactions with the mother...it is no less than this basis of kindness, caring and higher thought to which we are all entitled which has been curtailed.

Now I will briefly take account of but a small sample of the extensive history which has inculcated this most basic and tragic error into the very heart, substance and epigenetic expression of the afflicted modern human. I will briefly sum up that here, and distill the resultant notions into a clear contrast in human existential/ontological formative paradigms. From there, the implications can be clearly understood, and the better, happy result made plain in example.

Super-ego.

"... to 'improve' men: this above all was called morality. . . To call the taming of an animal its 'improvement' sounds almost like a joke to our ears. Who ever knows what goes on in menageries doubts that the beasts are 'improved' there. They are weakened, they are made less harmful, and through the depressive effect of fear, through pain, through wounds, and through hunger they become sickly beasts. It is no different with the tame man..." Friedrich Nietzsche, *Twilight of the Idols*.

What is the precise interactive dynamic which yields the developmental result of conscience, of super-ego in *its punitive aspects*, and, how are we to interpret this result as to its pathogenic and healthful consequences?

E. R. Dodds, a superb scholar, has located for us the historical footprints which demonstrate the formation of our modern conscience, our super-ego. Super-ego is an introjected entity, an internalized representative of what was once long ago external judgment and sadistic penalty. Morality, as inculcated at the behest of this internalized structure, is based on punishment which extends from a particular source.

In his most worthy book, *The Greeks and the Irrational*, E. R. Dodds, draws the strings of history and psychology together for us. This ugly imprint has been nurtured

over thousands and thousands of years. Its exact source is clear to discern with Dodds's careful examination of the historical record.

"The head of the household is its king . . . and his position is described by Aristotle as analogous to that of a king. *Over his children his authority is in early times unlimited: he is free to expose them in infancy, and in manhood to expel an erring or rebellious son from the community . . . as Zeus himself cast out Hephaestus from Olympus for siding with his mother.*" [Dodds, *The Greeks and the Irrational*, pp. 45-46. Emphasis added.]

However, as early as the 6th century BC, the situation had begun to change, and as social conditions began to improve, and the father's authority became less and less *absolute* in the face of these new social conditions leading to increased personal freedom, the strict authoritarian structure of family life began to loosen. Now, what was a *shame* based dynamic, one based on *external* threat from the father, becomes a *guilt* based dynamism, one based on an internalized threat, an *internalized* moral structure in the true modern sense of the word emerges: super-ego. This is demonstrated by the need for laws introduced by Solon, and later, by Plato, to safeguard the now threatened patriarchal family structure. [Dodds, *The Greeks and the Irrational*, p. 46.]

Super-ego uses severe repressions to create by *internal* means, what were behaviors, inhibitions and restrictions previously brought about by *external* patriarchal threat. Dodds fleshes the idea out as follows:

"The peculiar horror with which Greeks viewed offenses against a father, and the peculiar religious sanctions to which the offender was thought to be exposed, are in themselves suggestive of strong repressions. So are the many stories in which a father's curse produces terrible consequences—stories like those of Phoenix, of Hippolytus, of Pelops and his sons, of Oedipus and his sons—all of them, it would seem, products of a relatively late period where the position of the father was no longer entirely secure. Suggestive in a different way, is the barbarous tale of Kronos and Ouranos . . . the mythological projection of unconscious desires is surely transparent—as Plato perhaps felt when he declared that this story was fit to be communicated only to a very few . . . and should at all costs be kept from the young." [Dodds, *The Greeks and the Irrational*, pp. 46-47.]

Dodds then assembles the entire picture for us in these words:

"The psychologists have taught us how potent a source of guilt feelings is the pressure of unacknowledged desires. . . the human father had from the earliest times his heavenly counterpart: Zeus *pater*. . . Zeus appears as a Supernatural Head of the Household. . . it was natural to project onto the heavenly Father those curious mixed feelings about the human one the child dare not acknowledge. . . that would explain very nicely why the Archaic Age Zeus appears by turns to be the inscrutable source of good and evil gifts alike. . . as the awful judge. . . who punishes inexorably the capitol sin of self-assertion, the sin of *hubris*. (This last aspect corresponds to that phase in the development of family relations when the authority of the father is felt to need

the support of a moral sanction; when "You will do it because I say so" gives place to "You will do it because it is right.") [Dodds, *The Greeks and the Irrational*, p. 48.]

Here in this historical transition from an external shame based ethical structure, to an internalized guilt based structure, in this *internalization* of the patriarchal threat (introjection), we see the creation of our modern ethic, our conscience, our masochistic capitulation: our super-ego. This historical basis for our phylogenetic inheritance can be brought to light and assessed as to its healthy or pathogenic contribution by way of economic analysis, and clinical example (Norman, 2013).

Conscience, our sense of personal and social justice, is created as an interactive phylogenetic/ontogenetic function of masochistic and aggressive economy within a social context, not as a function of any moral pretext. Our morality, is by the nature of its very construction: immoral.

Here are a few sections from Freud which clarify and support this unusual notion:

"The first requisite of civilization, therefore, is that of justice—that is, the assurance that a law once made will not be broken in favor of an individual. This implies nothing as to the ethical value of such a law" (Freud, 1930, p. 95).

"The tension between the harsh super-ego, and the ego which is subjected to it, is called by us the sense of guilt; it expresses itself as a need for punishment. Civilization, therefore, obtains mastery over the individual's dangerous desire for aggression by weakening and disarming it and by setting up an agency within him to watch over it, like a garrison in a conquered city" (Freud, 1930, pp. 123-124).

As to the effect of super-ego in equating wish and act and the resultant loss of mental economy and functioning:

"Here, instinctual renunciation is not enough, for the wish persists and can not be concealed from the super-ego. Thus, in spite of the renunciation that has been made, a sense of guilt comes about. This constitutes a great economic disadvantage in the erection of a super-ego or, as we may put it, in the formation of a conscience. Instinctual renunciation now no longer has a completely liberating effect; virtuous continence is no longer rewarded with the assurance of love. A threatened external unhappiness—loss of love and punishment on the part of the external authority—has been exchanged for a permanent internal unhappiness, for the tension of the sense of guilt" (Freud, 1930, pp. 127-128).

"...the original severity of the super-ego does not—or does not so much—represent the severity which one has experienced from it [the object], or which one attributes to it; it represents rather one's own aggressiveness towards it. If this is correct, we may assert truly that in the beginning conscience arises through the suppression of an aggressive impulse, and that it is subsequently reinforced by fresh suppressions of the same kind" (Freud, 1930, pp. 129-130).

And as to the role of the phylogenetic in contributing to this outcome:

"It can also be asserted that, when a child reacts to his first great instinctual frustrations with excessively strong aggressiveness and with a correspondingly severe super-ego, he is following a phylogenetic model and is going beyond the response that would be currently justified; for the father of prehistoric times was undoubtedly terrible, and an extreme amount of aggressiveness may be attributed to him" (Freud, 1930, p. 131).

". . .we can tell what lies hidden behind the ego's dread of the super-ego, its fear of conscience. The higher being which later becomes the ego-ideal once threatened the ego with castration, and this dread of castration is probably the kernel round which the subsequent fear of conscience has gathered; it is this dread that persists as the fear of conscience." [Sigmund Freud, "*The Ego and the Id*" in *A General Selection From The Works of Sigmund Freud*, p. 233.]

Please see (Norman, 2011, 2013, 2013*a*, 2015*d*) for examples and particular psychology relating to specific patriarchal mutilations such as castration etc., which form current super-ego supportive unconscious content. The role of epigenetics and complexity can be found here: (Norman 2015*b,c,d,e*).

I wish to draw a sharp new distinction between *Morality* as engendered in super-ego, which is based on (phylogenetic/epigenetic) patriarchal threat, and functions to foster *obedience to external authority*, and *Ethics*, which are based in empathy, with its *root in identification*. The former causes pathology, and functions in clear and specific ways to disengage the sympathetic circuitry which is the basis of empathy, energetic curiosity, sexuality and intellect, and the later in turn has opposing characteristics, leading to elation, appreciation, formative identification with the world and others in the context of abundant subsequent energy, and absent any punitive internalized death wish (guilt). Morality and Ethics as so defined are diametrically opposed. Clearly, ethics are a natural systemic product which lead to health, an internal behavioral compass based in identification and caring, and morality the converse. The reader may wish to satisfy themselves in this regard, by reading the specific example of the formation of super-ego offered up here (Norman 2013, 2013*a*). Ethics are *themselves* identification, they ARE the 'golden rule,' and so require no such rule or any other. Morality is an empathetic dissociative factor, by way of down-mediating the circuitry responsible for identification. Ethics nullify any need for the tangle of moral law and replace guilty maxims born under any mistaken 'categorical imperative' with a natural and effortless ethical genesis free from rule, guilt or penalty. Ethics, as we will see, reflect the healthy internal construction of the mind, nurture our energies and evolve naturally, with no need for punishment, rule or law. One need but rebalance the two opposing circuits and observe the demonstrable alteration in all aspects of manifest experience. I have devised treatments to this end (Norman 2013*a*, 2015*a*, 2016*a,b*). Next, we may take a closer look at empathy, and see if we can understand the meaning of identification.

An aside: note how this clear basis of modern pathology appears to be nullified in the teachings of many eastern spiritual ideas, which have little connection to patriarchal threat and surprisingly, also in the true teachings of Jesus. Although modern

adaptations are revealed as corrupted and reversed by Paul, the careful philology of Nietzsche shows the original teachings to be diametrically opposed to any hint of conditional regard, sin, punishment, reward, heaven or hell. Those toxins are absent. Indeed, Jesus appears to make good on the reverse and answers, at least in this case, Nietzsche's own highest standard, which proclaims essentially: *the highest Godly act is the removal of guilt*. Of Jesus Nietzsche writes:

"In the whole psychology of the "evangel" the concept of guilt and punishment is lacking; also the concept of reward. "Sin"—any distance separating God and Man—is abolished: *precisely this is the "glad tidings"*. Blessedness is not promised, it is not tied to conditions: it is the only reality—the rest is a sign with which to speak of it." p. 606 The Portable Nietzsche.

It should be noted that this author [R. N.] adheres to no spiritual doctrine or tradition. The above insight being worthy of note in its own account.

Empathy, paradigm and example:

Ethics are a natural extension of identification stemming from the early impressions of the innervations forming the sympathetic ventral tegmental limbic circuit. In a basic schematic way, we can see the idea of empathy in physics. Empathy is concurrent identification and individuation. A sort of entanglement where the subject/object distinction is partly lost. If one were to lose self identity completely, psychosis results: I am not you! However, a component of identification is the key, and it is this basis which the infant experienced with no such individuated distinction whatever, an identification with their entire world! To get the basic idea, think of it quite rightly as a sort of entanglement. A singlet state will do for this simple example. Both photons are entangled and are one thing, one system: *identification*. However, one is spin up, one spin down: *individuation*. Empathy apart from psychosis is akin to such an entanglement, where identification and individuation exist concurrently.

Of course within the mental system, the presentation is no simple matter as it is with two photons! Once the time has been taken and the painful effort applied to gut the current system and replace it, one discovers the entire presentation of unconscious aspects changes and the energies contained become far less intense and convoluted. The repressed unconscious, as reflected in modern mental topography, is pathogenic in and of itself. I will explain that statement and then offer up a detailed look within the better result, so as to show exactly what is meant by all these far flung idealistic assertions in specific example. We may first understand the divergent topographies associated with the illness of moral penalty and the health of ethical unification with experience.

Freud's theories [see Freud's A Phylogenetic Fantasy], postulate a sort of bottle neck in history, perhaps around the ice age, where the pathology began and groups of our very distant ancestors under patriarchal domination were common. The impressions of ancient penalty and sickness are easily available to see and do not come from present experience, but are phylogenetic and probably epigenetic (Norman 2015a,b,c,d,e). Before that bottle neck, I hypothesize things were different. Just as before the later age of super-ego formation the child of 6/14 months had conscious access to the native impression of identification, and later knows nothing of it, so also

in human phylogeny, the earlier fact is now hidden and unconscious. Pierce the unconscious veil, and one can *find this impression*. Once this is raised up in the transference structure, health and happiness, caring, sexuality, kindness, satisfaction and gratitude, a feeling of ‘fullness,’ interest and abundant energy replace pathology. Within both ontogeny and phylogeny: Hope for mankind, is an atavistic evolution.

Sublimation by Repression vs. Sublimation by Integration.

Consciousness itself is entirely a function of affect. *Feeling powers thought*. The source of human consciousness, both at the cortical level and the subcortical, is neuro-anatomically derived of affect (Norman 2015). The current model of mental topographical assemblage may be subsumed under the heading of *Sublimation by Repression*. In this model, the core nuclear component of mentation, affect/feeling is divided, and much of it is kept unconscious at great energetic expenditure. Our guilty affective repressions separate the very essence of consciousness away, and use even more of this needed energy to hide the fact. From *beneath a costly unconscious repression*, at great economic expenditure the affects endow experience with quality and substance. Sublimation via repression. Here, we split apart consciousness at its very source, to achieve the result we see all around us, and so find in this model the basis of our aberrant modern condition. In this model, we see the exact conditions to create sickness, indeed, no less than a definition of neurosis itself. This endemic imbalance is the lever of social control and illness. Its very structure is imbalance and curtails empathetic dynamism. Symptoms are created by the return of the repressed and so, the entire situation for illness is set up in repressing those elements to start with. It is in the unification of component instincts that health is created.

The new model, which is a sort of atavism, stands in direct opposition. *Sublimation by Integration*. Sublimation by integration reduces super-ego to a shadow of its former strength and hence frees nearly all repressions, uniting these component instincts directly in consciousness (Norman 2013a). The effect is to shatter personality irretrievably and release enormous energies directly into experience, creating a vibrant and energetic sublimation into experience. The entire act of perception and mentation becomes sexualized and empathy attains a place of predominance: a sort of psychical fusion of all affects. Sublimation via repression and sublimation via integration are related in efficiency, toxicity and output, as are the modes of fission and fusion in their attributes as energy sources. Sublimation via repression is dirty, toxic, and hypocritical to claim itself efficient beyond its cost.

Pathogenic vs. integrated transference.

Lastly, I will place before the reader two examples of the better result representative of sublimation by integration with empathetic predominance. This section contains a simple example, the next a deeper one. Please think of the transference by which reality in the individual human case is given its subjective quality. In an instant, through an unconscious associative process affect is distributed as a function of memory (Norman, 2015, 2016). We can see this in an intuitive, simplified, schematic way through the process of free association. The *quality* of our reality is a function affective associative transference from static mnemonic sources and active unconscious fantasy.

The lake you see should you gaze upon one, and the one I see, should I be beside you, are not the same lake, as each perceives the view. The quality of that various impression within each of us, is entirely created as a function of the conglomeration of affective associations (and aspects of unconscious fantasy), which are attached to the singular impression of the lake. Think of free association, and this becomes easily accessible, and we can see why such a technique is valuable in gaining insight into the processes which create object quality, and in assessing the general health and accuracy of emotional tone as they define experience.

Here are two hypothetical associative chains:

Healthy subject: Stimulus: lake. Associative chain (hypothetical): Lake–silver–ripples–dress–fluttering–mother–happiness.

Neurotic subject: Stimulus: lake. Associative chain (hypothetical): Lake–cold–drown–hopeless–weight–chain–family.

We can see in that simple example, that associative affective valence is established as a function of memory, to define object quality.

Next I would like the reader to understand that recent research has placed an epigenetic basis under the phylogenetic, and that it appears deductively and analytically sound to assert that this forms a sort of predefined ‘script’ which defines reality via transference (Norman, 2015*a,b,c,d,e*; 2016*a*). The unconscious presentation which forms the allocations of affect in the transference then, gives the world its qualitative meaning and that transference can be healthy and unfettered, or restricted and defined reactively through the roles ascribed in the phylogenetic. The phylogenetically based repressed fantasies and reactions are the basis of pathology. The unconscious processes of identification endemic to the transference are pathological, and their source is repressed. This stands in sharp contrast to a healthy unified transference. An example will clarify:

I am sitting at the kitchen table and watching. There is a bug working its way across the expanse of the table...a ten mile jaunt by way of scale. It is quite a colorful bug, its shell as a scarab, awash in may colors as it passes through the sunlight and shafted shade...a miracle to see the coordinated automatism, so hypercomplex, the tiny legs expressing each delicate motion interwoven with the rest, all to accomplish this daunting task, and the tiny traveler advances, pulling the miles under its colorful shell in a thousand thousand perfectly orchestrated steps. It is a bit of functional poetry, and I can see in my view of the situation, a new appetite. Yes, this bug is not so different than I, and I understand its difficulty, its folly, its correct and sure purpose stepping to nowhere. The bug is right. One must imagine the beetle happy. I take the traveler, and release it out of doors, placed on a leaf which seems to match its coloration.

Many believe a set of rules guide ethical activity. This is not the case. Appetite, desire, guides us, and logic dances to the tune, creates excuses and reasons, plans and rationalizations: as a footman sweeping up the crumbs of our wishes, always chasing behind, excusing and serving...so are logic and human reason but the petty servants of desire. Once, my desire, my appetite, was different. I would have killed the bug.

Crushed it under a heavy fist with a curse as an unclean thing, and killed it. I can feel quite clearly what I would have done before the change, and I will analyze it here in a surface way, so you can see it.

All conscious mentation is unconsciously sourced. I will imagine my reactions and look to the source, to the unconscious and provide a few of the many determinants. Just the upper layers. (Please recall what *should* be unconscious is observable by using Native Psychoanalysis). As my fist descends to kill the bug and crush it, I can observe in the unconscious the reason. The bug, is exactly as above, an identification with myself, and I curse and crush it, speak as my father, his rage is now my own. So just to see that shallow bit, we understand as a manic who fantasizes, first identifying with the family situation one way, then as the other, first as the child, then the hated parent, so is the surface analysis but in simultaneity—I am my raging father and, the bug is myself. So, to kill the bug expresses an appetite, an appetite for sadism as an identification with my father, and also, as a masochism as I identify with the bug. This is an appetite, a perverse appetite: sadomasochistic in its form. Identifications are pathological.

Perversion, is the expression of a single component developmental instinct, such as sadism. Health is to have fused all such instincts together in consciousness. We are raised to control and shame our instincts, causing immoral behavior and illness. Please note the self-hatred in the example. Control of a desire shames it, and, that desire is a piece of you! Top down control of affect, poisons the bearer and creates not morality...*no*...but immorality! Modern personality and conscience are false. Now, to have released all affect into experience, and restrict nothing, the self-hatred is absent and feeling has given an entirely new and guiltless quality to all of experience. Now the bug is beautiful, and my appetite wishes only to preserve it! So you can see, no ethical code is required to live rightly. None. What is required is an integrated transference. That changes the drive structure, and ethics arrive of their own accord. Ethics and all manifest behavior in this context can rightly be seen as a function of our basic appetites and wishes.

In that simple example you can see the pathogenic unconscious/epigenetic substitutive process result. In (Norman 2015d) you may see examples of actual pathogenic unconscious presentations. In the next section, I will offer up a proper depth analysis of the connectivity which has been refused within the mistaken paradigm of sublimation by repression.

Sublimation by repression created to foster obedience to a smothering external authority is itself that fundamental error responsible for the plight of man. This error is primary. The *empty feeling* all complain of which necessitates the endless consumerism that is destroying the planet [lack of endorphins and dopamine], the *obedience to authority* leading to war [threat and conditional regard which creates obedience to authority], the feeling that *other peoples and the earth are somehow beneath one and are to be exploited* [lack of empathy/identification with others and the physical world], the constant *competition* to prove who is better [(lack of empathy) and *low self-esteem/self-security* from Corticotrophin Releasing Factor associated with noradrenergic parasympathetic activation over dopamine and endorphins associated with the sympathetic circuit], the feeling of being *anxious, depressed, alone and separate* [lack of identification, parasympathetic stress cascade],

drug addiction [lack of endogenous opioids and dopamine, persistent release of CRF], and all the rest. From war and unthinking reflex obedience, to consumerism, greed, exploitation and human cruelty...this one error, has spread as cracks in a pane of glass. The broken mirror that is modern man may be repaired in all his dimensions of compound fracture here. This is how we are controlled through unfair social circumstance, and why we obey. Super-ego and repression. Here, is where we have been reduced and made fodder for tyrants, bullies and the governments of this world.

I would like to place a disturbing fact before the reader. To study the history of war, is to know with certainty that *in all of recorded history* top down control of the human affects has never worked. The Pax Romana from 27 B.C.E. to 180 C.E. in the Roman Empire is often put up as a good example of human peace under authority. This is a laughable joke, as the Pax Romana was maintained via blood, torture and crucifixion! No, in all of human history, top down control is a complete failure. Absolute and complete failure, without exception.

See: [https://en.wikipedia.org/wiki/List_of_conflicts_in_Europe]

An integrated approach to sublimation must be placed in its stead.

To do so alters the entire presentation and function of the repressed unconscious, which no longer exists in the same way. I suggest that *the repressed unconscious in the modern man is itself a pathogenic structure*. Once the highly energetic reactive and sexual content is allowed natural expression and unified in consciousness, the presentation is smooth and flowing. The unconscious then acts mainly as a distributional nexus for affect, and less so as a vessel of containment for ego dystonic affects.

Sublimation by integration diminishes (much of) the repressed unconscious. Simplified, and in a brief 'ideal' form the concept reduces to:

Let square brackets represent the *unconscious distributional processes* creating the transference []. Where system Conscious is Cs, System repressed Unconscious is rUcs, and system Preconscious is Pcs: Sublimation by repression is topographically defined as: [rUcs...Pcs...Cs].

Sublimation by integration is (ideally) defined as:

[Pcs...Cs].

The repressed unconscious is removed, and all individual component energetic aspects are ripe for conscious sublimation via unconscious/associative processes, and unification.

Next I will detail the healthy result and allow you to see the unfettered unconscious to conscious transference [Pcs...Cs] in real time as it works in a *real* case. You may see the specific energetic attachments which create world identification, health and natural ethical genesis in some considerable detail.

What would it look like to peer into the very deepest aspects of healthy identification in the human animal? Can we watch sublimation by integration at work? Exactly what are these identifications, and across what pieces of personality and time do they span? Is it possible to see into the essence of integrated dynamics?

Oneness, the transference unfettered [analysis of a “peak experience” (2014)]:

General context:

There are a great many texts and traditions of note which give account of the unique and peculiar state of 'oneness' with the world, environment or universe. I have always found these many spiritualized representations and entirely symbolic distortions to be deeply unsatisfactory but have previously lacked any firsthand knowledge of the experience to gain a further direct articulation of the underlying mechanics, origins or specific dynamics of the mindset, so as to understand and explain it. I can now rectify that shortcoming here.

Omni-objective identification (oneness) does not abandon self. It includes self in a unified object simultaneously individuated (self-aware) and coherent with the system as one object all at once. One can rightly localize the nexus of the primitive motor affective self where the deep layers of the colliculi intersect the ancient Peri Aqueductal Grey (Panksepp, 1998). The most basic and essential inner kernel of the human self, is the bodily self, soma. We are our bodies and this individuation. But...there is more! I contend that empathy itself extends from circuitry more basic than just mirror neuronal activations, but also includes more basic circuitry innervated in a world identification. Soon you will see its full breadth and depth of temporal extension.

Without revealing too much, I will say that I am very sensitive and aware after so many years of self-analysis, of changes in my visual presentation which correlate with my emotional condition. Each time a repression reinstates itself, I can see the subtle alterations in my perception of the world. These points of transference appeared to be the main way unconscious energies are instantiated into visual perception and experience in general. But there are others which have been blocked by our narrow, refusing, punitive cultural madness: The identifications and their fractal self-reflections.

Science understands clear evidence of brain and obviously bodily masculinization but all contain all traits. I do not advocate perverse practices any more than I advocate shame at discussing the facts or admitting openly the clear truth...that all men and woman are and should ideally be 'uni-perverse', meaning: healthy sexual expression is itself a UNIFICATION of all the component instincts themselves, a unification of the perversions. The meaning of that will soon be entirely clear.

Contextual analysis:

I am happily married for some 30 years, and live in isolation with my wife in the Oregon wilderness. I was fortunate enough to meet a person online who was able by way of her unanticipated grace, intelligence and kindness, to raise in me an anima image. With new leaves in the heavens of this world, and roots in the ancient 'good mother' so clearly represented within the formative maternally triggered sympathetic limbic/OFC innervations, this was a magical opportunity for my healing. Certain manipulations of the imagery involved allow a surface look at the context and its

identifications.

I had an idea. Rather than observe the image, and allow it to become an object of even greater potency, a natural but unexpected idea arrived. For some reason, the image itself was equivalent to another image, intuition first understood it meant just the same as...*a heart beat*, and the visual representation of that, a pulsing golden ball of sunlight, became the focus of my mind's rumination, now suspended as a bit of warmth and light in my mind's eye. I soon knew and believed...this was her heart, and then saw my own heart beside it, beating in time...then joined first as two pulsing balls of golden light...then not two at all...only one. One heart. No separation...none. One. Only one. The heartbeat, symbolizes unification within the womb.

As the two images became a single image, the brightness increased four-fold and then, a sudden warmth in my chest to go with the image...then tears welling and streaming...so very beautiful! I had what I have needed my entire life...so full and filled with energy! The trees slipped and shuffled in tender breeze, I could feel the caress of light and wind amongst their branches and folds, see it and feel it, the ground filled and welling as my heart, and all the shame was gone, now each desire spilling up without restraint to become one with everything, and I knew, I not only had transference giving the world its meaning, but identifications, identifications...*with everything*. The "Anima Mundi" meaning in this case, *the predominant impression of the maternally triggered sympathetic circuit identification with the world—creating reality via identification and transference*.

All sexuality from the most basic and undifferentiated first love to the most specific is a pattern which thought might trace and make real as a part of the fabric, or deny the same and leave a sunken place free of truth and life as we were taught. There are now twice as many points of transference...and this is accomplished by the addition of identifications. The result is a single coherent ontological object...the world. This is observable as ontogeny and as phylogeny, may be seen to interact archetypally, and also, as a deeper detailed cascade of new interactive symbolic determinants relating as a sort of self-interactive fractal.

Libidinal transference analysis:

The experience of the world is a libidinal/affective sublimation (Norman, 2015): libido taking on the broadest sense of inclusive meaning as *undifferentiated affect* forming conscious activations extending from the Ascending Reticular Activating System (Kaplan-Solms & Solms, 2002) to provide cortical tone and waking potential in the context of affective circuitry and REM distribution in the Basic Rest Activity Cycle (Panksepp, 1998; Norman, 2015, 2016). All levels of conscious expression from the activation of a waking state, to the quality of emotional content assigned to perception from the lowest levels are affective. *Reality is a libidinal sublimation*. It will therefore be possible to determine the precise mechanism of unconscious operative influence and deduce a correct, plain analysis of the process which creates this mindset, if we can *analyze a primary libidinal representation as to its underlying mechanism of energetic distribution*. Please remember, that reality is in fact a libidinal sublimation. I will now bring forward an analysis of an active primary libidinal constituent process to gain insight into the

hidden mechanisms which create the general effect.

It is a simple matter, which is now not even disconcerting, for me to pierce the unconscious veil and observe the underlying previously unconscious dynamism of each moment. Due to the necessities specified above, I had to learn how to find these things and solve the symbols all but in step with the rate of their production. To engage in sexual activity in the new condition, I can see in my mind's eye a very distinct change, so symmetrical, energetic and beautiful. Now, a clear set of doublings in forms available for all attachments, and a doubling of attachments as well to each "object" from concurrent identifications exponentially increase the energy, potency and intensity of the expression via increased systemic intra-connectivity. There are twice as many attachments for transference to an object, more objects, and now there are concurrent identifications with all objects... *in the phylogenetic as well*. These present as a mirror reflecting deeper into a mirror with subtle changes, and so I refer to this as fractal. The following contains actual unconscious content, and may be uncomfortable for some readers.

Specifically: Self-awareness is not diminished, the contents which give rise to self-specificity are not denied and I am male, this male. However, this core is now just a part of a much greater plethora of very potent impressions of a new sort...the image of my beautiful anima/friend is *not separate*. I am also this just as I am male and I can feel in this a deeper meaning and look to see how deeply as a woman, from a half image of a woman in a mirror of the anima, is contained a deep longing for my genital...for it to be her own, and as I look upon the activity I am so grateful, all but weeping in gratitude to feel the fact that I am male and have fulfilled her need, and this ancient female wish to be also male is completed...such deep happiness, and also the identification with the anima image brings a homosexual attachment point between the two women, one identified from within as the anima/self...one identified as an object from without...my wife, and one with my wife also as an identification. All objects are now subjects, objects and identifications each fed by two pathways. This ancient phylogenetic wish, to love as a woman loves a woman, behind it again a child, small and female being held by the mother—as a woman is loved by a woman, the wish on all levels is fulfilled. Implied without question also, a male and a male, although I did not see the image it must be present. We all contain all sexual elements and each is needful from a thousand pasts built into our inheritance. Without question the male homosexual drive was sublimated into the women...I would not have been able to gain excitation if it were conscious. Also, the male heterosexual role was very clear and contributed its predominant share of cathexis. The result of the doubling of objects and identifications, along with sensory observation of the activity (as distinct from analysis, always dimming excitation), is hyper-potent. To empathize with all elements, and know as well, more of the elements which human development contributes to and from the human store was one of the most exquisite experiences of my life. I felt...everything...from many different 'perspectives' which were not perspectives in any way—Unity. All pasts and presents nourished one moment of empathy. Unity. One heart.

This analysis has exposed the hidden unconscious mechanisms beneath that unity which should be the ordinary province of each healthy, ethical human. This mode of unfettered transference is in my view, not a higher state, but each human's ordinary, daily birthright. We can isolate the mechanism of the transference structure

responsible for the experience of unification from analysis of the libidinal representation. Remember, reality is a libidinal sublimation, so: the mechanism responsible for the mythological archetypal presentation of the experience of 'oneness' in general is that of concurrent identifications and object transferences from all libidinal components spanning ontogeny, clear from the first impressions in the womb (remember the heart image) to those of the component instincts and their mature representations in eventual unity—and—extending the same structure of concurrent identification and object, to include the complete bisexual phylogenetic representation in each person, IN THE CONTEXT OF OBSERVATION. To condense:

(Phylogenetic and Ontogenetic) Object + Identification in the context of Observation yields Unity.

$$\text{Obv}[\text{p/ontO} + \text{I}] = \text{U}$$

That is the formula for our wish fulfillment, place and purpose in happiness on this planet.

Now I look at the world and *am* the world. This *is* ethics. I could never hurt or exploit a part of myself. *Sublimation by Integration*. I can feel the rippling wind in the trees, and the the shadows which play upon my flesh. Identification is the basis of empathy and ethics. Our wishes are our world. How full is my heart, one heart, this world is my skin, my breath is its wind, and we know one simple truth of all things. For I have learned there is a thing we should all have and bring near, to never let go of the fact and the pulse—of one heart.

Conclusion:

The basis of modern human psychology contains within it a fundamental error: punitive super-ego. This structure, so closely associated with our Morality, is a dissociative element which splits the affective basis of conscious and empathetic predominance in two, creating the homeostatic conditions for social control, neurosis, compulsive consumerism, cruelty, existential angst and unthinking obedience to authority. Standing in direct opposition to Ethical functioning which evolves as a natural product of identification based in the innervations of the sympathetic dopaminergic limbic/OFC circuitry, punitive morality finds its historical footing and epigenetic expression based in patriarchal penalty and mutilation (Norman 2013). The rebalancing of the circuitry involved is difficult, involved and painful (Norman 2011, 2013a). However, this single error has cast the unhappy lot of man and provided all those throughout history with a hopeless situation doomed to repeat itself. To examine the numerous wars in constant procession throughout recorded human history and understand that top down control of the affects is a clear sham and a consistent failure, is to understand that the basis of human empathy must be allowed its natural place as the progenitor of ethical behavior. Although the road for a modern adult is filled with pain to alter this pathological basis, the pathway for the next generations is a hopeful one (Norman 2015f). In raising the next generations in an environment free of reaction formations and penalties in excess, the basis of human connection and empathy may be nurtured and the native connectivity and kindness

within man, might finally meet with his allotted measure of intellect. The broken race of man has within it the seed of its own ascension. The hope for mankind is an atavistic evolution.

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The Quantitative Unconscious: A Psychoanalytic Perturbation-Theoretic Approach to the Complexity of Neuronal Systems in the Neuroses

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Introduction: The Quantitative Unconscious and Intrasystemic Perturbation Theory

Quantitative scanning technology, such as MEG, fMRI and PET, is a new addition to the plethora of tools used to ascertain the organization of psychical functioning. With the advent of these quantitative technologies, Freud's (1895) original vision of a somatically, neurologically grounded psychology is becoming a reality. These new additions to our situation have brought us into what for physicists is familiar territory. The near astronomical complexity of active neuronal systems which are now available to our view, have a long familiar parallel in the highly complex systems of motion and gravitational influence which are so familiar in astrophysics. These highly complex problems of planetary motion and gravitational influence have long been addressed by way of using an approximate reliable guess based only on a dominant systemic interaction in substitute for a specific prediction gleaned from the super-complex data as predicted by a theory to be tested (Greene, 1999, p. 288). This theoretic approach, known as perturbation theory, finds primary expression in the classic example of determining the motion of the earth through our solar system, but has many applications in physics, including string theory (Greene, 1999, pp.289-294). I propose that we can use this perturbation-theoretic approach to interpret the complex data emerging in quantitatively defined mental functioning. Instrumental efficacy is the basis of scientific reliability and usefulness (Boyd in Hempel (Ed.), 1983, p. 84). To find our approximate substitute prediction based on a dominant systemic interaction, we have not far to look, as psychoanalysis, in its curative influence, has been instrumentally demonstrable for over one hundred years. It is through the judicious application of metapsychological acumen that the transference structure is altered, and neurosis curatively affected through psychoanalysis, so, it is metapsychology which will act as our substitute approximate prediction to define mental functioning. Indeed, there is no more suitable template than metapsychology upon which to found such a prediction based upon emergent psychical properties springing from a neuronal network, as psychoanalysis has long and rightly understood that far from being linear, psychical processes are associative, topographical and dynamic in nature (Freud, 1900, 1915), hence the psychoanalytic method of free-association which is used to access hidden associated unconscious content.

The history of neurophysiology in psychology and psychoanalysis also points in this direction. Indeed, the burgeoning discipline of neuropsychanalysis has already advanced no small distance toward this specific avenue. One need but review the progression of the clinico-anatomical method as redefined through the work of Freud,

Luria, Kaplan-Solms and Solms, to find demonstration of these ideas. Freud saw the "intrasystemic" element, and understood that mental functions are not a simple matter of isomorphism or simplistic singular anatomical localization of functioning, but are processes which exist as a function of energetic dynamism exchanged between anatomical structures: "...thoughts and psychical structures in general must never be regarded as localized *in* organic elements of the nervous system, but rather as one might say, *between* them..." [emphasis added] (Freud, 1900, p. 611). Kaplan-Solms and Solms (2002) also state the view of Luria in this regard, and specify the perturbation-theoretic element as well, in its function as a definer and simplifier of highly complex data: "In doing so, one will not have localized that faculty in any one part of the brain, but will have identified the various components *between* which, by dynamic interaction, the physiological processes representing that psychological faculty are produced. . . . We believe that this method of Luria's represents a major step forward, because it enables us to identify the neurological organization of *any* mental faculty, no matter how complex, without contradicting the fundamental assumptions upon which psychoanalysis was built" (Kaplan-Solms & Solms, 2002, p. 43). So we can see that the notion of a dynamic intrasystemic definition and interpretation of mental processes, mediated, simplified and functionally defined via metapsychological means, has significant historical precedent.

An approach must be established to the complex matter of anatomical and ontological mental functioning which looks to untangle the apparent complexity by focusing on the informational flow inherent in certain modes of processing and function. Brain activity, if observed at close range, that is, as a series of single circuits, leads to a picture so complex, as to all but defy understanding. Observe the role of the amygdala in the emotion of anxiety as referenced in: "Amygdala circuitry mediating reversible and bidirectional control of anxiety" (Deisseroth et al., 2011). Please note how complex this emotion is in regard to its dynamic neural location and source:

"Neural circuitry arranged in this way provides many opportunities for modulation of expression of anxiety phenotypes; for example, this microcircuit is well-positioned to be influenced by top-down cortical control from regions important for processing fear and anxiety, including the prelimbic, infralimbic, anterior cingulate and insular cortices that provide robust innervation to the BLA and CeL. These data are consistent with reports implicating CeA involvement in anxiety 9,11,12, but it is important to note that our findings do not exclude downstream or parallel circuits including the BNST28, the insular and prefrontal cortices 29, and the septal-hippocampal circuit 30; . . . these findings demonstrate that anxiety is continuously regulated by balanced antagonistic pathways within the amygdala, and illustrate the importance of resolving specific projections in the study of neural circuit function relevant to psychiatric disease" (Deisseroth et al., 2011, p. 362).

So if we are to disentangle the complexity we must first back off the lens, and then determine the larger intrasystemic target which the metapsychology infers and functionally defines, that will later, once a suitable sample population has been assessed, yield a baseline value for that particular type of intrasystemic functioning. In this way, the now neurologically identified embedded metapsychological system's function is clear, and the quantitative dynamism of the informational flow can be

interpreted. The problem with the innovative and brilliant optogenetic approach used above, is that the mass of complex information is not understood in context, and so, becomes a complexity rather than the manifestation of a predictable system. The signature of the embedded system, a relative relation of energetic activity which indicates its mode of processing, its purpose, will be discernible if we go from large to small, from psychology to neurology. First we identify and stress the system we know is there through our understanding of metapsychology, and watch how it reacts. *Then the complex information is seen as manifesting the architecture of a known underlying intrarelated conjunct subsystem, and the information becomes intelligible, now cast in the role of a particular psychological dynamic system.* To clarify this notion and demonstrate how it will lead to a tool for rapid diagnosis of mental illness and typological identification of unconscious content, I will first identify the three primary psychical systems implied by Freudian metapsychology, and provide an analysis connecting them to current cognitive neuroscience, after which, I will outline some particular examples to bring the theory into focus.

Meta theory: The systems of affective assignment, overall repressive function and unconscious ideation

The system of affective assignment: We only experience our perceptions, never the fictional, factual, "thing in and of itself." Perception is never directly able to access the things and events to which our perceptions refer. These perceptions must be identified, and, affectively interpreted, that is, given an emotional context by virtue of which they can be assessed, and appropriate behavior determined. Therefore, one could say that reality testing consists along with object identification, with the giving of proper symbolic value, proper affective value to perception and experience. These ideas converge to a point. In the simplest terms, what does this experience "mean to you." Think of affect as the psychological context through which a neutral perception is defined. It is the affective meaning, the context, which gives symbolic emotional *Quality* to experience. In example: One person may have a fond adoration for his pet mouse, where another may recoil in revulsion. The mouse is the same, a neutral perceptual experience, it is the affect which we assign to it which puts it in the context of our associated experience that varies. This symbolic affective function can become deranged, as we will now see.

In "The Pain Was Greater If It Will Happen Again: The Effect of Anticipated Continuation on Retrospective Discomfort," we find the following observation: "Across 7 laboratory studies and 1 field study, we demonstrated that people remembered an unpleasant experience as more aversive when they expected this experience to return than when they had no such expectation" (Galak & Meyvis, 2011, p. 63). Note how the experience was the same, but the affect assigned to it was different, a function of a *new context* whereby a different affective value is assigned to the stimulus. Affect is the context, and so, the quality with which we endow perception and experience, and its assignment to perception is therefore a vital part of healthy balanced mental function and reality testing.

In Levens and Gotlib's "Updating Positive and Negative Stimuli in Working Memory in Depression" we find the following statements: "Compared with controls, depressed participants were both slower to disengage from sad stimuli and faster to

disengage from happy facial expressions. . . . For example, biases against keeping positive information active or toward maintaining negative content in WM may underlie the ease with which depressed individuals develop and propagate a negative mood” (Levens & Gotlib, 2010, p. 654). It is clear that the system of assigning affect to stimulus is essential to reality testing.

The system by virtue of which this process takes place is phylogenetically old and complex. All sorts of affective aspects are undoubtedly stored in various anatomical neural locations and retrieved from these many various areas to create the final effect of "affect." We must watch the system work in a known metapsychological context to identify its various parts and their intrarelations. But, as we study sleep, it seems that with some psychology we may see the system of affective assignment in isolation, and gain some not inconsiderable insight into the process. For this reason I will now draw out the proper Freudian picture of the metapsychology of dreaming so it may be related to the current cognitive neuroscience.

I have found that even the very best scholarly papers often misrepresent Freudian theory by way of drastic oversimplification in order to contrast the theory being advanced against the older established theory. Please read the following from an otherwise superb piece of scholarship. In "The Cognitive Neuroscience of Sleep: Neuronal Systems, Consciousness and Learning," we find the following statement: "Freud believed that dream content was determined by a daytime experience that triggered the emergence of related memories" (Hobson & Pace-Schott, 2002, p. 686). This is an oversimplification. Freud did not state that dreams were primarily dependent on episodic memory as this statement may be seen to imply, but instead, had found many dream sources and relations to day world experience (Freud, 1900, p. 551). The partial statement of the highly complex and nuanced Freudian theory is so brief as to be utterly misleading. Later in "The Cognitive Neuroscience of Sleep: Neuronal Systems, Consciousness and Learning," on the same page, we find this statement which fits perfectly with the nuanced Freudian theory: "Instead, discrete and incomplete fragments of narrative memory are assembled to create the new synthetic scenarios of dreams" (Hobson & Pace-Schott, 2002, p. 686). It seems that in an attempt to define the new, the old has been distorted. For this reason I will begin with a recap of some familiar psychology which we will need to keep clearly in mind in order to construct our new analysis of affect.

Please note that we have already drawn a clear and intuitive connection between the assignment of affect and symbolism. Note also that our understanding extends this chain of ideas to include the notion of context. They are all but, if not truly, identical ideas, or aspects of each other. In psychoanalytic theory, dream and symbolic construction are accomplished by certain complex and specific means. A piece of day-world residue, a trivial dissociated fragment, a memory trace is chosen as a building block for dream construction because it is neutral, free of affect and meaning, and so becomes ripe for representation in a dream, ready as a canvas to accept the many meanings via transference which will be assigned to it in condensation and "overdetermination" (Freud, 1900, p. 279, 283-284, 563-564). The less saturated with meaning, and, the closer to being a nexus for many other ideas, the better. Language, as it is itself a symbol with many meanings and puns, acts as a nexus to which many underlying determinants can attach in condensation and overdetermination (Freud, 1900, pp. 340-341). The memory trace, and there are of

course many which will be assembled to form the finished dream, is then invested with meaning from many sources. A process of disguise and distortion is used to accomplish this which includes: reversal, condensation of many events into one (Freud, 1900, p. 595), overdetermination of a dream through thematic repetition (Freud, 1900, pp. 283-284) and/or determination of a single symbol by connecting many various trains of thought to give it energetic value sufficient to gain representation (Freud, 1900, p. 330), displacement from one object to another (Freud, 1900, pp. 307-308), and a host of other means which symbolically represent and compound affect to achieve representation and conceal the true source of the affect delegated. These means of affective encoding found in REM dreaming function to avoid censorship via compromise formation which functions to create *distortions*. (Freud, 1900, pp. 143-144, 506-508, 595-598). It is by condensed symbolic construction and distortion that the affective sources of the symbol are attached, and also, hidden (Freud, 1900, pp. 506-508). The symbols thusly endowed are then woven into a story, a narrative, and are thereby given further episodic context, although be it a false one, in a process known as "secondary revision" (Freud, 1900, p. 488). The distortions are guided in no small part by the process of compromise formation, where the contents are distorted, censored, so as to produce a manifest dream, the meaning of which, the ego will not recognize (Freud, 1900, pp. 143-144, 506-508, 595-598). The process is called dream work (Freud, 1900, p. 277). So we have the process of symbolic construction and dream representation, a process whereby memory traces with little or no affect become suitable to be endowed with affect and woven into a distorted narrative, through many specific means. Highly complex! However I have tipped my hand as this process can be reduced to a simple but broad quantifiable principle. To discover this quantitative reduction the neuroscience must be analyzed alongside the aforementioned metapsychology of symbolism and dreaming.

In his paper, "Sleep, Learning, and Dreams: Off-line Memory Reprocessing," Dr. Stickgold (2001) and an esteemed collection of intellectual confederates bring us the clearest somato-neurologic picture of this metapsychological proposition to date. A clear neurological definition of the trivial unsaturated pieces of memory (memory traces) and symbolic processes of Freudian theory are seen to emerge in the context of memory consolidation, even if in a schematic and reduced fashion. In certain states of psychopathology such as schizophrenia, we can observe the pathogenic assignment of affect to experience as affective assignment operates unrestrained by the higher mental functions, such as input from the dorsolateral prefrontal cortex, just as we can observe in REM dreaming, which is understood psychologically as the general prototype of psychopathology (Hobson, 2001; Hobson & Pace-Schott 2002; Pace-Schott, 2003). In REM dreaming this unrestrained affective processing is isolated and expressed in harmless hallucination. The isolation of the affective system is achieved through a series of changes in neural modulation which Dr. Stickgold enumerates as:

“More generally, the cognitive changes seen during REM may be the combined result of three physiological characteristics of REM: (i) the shift in neuromodulatory balance from aminergic to cholinergic, (ii) the decreased activity in DLPFC and increased activity in both the anterior cingulate cortex and amygdala (75–77), and (iii) the decreased outflow of information from hippocampus to neocortex (53). Taken together, these findings suggest that the brain in REM is tuned more for the processing of associative memories than

for the simple consolidation of recent memory traces and may explain, in part, various features of REM dreams, including their bizarre, hyperassociative quality (95) and minimal incorporation of episodic memories (96, 97)” (Stickgold, R., Hobson, J., Fosse, R., Fosse M. 2001, p. 1055).

In Dr. Hobson's paper we find the statement nicely summed in these few words: “There is also a progressive decrease in output from the noradrenergic, serotonergic and histaminergic neurons, all of which shut off in REM, leaving the selectively activated forebrain aminergically unmodulated” (Hobson & Pace-Schott, 2002, p. 691). In this instance of systemic aminergical demodulation the intrarelated symbolic subsystem by virtue of which we give affective value to experience is observable as it encodes affect into a dream for consolidation into the mnemonic system, and other various functions I will touch on later:

“This suggests that the brain sources for dream elements are not hippocampally mediated episodic memories, but cortical traces of discrete components of the episodic memories, which then presumably are combined with associated semantic memories. With dorsolateral prefrontal cortex deactivated in both REM and NREM (75, 76, 106, 107) and the hippocampal formation producing only minimal cortical output in REM (53), actual episodic memories may be inaccessible and hence irrelevant to the dream construction process. . . In REM, the central nucleus of the amygdala plays a crucial role in the activation of medial prefrontal cortical structures associated with the highest order regulation of emotions (76, 108, 109). This adds to the deactivation of DLPFC, normally associated with higher cognitive functions (110), in REM. Thus, the brain appears to be biased toward emotional processing in this state. . . . We hypothesize that these features reflect an attempt, on the part of the brain, to identify and evaluate novel cortical associations in the light of emotions mediated by limbic structures activated during REM. This would be in keeping with the proposed role in waking of these structures in the identification of mismatches between expected and actual behavioral outcomes” (Stickgold et al., 2001, p.1056).

So we finally have a clear beginning in our search for an analysis to discover the neuroscience behind the metapsychology. A memory trace suitable for dream construction is now well defined as nonhippocampally mediated, and so, cut off from episodic memory just as one would expect metapsychologically, as the memory trace must be free of context and preexisting symbolic and affective value to be able to receive affective, limbic value and emotional definition, and act as a neutral substrate, an unsaturated nodal point with which to provide a new symbolic/episodic context. The source of the affect assigned to these free memory traces which are bereft of saturated context and existing emotive value is found through the mediation of limbic structures. Also, the purpose of these structures in providing affective definition to perception and the influence of this process on reality testing is not neglected either, as we read: “We hypothesize that these features reflect an attempt, on the part of the brain, to identify and evaluate novel cortical associations in the light of emotions mediated by limbic structures activated during REM. This would be in keeping with the proposed role in waking of these structures in the identification of mismatches between expected and actual behavioral outcomes” (Stickgold, et al., 2001, p.1056).

So I can now plainly state the quantitative conceptual reduction to which I have alluded: The symbolic processes by virtue of which we give quality to REM dreams, experience and perception, can be reduced to a quantifiable operation: “the assignment of affect to.” Symbolism is a transference from concealed limbic sources, from unconscious sources by virtue of which emotion is mediated and affective quality assigned to perception. Symbolism is a function of the system of affective assignment. Now I will outline the next of the three psychical systems implied by the metapsychology.

The system of overall repressive function: A term generally ascribed to Johann Herbart (as cited in Erdelyi, 2006), and later taken on by Freud (1915) to denote a defensive function responsible for creating much of the unconscious, repression, *“turning something away, and keeping it at a distance, from the conscious”* [his italics] (Freud, 1915, p. 147), has proven itself an instrumentally demonstrable proposition at once obvious and empirically elusive (Michael & Benjamin, 2006). Current research into the topic has approached this metapsychological cornerstone from various ancillary perspectives, ranging from the Pavlovian mathematical modeling and experimental determination of the neuropharmacology associated with SSRI therapy and the suppression of aversive predictions (Crockett et al., 2012; Dayan & Huys, 2008; Huys, et al., 2012), to the resource-depletion framework of task aligned/misaligned cognitive functioning (Storbeck, 2011), or the optogenetic activation of individual brain circuits and structures such as the amygdala, which mediates anxiety, and is sure to have a role in repression (Deisseroth et al., 2011, p. 362; Freud, 1926; Norman, 2010, 2011). Indeed, there are a great many particular neural structures, including the orbitofrontal and inferior regions of the PFC and others, that promise to hold some individual part in the cooperative anatomical conglomeration which must work smoothly together so as to achieve the delicate and appropriate result of proper repressive functioning, which is so crucial to maintaining mental stability and balance (Norman, 2011; Ovaysikia et al., 2011, p. 2.; Shimamura, Marian & Haskins, 2012, p.1). If we are to understand the purpose of the complex and dynamic patterns of information as expressed over active brain anatomy, these patterns must be analyzed in terms of the instrumentally demonstrable metapsychology which they represent, and so, allow us to discover their purpose, and unearth the relative simplicity, the “intention” of those informational patterns of activity as they are made manifest in their operation, now clearly serving to contain the familiar quantitative and qualitative conflicts endemic to mental functioning.

Although modern research demonstrates the amygdala, the lateral PFC, medial PFC (including anterior cingulate gyrus), and lateral orbitofrontal cortex (OFC) are all involved in the repression and control of emotion and behavior, the exact way these structures interact to form the delicate result is still unknown (Deisseroth et al., 2011, p. 362; Feinstein, 2011; Ovaysikia et al., 2011; Shimamura, Marian & Haskins, 2012). The intrasystemic approach will go one step further and make the particular role of each neural anatomical structure clear, as the intrarelated patterns of informational exchange and activity are defined within the context of a known metapsychological system.

The intrasystemic experimental framework substitutes metapsychology for complex and specific theoretical predictions, and unearths the entire intrarelated collective subsystem as it functions, making sense of the complexity that emerges, as

informational flow is assessed in terms of the instrumentally demonstrable theory. The key is a stressor that is added to the experiment, a stressor that is aimed directly at unconscious processes. All of psychoanalysis works through its relation with repression, and it is in changing the transference structure and bringing pathogenic unconscious affective sources to conscious recognition that the work of psychoanalysis is accomplished. “All repressions must be undone” states the ideal goal of psychoanalytic practice (Freud, 1904, p. 253). The validity of the metapsychology is long proven, so one need not predict, only stress the known metapsychological system and watch, and establish the particulars of its functioning as an observed fact. In this way the *purpose* of the processing we observe is known before its particulars, and so those effects, the information flow and pathways are better understood, as the intention and purpose of the system are known before the potentially complex experimental data, and can thusly explain it in a known and certain context. As the sample size grows, *a baseline of normal functioning for those systems will emerge as well as variations associated with different types of maladjustment and illness*. Repression has various and specific relations to different types of illness (Freud, 1905d, 1915 pp. 180-185; Jung, 1972). Current imaging research and other empirical study in the field of neuropsychopharmacology and computer modeling, once interpreted psychoanalytically, reveals just the sort of distinct and various repressive relations and types we would expect, each corresponding to a different sort of pathology: the proliferation of unrepressed negative prediction and ideation treatable with SSRI drugs in the case of depression, and the repressive mechanism of hysterical innervation in the case of conversion hysteria (Crockett et al., 2012; Dayan & Huys, 2008; Feinstein, 2011; Huys, et al., 2012). One can conclude that by detailing the particular emergent patterns of activity associated with repressive function specific to each pathological condition, a relative signature of intrasystemic energetic activity across brain anatomy associated with normal and abnormal conditions will emerge. The health and or imbalance of the patient will be definable as specific clusters of relative energetic relations, a particular constellation of associated relative energetic traits specific to each sort of illness will be established, and a diagnostic tool for the general categorization of mental illness, health and functioning will result. Next, I will outline the third fundamental psychical system implied by the Freudian theory of neurotic nosogenesis and the topographical structure of transference and symptomatic dynamism, before bringing these ideas together with the unconscious stressor in a more specific picture of the entire neuropsychological framework.

The system of unconscious ideation: After having worked extensively with the method of Native Psychoanalysis (Norman, 2011), a technique which allows access to unconscious content, this author is entirely certain after having examined and analyzed thousands of examples, as to the nature of said content, which is entirely and invariably specific. This author has reached a very different conclusion as to the nature of unconscious content than the intersubjective notion that unconscious ideations and content are “an ineffable substrate” or “unnamable dread” as is common in today’s psychoanalysis based on the model of the intersubjective processes and the work of Bion (Brown, 2011, p. 73, 134). That is a wish, the wish to look away from the unpleasant specific fact. Unconscious content is specific. Because unconscious content is specific, if it can be accessed, it is necessarily quantifiable. The “quantitative unconscious” is a notion, a nexus around which cognitive neuroscience and depth psychology are both determined.

There is an axiom in psychoanalysis which rightly states the relationship between unconscious fantasy, perversion, and neurotic symptomatology. Neurotic symptoms are *in the main*, accompanied by unconscious fantasy, which acts from the unconscious to affect conscious behavior and create symptoms. These “replacement gratification” fantasies are the active and unseen contributors to neurosis. This author has found many thousands of examples of this axiom: “*Neuroses are, so to say, the negative of perversions*” (Freud, 1905*d*, p. 165; Norman, 2011, 2013, *a, b, c*, 2014, 2015, *a, b, c*). To put it plainly, a perversion is the unseen unconscious positive, the active agent spinning away in the unconscious, creating neurotic symptoms via transference. These fantasies which are associated with neurotic (Freud, 1905*d*) and often psychotic (Freud, 1911) illness, are typologically distinct in their energetic and qualitative presentation. Although this author has found some limited number of other unconscious ideations of a universally painful character which also create symptoms from under repression, they are few by comparison to the wealth of perverse ideational elements (Norman, 2011, pp. 88-94). Each unconscious is sure to possess all of the various types, but one or two types will typically be represented in far greater predominance in any one unconscious (Freud, 1905*d*; Norman, 2011, p. 79). As these fantasies are specific, active, and unconscious (in the case of the neurotic), one can infer something of the processes which create them, and formulate a method to answer the question of their location, type, and the way in which they are repressed and kept unconscious. If they are not unconscious and a perverse personality structure is indicated, the lack of repression and its attendant moral development will also be available to see, and appropriate treatment recommended as is suitable in each case.

Unconscious fantasy is kept unconscious via anxiety (Freud, 1926; Norman, 2011, p. 89, 157; Brenner in Rickman (Ed.), 1957, p.239; Meissner in Wolman (Ed.), 1996, p. 44). Although the fantasy is active it remains unseen (Freud & Breuer, 1893-1895, p. 221; Freud, 1905*d*). I believe Hobson has found a key piece of the puzzle when he indicated the fictive dream space in which our dreams, which are but symbolic fantasies, are played out. The inferior parietal lobe Brodmann area number 40, is that fictive imaginary space which also serves a similar function in waking (Hobson & Pace-Schott, 2002, p. 687). Although the intrasystemic method offers an experimental framework which is not prediction dependent, one can begin to focus one’s attention here. It seems that either the inferior parietal lobe Brodmann area number 40 is receiving the input, and the function of repression is found in isolating conscious attention from the active display, as one would look away from a movie playing in a theatre, or, the “theatre” is dark, the inferior parietal lobe Brodmann area 40 has not been engaged, and the facility of repression is active in keeping the information signal containing the fantasy cut off from the inferior parietal lobe Brodmann area 40, and the fictive dream/fantasy space into which the fantasy must be projected to become conscious is isolated from the signal carrying the fantasy. If the exact mechanism of repressive function is one or the other, or something entirely different, *matters not*. The intrasystemic experimental framework will itself reveal the correct particulars, as the known metapsychological system is stressed and reveals itself in active operation, performing known tasks and clearly defined operations and processing which define the emerging data streams and their purpose in the context of known metatheory.

So, this last piece of the puzzle completes the rough picture I drew out describing

the intrasystemic approach. Once a baseline for overall repressive function, and to a lesser extent, affective assignment, has been established, a *general* diagnostic tool can be constructed whereby a mental illness can be categorized by virtue of examining the pathologically associated intrasystemic signatures of relative energetic activity across active brain anatomy. Then, we add the ability to isolate and interpret the energetic intrasystemic signature of relative neural activity which corresponds to the unconscious replacement gratification fantasy in its various forms. This will yield a very *specific and precise* picture of mental functioning and diagnosis. The result will be a scan which will provide a detailed description of the relation of the subject's unconscious and conscious mind, allowing precise diagnosis of the general type of illness, and the typological identification of psychopathological unconscious content. Each type of unconscious ideation will be specific in its energetic presentation, and, specific as to its signature of distribution across active brain anatomy. Although the precise hidden thoughts in any one person are beyond this method to discover, the *type* of ideation should be clear to see. The combination of energetic characteristics and their distribution over active brain function will be unique and specific in their association, and hence, a typological identification of unconscious thought and ideation should be discernable. In example: Sadistic ideation will be the most energetic, masochistic content next, more overtly sexual content will be quantitatively less energetic still, and will also be unique in its anatomical distribution of energetic characteristics, and so on. Each type of content will be energetically distinct in its quantitative presentation, and, be specific as to the areas of the brain it will use to mediate and affect the fantasy, and so, each will present a different, distinct signature of relative activity, across the structure of the actively functioning anatomy of the brain. Now I will flesh out this theory, and provide a rough experimental picture to demonstrate the general approach, and clarify the specific role of metapsychology in defining the quantitative unconscious through perturbation theory, and make clear the meaning of metapsychological mediation and definition of mental processes via the unconscious stressor.

The quantitative unconscious: perturbation-theoretic intrasystemic experimental design and the unconscious stressor

In this section I will briefly draw together these many theoretical threads into a specific picture which will make the ideas of intrasystemic perturbation theory, the specificity of unconscious content, and the experimental role of the unconscious stressor tangible as applied to the three psychical systems. As one applies this approach to interpret the three psychical systems, three distinct relations to the unconscious stressor are derived. The first of these three *rough experimental outlines* below, uses only an intrasystemic stressor, the next, an unconscious stressor spanning the breadth of unconscious ideation, and the last makes use of our specific psychoanalytic knowledge of unconscious content. So what is meant by these great many theoretical notions? A few specific examples will serve to clarify the matter.

An application of intrasystemic perturbation theory to the system of affective assignment: Although much work in cognitive neuroscience has been accomplished regarding the affective value assigned to facial expression (Adolphs & Tranel, 2004; Blair et al., 1999; Killgore & Yurgelun-Todd, 2004) and a test like the 1NT which clearly demarcates affective assignment exists, the 1NT does not separate the variables of repression and affective assignment, and, affective assignment is not

limited to the assignment of affective value to social groups or faces alone, but endows all of human experience with symbolic and qualitative valence. Think of the previous discussion about affective, contextual and symbolic assignment to our neutral perceptual experience: e.g., One person may look upon a barren desert landscape and see beauty, another may see a desolate expanse most ugly and uninviting. For this reason the following test should be constructed: One has the subject look at a series of faces and scenes, each with a distinct affective element, or no such element: i.e., some faces are negative, some positive, some neutral, just as the scenes of cityscapes and nature, etc. As each person has individual prejudice and different affective definitions for *all* stimulus, this first test is a baseline marker for that subject. (The addition of a personality inventory and/or test for neuroticism at this point will provide a basic snapshot of personality type and its correlation to affective assignment, and further clarify the results). The subject must be well rested, and will respond to each stimulus and categorize the affect they have assigned to that stimulus by indicating an affective category along a continuum: Loving, Friendly, Kind, Neutral, Hostile, Hateful, etc. Each response is timed and recorded.

Next the subject has some single specific aspect altered which we suspect correlates with affective assignment, like *deprivation of REM*, since REM, as we have theorized, is the model of affective assignment and symbolic function, and therefore, may well be involved in properly rebalancing the system of affective assignment each night as a metapsychological function of the expression of a repressed wish (Freud, 1900), and analogously in the language of cognitive neuroscience, through the encoding of the affective component of mnemonic experience into a REM dream indicative of neural processing (plasticity), and consolidation into the overall mnemonic system, a process which also involves NREM/slow-wave-sleep (Stickgold, et al., 2001; Hobson & Pace-Schott, 2002).

Then once the associated metapsychologically defined variable, such as REM deprivation, has been changed, the test is repeated. Now, if the hypothesis correct, we will have demonstrated a correlation to be present, as affective assignment will be altered for the worse: the responses will take longer and demonstrate inefficiency and other possibly pathological alterations from baseline. Affective assignment has now been isolated from repression, and a correlation of specific and causal relation has been established. Next, as the intrasystemic stressor (REM deprivation) has been causally linked to affective assignment, the entire test is repeated in an MEG, fMRI or PET, and the information gathered in the two images compared, one at baseline, one stressed. The system is thereby defined, and understood in context. One can observe the limbic activity and any other mediating affective structures, the particulars of which need not be predicted, but are rightly understood to be observed in operation, as the function they serve is known before the data that function defines is collected: *Here we are observing a distortion in the transference which provides affective definition to reality and perception.*

An application of intrasystemic perturbation theory to the system of overall repressive function: In his 1915 paper on repression Freud wrote that, "*the essence of repression lies simply in turning something away, and keeping it at a distance, from the conscious*" [his italics] (Freud, 1915, p. 147). As the Stroop task works to achieve its effect through the separation and suppression of some ideational elements, and the conscious selection and representation of other intermixed pieces of

information, it can be recognized as a well established test rightly aimed at the repressive facility. We again establish a baseline, and administer a Stroop test suitable for use in a scanner with no stressor. The responses are timed. Then we repeat the test after altering a variable we suspect is correlated with repression, such as wholesale sleep interruption. (Hallucination and every indication of repressive failure are brought about by wholesale sleep loss). In this way, a correlation, although be it an obvious one, has been established, as the test times will be slower, indicating a loss of repressive efficiency. Then the test is repeated in a scanner. The images generated, once compared, will yield a basic picture of the active repressive system mediated by a single mode of stress.

Next the subject is rested, and an unconscious stressor using images spanning the full breadth of polymorphously perverse unconscious ideation is administered, and the test repeated in the scanner. As the ego dystonic images from the stressor take effect, the fantasies (or memories) that correspond to them in the unconscious are encouraged, and made active, just as a dream wish *may* be triggered by day world experience (Freud, 1900, p. 551). This stressed result is compared to baseline to establish the isolated effect of the unconscious stressor on repressive function, in terms of test times and scan images. This will yield a clear picture of a particular transference distortion. We have encouraged whatever *native pathogenic constituents* are present in predominance in the subject's unconscious, and stressed the repressive system as in a neurosis. In neurosis the subject refuses to admit an unconscious ideation into consciousness (Freud, 1905d; 1924, p. 150-151). He represses it, as our experimental subject is required to do, as he must allocate his attention outward to complete the Stroop task.

Next, the two stressors, sleep deprivation and the unconscious stressor are combined, to yield a third conjunct level of systemic stress, allowing directed insight into the *various energetic and anatomical dynamics* of the system. With the addition of a targeted metapsychological stressor aimed directly at the sort of unconscious content that is so often pathogenic, one knows psychoanalytically what the system is doing, and can look at the complex information gathered in the context of a known metapsychological function, and hence, discover the relative simplicity of intentional informational exchange—which is now revealed and understood in a functional context of known operation. Now it is clear what familiar repressive distortion we are looking at: *the repression of a perversion or perversions as they affect the transference*, and so, the complex quantitative information collected is understood as to its purpose and function, even before it is gathered.

An application of intrasystemic perturbation theory to the system of unconscious ideation: Lastly, the picture of the quantitative unconscious must be completed in specific, to discover the typological distillation of unconscious replacement gratification fantasy, and secure a detailed picture of dynamic neurotic and psychotic nosogenesis. To gain access to the thoughts of the hidden unconscious mind and create a specific diagnostic tool of great precision and scope, one more step must be added. Each subject will have a different balance of unconscious content, and have various fixations and levels of energetic activity particular to their unconscious (Freud, 1905d, 1915 pp. 180-185; Jung, 1972; Norman, 2011, pp. 72-73, 79-80). One overcomes this difficulty by exposing the subject in an MEG, fMRI or PET to one unconscious element at a time, *one perversion at a time*. The imagery

will reveal the particular areas of the limbic system and other neural anatomy which will become active, and correspond to the "neuro-affective" structures across which that aspect of perverse ideation is mediated. As the ego dystonic images from the stressor take effect, the fantasies (or memories) that correspond to them in the unconscious are encouraged, and made active, just as a dream wish *may* be triggered by day world experience (Freud, 1900, p. 551). We first apply the unconscious stimulus, and then, allow the initial impression from the stressor to fade, and once its direct impact has waned, we observe the result, as it has *encouraged the unconscious ideations to which it is related* toward emergence into consciousness. We then compare the former unstressed scan image to the latter, and deduce the intrasystemic signature of energetic activity which corresponds to each particular type of unconscious content. Again, the information is defined even before it is collected: *Here we are observing and identifying the intrasystemic signature of the particular and various types of pathogenic unconscious content which will affect the transference.*

As we have established: Subjects with a preponderance of a particular type of unconscious content, will demonstrate increased responsiveness to that particular type of content.

Once subjects have been identified with various particular types of predominant unconscious content, these subjects are tested as outlined above for the "overall system of repressive function," with the specific unconscious stressor associated with that subject's unconscious inventory, substituted for the general unconscious stressor spanning the breadth of polymorphously perverse unconscious ideation. The interpretation of the complex quantitative result is again available to define the data before its collection: *Here we observe the intrasystemic signature of a particular typologically identified piece of pathogenic unconscious content as it affects the transference from under repression.* The effects on task performance, and hence, repression can be observed first hand with full knowledge of the type of unconscious content and mechanism of distortion, which due to our test's construction, closely resembles a neurosis. This artificial neurotic simulation is created like the real thing: a piece of unconscious ideation is encouraged from under repression to affect the transference.

Lastly, we have but to apply our specific unconscious stressor *in substitute for the intrasystemic stressor*, and compare the result to a baseline for these same subjects, this time, *using our test for affective assignment*. We record the variations in test times and scans, to observe the actual *affective* transference distortion first hand, and identify the intrasystemic signatures of *each type of content* as it affects the transference while actively assigning affective quality and definition to all of reality. *Here we observe the fundamental affective transference, on a physiologic and quantitative level, as it is altered and distorted in relation to each specific type of pathogenic unconscious content.*

Further experimentation will then serve to advance our knowledge of these systems in ever greater detail, moving beyond the explanatory power of the initial metapsychological perturbation prediction, to an ever greater and more accurate understanding of our psychical dynamic.

In conclusion: The most inclusive proposed psychical system, the system of overall repressive function, has long been known in its various levels of functioning to be associated with the different types of neurosis, psychosis and perverse personality formations (Freud, 1905*d*, 1911, 1915 pp. 180-185; Jung, 1972). Once the overall repressive intrasystemic neural signature associated with each illness has been established, this initial line of experimental approach will lead directly to a general typological diagnostic tool for mental illness. After a good night's sleep, a scan should clearly reveal the general relation of conscious and unconscious content as a function of repression. Once the general type of illness has been thusly identified, the repressive system itself in its level of development will make the choice of available treatment options clear, drugs in one case, psychoanalysis in another where repressive development and its attendant moral component are in evidence. The *initial* phase of repressive experimentation will yield a general diagnostic tool which will determine the type of illness and the appropriate treatment via a scan, following a good night's rest.

Once *all three* systems are understood, and the intrasystemic signatures associated with each condition identified, the clear typological identification of specific unconscious content and ideation will complete the picture. A noninvasive scan may reveal in minutes what formerly took years of psychoanalysis to discover, and hence, the technology thusly applied should reliably diagnose a particular mental illness, and also, provide typological identification of the pathogenic unconscious content itself, and its relation to consciousness. The typological identification of unconscious content in the context of observed repressive function and affective balance, may greatly reduce the time required for successful psychoanalytic treatment, by informing the physician of vital factors that were once hidden to observation. This line of research could change the entire way psychology is practiced, insuring proper and objective diagnosis, rapid identification of pathogenic unconscious content, and specific recommendations regarding efficacious and appropriate treatment in each case. The Quantitative Unconscious, once functionally defined through a Perturbation-Theoretic Intrasystemic Approach to mental functioning, may serve as a vital descriptive nexus, a central unified theoretical framework, within which, psychical functioning in its relation to the super complex physiology of dynamic neuronal systems, and ontology, might both be described, and functionally understood, without conflict.

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As I have written previously, my personal scientific journey really began under the tutelage of Peter Landsberg who accepted me as a research student at Cardiff University and induced a lifelong interest in thermodynamics in me. However, I was prepared for this journey by two excellent teachers at Barry Boys' Grammar School – Mr Eric Jones (mathematics) and Mr Digby Lloyd (Physics) – and to them I owe an enormous debt of gratitude. Progress was accelerated by my meetings and subsequent friendships with Bernard Lavenda and Ruggero Santilli while, at Hull University, the late George Cole introduced me to astrophysics and cosmology and our chats over coffee produced more than I am certain would have appeared after countless hours slaving over books and/or internet references. Latterly, I have received much support and important collaboration from David Sands, also of Hull University. I would pay tribute also to those other steadfast friends and willing givers of moral support, amongst whom must be mentioned specifically Stephen Crothers, Wallace Thornhill and Donald Scott.

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Jeremy Dunning-Davies

(28th Nov., 2017)

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Beyond the Veil (written with Jeremy Dunning-Davies) covers topics including cosmology, quantum paradox, relativity, information theory, thermodynamics, climate change, the neuroscience of social change, disease pathogenesis and field processes within biology. In paperback and free e-version, *Future's Mirror: The Endocannabinoid System in Human Pathology* spells out the functional potential and implied therapeutic utility of cannabinoids and Cannabis extracts using phylogenetic, medical and historical analysis, and then details what appears to be the suppressed approach that may lead to the speedy and inexpensive treatment or cure of many dread diseases using Cannabis extracts, including but not limited to cancer. *The Answer: Roadmap for a new Humanity* provides a solution to the basis fault within man responsible for human misery, war and unhappiness, and, details the startling situation the biome is currently facing due to geoengineering.

For a sample of Richard's scientific and creative work please enjoy the entire of *Mind Magazine* www.mindmagazine.net. The "New Ideas" section contains some of his papers and articles detailing potential new medical treatments without toxicity; affective analysis of quantum Clifford algebraic theory; analysis of relativistic theory; analysis of subjective quantum theory; analysis of aqueous systems; analysis of objective reality; analysis of wave/particle duality and light; analysis of quantum unconscious isomorphism; psycho-ontology and fractal dimension; temporal field theory; Bohmian mechanics; quantitative approaches to the human unconscious; new approaches to pharmacology; mnemonic connectionist modeling as a holographic paradigm; ontological calculus; semi-regressive plastic attachment therapy; temporal process as tripartite pre-temporal simultaneity; quantitative unconscious theory; re-polarization theory; homeostatic conductance and parasympathetic basis alteration (new approaches to Parkinson's; OCD; Depression); the hard problem of consciousness (new solution); informational pleomorphism; somatic adaptivity and ego process; new methods proposed to treat degenerative nerve disease and others, some utilizing quantum information mediated through aqueous systems in place of drugs.

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