

## FROM TRINES TO ENNEADS: DETAILS TO CONNECT WITH THE SCIENCES

---

Ian J.Thompson<sup>8</sup>

We have learned from the Heavenly Doctrines in many places that everything created receives influx in the image of the Creator, who has a trine of discrete degrees of Love, Wisdom and Use. That implies that creation itself is a trine as the three recipients each of particularly love, wisdom, or use. This is the broad brush that is so wide we cannot see the parts of the trine at the same time, for they are the heavens (1), the mind of consciousness (2), and physical nature (3).

1. Love

2. Wisdom

3. Use

If the sciences are concerned with processes in nature, what do we thereby learn about those details? We remember that “Divine is the same in things greatest and least.” Hence the heavens, minds, and nature should themselves have an *internal* trine, to contribute to their overall function. So now there is the trine of 3 degrees, and an *ennead* of 9 sub-degrees. (‘ennea’ is Greek for 9). We identify three of these enneads in the heavens as the celestial (1.1), spiritual (1.2), and spiritual-natural (1.3) heavens. We identify three of the enneads in minds as to do with love (2.1), understanding (2.2), and actions (2.3). We identify three of the enneads in nature as to do with physical ends (3.1), causes (3.2), and final effects (3.3). By simple extrapolation of the original trine, we can begin to see the connected functions of all of these 9 enneads:

---

8. Ian J. Thompson is currently employed as a Nuclear Physicist in the Nuclear Theory and Modeling Group at the Lawrence Livermore National Laboratory, USA, having until 2006 been Professor of Physics at the University of Surrey, UK. He holds a B.Sc. in Mathematics and Physics from Auckland University (New Zealand), a M.Sc. in Computer Science from Massey University (New Zealand), and a Ph.D. in nuclear theory from Auckland University. His personal website is [www.ianthompson.org](http://www.ianthompson.org). His professional research deals with coupled-channels and few-body models for nuclear structure and reactions, especially concerning halo nuclei. He is a Fellow of the Institute of Physics in the U.K, and of the American Physical Society. He has published over 240 articles in refereed journals, supervised 9 Ph.D. research students, written a nuclear physics textbook *Nuclear Reactions for Astrophysics*, and has contributed the chapter on Coulomb Functions to the NIST *Handbook of Mathematical Functions*. Ian’s research in philosophy, psychology and theology is of equal duration in years, and has produced 6 referred papers, 2 book chapters, and two books: *Philosophy of Nature and Quantum Reality* and *Starting Science from God*. He is a Fellow at the Center for Swedenborgian Studies of the Graduate Theological Union in Berkeley.

*The first ennead:*

1.1 Love for love itself	2.1 Wisdom about love	3.1 Use from love
1.2 Love for wisdom	2.2 Wisdom about wisdom	3.2 Use from wisdom
1.3 Love for use	2.3 Wisdom about use	3.3 Use as use itself.

Where these are:

<b>The heavens</b>	<b>Conscious minds</b>	<b>Physical world</b>
--------------------	------------------------	-----------------------

We begin here to see some features of psychology and physics emerging, and we wonder how these connect with the sciences.

Let us focus on the outermost degree of nature where uses are actually and finally accomplished. It is composed of physical or material substances which receive the effects of mind, but these substances are themselves without consciousness or intention. It has three sub-degrees. Swedenborg in *LJP* 320 describes their three atmospheres:

The three natural atmospheres arising from the sun of the world are the purer ether, which is the universal atmosphere, from which springs all *gravity*; the intermediate ether, which forms a vortex around the planets and surrounds the moon and other satellites, from which springs *magnetism*; and the lowest ether, which is *air*.

Now we begin to see connections with physics. But we have to recognize the limited scientific knowledge of his day. Hence we should give more emphasis to that of which he was more certain, namely that these three sub-degrees have to function together as *end*, *cause*, and *effect*. The different sub-degrees in the same parts of their respective trines will also behave in ways which give rise to *correspondences*. Correspondences are similarities in functional forms and structures. The first in each trine should function as an end, the second as cause, and the third as an effect. This is because all of these 9 sub-degrees in the ennead are related by influx. Divine influx enters into all these degrees both directly (*AC* 7270[4]), and successively or mediately (*AC* 5850) via the higher into lower degrees.

We know now that magnetism is combined in physics with electricity, and that gravity (according to Einstein) comes from a variation in shortest distances in space which is not uniform. So the overall scheme should be

1. The *first degree* (3.1) in nature is an *end*, and therefore must have functions as well as gravity. We will come to those later.
2. The *second degree* (3.2) in nature may well describe electromagnetic fields, but to function as a general cause it should include all the other quantum fields, such as the gluons and bosons that make up strong and weak forces respectively, as well as the Higgs boson. We need to include also the quantum fields for quarks, electrons, neutrinos, etc. that all contribute to the force fields between objects, as well as their masses.
3. The *third degree* (3.3) in nature has air as a representative atmosphere, so now should include all the solid material objects of the world. These objects are described by quantum wave functions given the masses and forces defined by the second degree.

In terms of modern physics, therefore, the second degree is described by quantum field theory, and the third degree is described ordinary quantum mechanics. There is no good description yet of the first degree: physicists have been trying hard for the last 50 years to invent a theory of quantum gravity, but they have not yet been successful. We want this first degree to have other functions as well, in order to function with *ends*.

Now, as you may have anticipated from the general principles at the start, we should consider that the Divine is present in each of the 9 enneads. The direct influx will lead to each being in itself a trine, and this results in sub-sub-degrees, of which there will be 27. *The whole physical degree can form an ennead*, and each of the above 3 physical degrees will have its own internal trine and their functions. In fact, that helps us very much to link up with quantum physics, since quantum field theory and quantum mechanics both have an internal triad of (1) starting principle (Lagrangian or Hamiltonian, respectively), (2) quantum wave functions propagating through space and time, and (3) events resulting from those propagations (deterministic and random, respectively):

*The physical ennead*

3.1	3.1.1 Reception of targets	3.1.2 Causes to arrange targets	3.1.3 Arranged specific targets
3.2	3.2.1 <b>Lagrangian:</b> Principles for quantum fields	3.2.2 Propagation of quantum fields for all future options	3.2.3 Results of quantum fields
3.3	3.3.1 <b>Hamiltonian:</b> kinetic + potential energies	3.3.2 Quantum wave function	3.3.3 Actual selections e.g. Measurements

Meanings of columns

	Principles	Propagating causes	Effects
--	------------	--------------------	---------

This means that sub-degrees 3.2 and 3.3 contain quantum physics that is almost all well understood. The 3.2 degree has the physics of quantum fields: electromagnetic, gluon, and Higgs bosons. It generates forces that act between 3.3 individual objects by the principles of quantum field theory. It is specified by the Lagrangian function in 3.2.1 with input coupling constants and masses. Below this discrete degree is the 3.3 degree for the physics of individual objects such as molecules, atoms, nuclei, quarks, etc. Again this physics is seemingly well understood, by wave functions in quantum physics, and by forces on masses in classical physics.

There are two remaining open questions in quantum physics: one at the lowest degree (3.3.3) and the other at the highest degree (3.2.1). The issue at the lowest degree is the *nature of measurement* in 3.3.3. This is still a puzzle to physicists even after 100 years. Nearly everyone assumes that these actual selection events occur, but they do not know exactly *when*. However, the uncertainty in the times for their occurrence have only small effects in most systems.

The issue at the highest known physical degree 3.2.1 is that of *renormalization*. This problem comes about because there are *input* mass and charge parameters in the field Lagrangian at 3.2.1. These inputs are called the 'bare parameters'. However, the field processes for all the possible

virtual interactions results in corrections to these values, giving what are called 'dressed parameters'. These are the values to be used in the 3.3 degree, as they include the combined effects of all possible virtual events. These 'dressed' values are those which should agree with experiments, so we need always to adjust bare interactions so dressed charges (etc) agree with experiment. This is a kind of 'input tuning' in order to get the desired output as a target. The problem is that the input values often need to be *infinite*, in order to get the targeted observed values. Something odd is going on. Physicists have invented various special *renormalization* methods to get around these difficulties, and they work in most cases. Still, even then, the input values are sometimes *extremely sensitive* to the target values. This is called the problem of 'naturalness', which is not yet resolved for some parameters such as the mass of the Higgs boson, or for the very small energy-density of the vacuum.

Let us then summarize the physics we do *not* understand. *First* there is the unknown but sought-after degree of quantum gravity. Clarifying its nature has been a big debate for last 90 years, as physicists try to the gravity of Einstein's General Relativity with quantum physics.

*Second*, here is the need for the parameter tuning of bare parameters to get the desired output of quantum field processes for the 'dressed' masses and charges. Field theory does not deliver these 'out of the box', but its renormalized parameters have to be fine-tuned to observed values. *Third*, there is the issue of linking the spiritual with the natural. Later in this issue we will make a proposal that links these second and third issues.