Rudolf Steiner University College

Master Programme: Educational Action Research

Environmental and Social Education

(M.Ed)

Three-In-One:

Foundations for a theory of learning and teaching in Biodynamics

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Abstract

In our contemporary Western culture, efforts to understand nature and the human being are largely undertaken through a mode of consciousness referred to as the 'verbal-intellectual' mind. It is this analytical, rational mode that is given pride of place in science, in the socio-political domain, in educational methods and content. Agriculture has become deeply steeped in practices and interventions arising from this analytical, scientific mode of consciousness. In the Biodynamic method, proposals by Rudolf Steiner initially appear to run counter to the progress of a science founded on rational, deductive reasoning. What Biodynamics presents, however, is a catalyst toward a critical review of the epistemological, ontological and methodological basis to our interactions with the beings and substances of the natural world. Alchemical thinking and practice offers a potentially fruitful direction for a renewal of scientific thinking and the development of exact imaginative ways of knowing. A two-fold educational process emerges as a way of stepping towards an understanding of the new directions proposed by Rudolf Steiner in his agricultural initiatives. On the one hand this entails a self-guided education on behalf of the practitioner, a self-education that then informs potential methods and approaches for research, for teaching and for learning Biodynamics.

For my children

Sophia and Michaela.

Budding growers and stewards of the Earth,

and my wife

Daniela

Companion throughout.

Acknowledgements

As a research offering that hopes to contribute some insight to the practitioners, teachers and students of land stewardship – and of Biodynamics in particular - I must acknowledge first and foremost my own teachers whose influence has in no small way made this exploration possible. As teacher, guide, colleague and friend, Dennis Klocek deserves my special thanks as he helped me put my ship back on course many years ago through a remarkable heart-felt sharing of his insights into the mysteries of human and nature. Many other teachers have contributed greatly to both my work and research either through their written or spoken words, and though these are too many to name individually I would like to give special thanks to Aksel Hugo, Henri Bortoft and Georg Kuhlewind – teachers whose voices and thoughts contribute greatly to the pages that follow.

My parents, researchers and writers both, have helped me over many years with unending support and encouragement and words fall short of expressing my thanks to them both.

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Thanks to Ruskin Mill Trust for supporting this research process in numerous ways.

Thanks to my burn-the-midnight-oil editor, friend and firm farming companion Mark Ross.

I must lastly acknowledge an indispensably deep wellspring of inspiration that informed the heart of my research that in the end remained largely underground - the poetical mastery of Wendell Berry, William Stafford, Olav Hauge, and Seamus Heaney.

It might be claimed that a healthy agriculture is the basis of a healthy culture and healthy culture implies a healthy agriculture.

Wolf D. Storl

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Prologue: In the Field

Notes from the schooling of a teacher through digging

Journal entry: Stroud, Gloucestershire. April 6th, 2011
Sun in Pisces, Moon in Aries (both ascending)[1].
started pulverizing quartz crystals at 11 am
ground on plate glass in full sun
took 3 hrs to grind enough to fill cow horn
filled horn with water from 501 stirring (April 4th)
felt like a good day to do silica prep
will bury on Friday at Vale Head Farm.

April 9th, 2011 - 2 PM
Vale Head Farm, Kinver, West Midlands, UK

I make my way to the top of the paddock that slopes up toward the old beech forest. It is hot – unseasonably hot - and dry, and bright…

I have chosen this particular paddock on this particular farm for several reasons. Firstly, this area – in the Midlands in England – sits in the Bridgenorth Sandstone Formation near the small village of Kinver. This area is known for its red sandstone, and the rusty coloured earth is everywhere visible in outcrops and exposed fields and – underfoot - is noticeably powdery and light.

I have chosen this area specifically for the siliceous nature of its soils, and I have no trouble digging down through the soft, friable sandy soil. The thought crosses my mind that, to an outsider, this must seem a rather eccentric activity - driving two hours north to dig a hole and bury a cow horn packed with ground quartz crystals!

I am alone, however, and am only watched from a distance by a few bemused Shetland sheep.

I have chosen this particular paddock as it is one of the higher, more exposed parts of the farm – a curving brow of field bordered by gorse scrub with good southerly aspect ensuring

[1] position based on the American Sidereal Ephemeris , an equal houses, sidereal ephemeris

sun exposure at all times of day – and year. I have chosen this particular spot as it is high up on the brow of the hill, but away from the drip line of the trees and roots of the gorse.

Digging down, I find smooth egg-shaped quartz pebbles of various sizes spilling out of the loose sandy soil – river washed stones? here? in the rolling hills of the Midlands? - a puzzle for the mind to play with.

Keeping aside a small pile of these pebbles, I dig a square hole two feet deep. I then take up the cow horn that three days ago I filled with finely powdered quartz crystals, and with only moderate ceremony, I place the horn, tip up, in the bottom of the hole. I cover the horn first with a layer of the quartz river pebbles – so that in six months time it is these that the spade strikes first and not the horn – and then I back-fill the hole.

I mark the spot with a knot in a piece of bailer twine tied to a gorse bush and for good measure, stick a sandstone rock over the exact spot, just below the level of the turf. Walking away I am filled with mixed thoughts, sensations and images. Sandy soil and sun, horn underground, light and warmth and the smell of over-dry earth…

Over the next months, although my work and travels take me far and wide, I am indelibly connected to this small patch of land in the Midlands and my mind often strays to imagine that single horn, packed with ground quartz, under the turf in the corner of the paddock at Vale Head Farm.

Chapter 1 ~ Introduction

There is a thread you follow. It goes among
things that change. But it doesn't change.
People wonder about what you are pursuing.
You have to explain about the thread.
But it is hard for others to see.
While you hold it you can't get lost.
Tragedies happen; people get hurt
or die; and you suffer and get old.
nothing you do can stop time's unfolding.
You don't ever let go of the thread.

William Stafford

Background

The central thread throughout this thesis emerges out of my personal interest in, and a life-long concern with, issues of ecology and land stewardship. In general terms, I have been for many years engaged with the question of the relationship between human society and the natural world. These concerns initially arose for me in my twenties as I awoke to *ecological* issues during several years of post-secondary school travel and work abroad. Ecological concerns grew to encompass questions regarding *methods* for *practical solutions* proposed in a variety of 'green' movements where, over time, I started to feel that the solutions put forth didn't essentially address the root of the problem – a root that I came to identify as lying in human consciousness itself and, closer to 'home', in my own cognitive life. Ultimately I realized the need for *epistemological* and *philosophical* reflection in order to try and understand my own cognitive landscape and, if possible, the roots of the crisis I perceived in the way in which culture and nature met – or clashed. All of the above threads grew to inform my own choice of professional path - that of an educator, and most recently an adult educator, in a land-based college in the United Kingdom.

As an amateur naturalist and gardener, my interest in the natural world and my continued search for a 'healthy' relationship to its beings and processes, led me in time to research the Biodynamic[2] approach to land stewardship. This interest arose out of a sense that several of the concerns I have mentioned above are addressed within both the philosophical foundations,

[2] Biodyanmics is the name given to the approach to agriculture initiated by Rudolf Steiner through a series of lectures given in 1924. The Biodynamic movement now constitutes farms, gardens and associations worldwide.

and practical applications, of the Biodynamic method. I pursued this interest initially through exploring the practical aspects of the method in my own garden. Over time I came to be involved in seminars or workshops in Biodynamics – initially as a participant and later as a contributor.

Over the last seven years I have been involved in teaching Biodynamics in an ever-diversifying range of contexts. My development as a teacher in this area brings with it a concurrent need to deepen my own understanding of both the theoretical and the practical aspects of Biodynamics (hence my research 'in the field' described in the Prelude above).

As a teacher contributing to the realm of Biodynamic education, the search for effective *methods* of learning and teaching in this discipline is a primary aim of this research project. This regards methods for my own self-education as well as for my work as an adult educator. My perspective on Biodynamics, arising as it does from that of an *educator* and not a professional farmer or horticulturalist, is concerned with the *interconnected* themes of science, social studies, agriculture and education. It has been important for me, in light of this broader context for my interest in Biodynamics, to approach questions of teaching and learning via a wider exploration of how Biodynamics is situated in the contemporary social domain. This is because Biodynamics presents some poignant challenges – both from a cognitive perspective and a practical perspective. From the point of view of more conventional methods employed in commercial farming and gardening many of the Biodynamic methods seem quite strange. Furthermore, from the perspective of modern science (which has become indelibly wed with agriculture in many respects) Biodynamics can come across as being highly suspect – irrational, unscientific and even highly subjective in its interpretation and application[3].

I will therefore begin this research project with an enquiry into how Biodynamics is situated in the contemporary social landscape and will follow this with a more focused enquiry into questions of self-education and teaching in Biodynamic education contexts.

[3] Perspectives such as those found at *Biodynamics is a Hoax* (http://biodynamicshoax.wordpress.com/) is a good example of this point of view, written by a vintner schooled in the sciences.

The following two examples arise from my own experience and illustrate ways in which I have encountered Biodynamics that highlighted a need for a deeper understanding of its principles and practices. Although the first example is an event that took place several years ago now, it highlighted for me a series of issues that I feel are still very relevant today – both for the student and the teacher of Biodynamics.

Town Hall Meeting

During an America Festival in the summer of 1997 in Fair Oaks, California, one of the festival organizers arranged for a Town Hall meeting to discuss issues of food and food production. Invited to the platform was a representative from Monsanto, a geneticist from UC Davis and the local Biodynamic gardener. A large audience gathered due to the obvious topical nature of this event.

Each speaker had an opportunity to present their perspective and then there followed a question time and discussion period.

The Monsanto representative started with a presentation (the details of which I have long forgotten) of which the dominant and unforgettable tone was one which presented his Corporation as working on behalf of the consumer, with the interest of the consumer squarely in mind. It was a well polished public relations talk and did more (for me) to raise questions of how huge corporations can truly have the local and personal perspective at heart then to give me the confidence in his Company that he so clearly wished to instil.

The geneticist was the second of the three to speak. Here we were presented with the picture that mankind has for thousands of years been 'improving' on plants and animals in order to enhance aspects of their growth and productivity through breeding and selection and that in the contemporary genetic engineering paradigm there is essentially no difference. This argument was delivered accompanied by a presentation of Mendel's work and the identification of genetic dominance revealed through his efforts.

The third speaker, our local Biodynamic gardener, gave a well-intentioned and heart-felt speech about locally produced food and the significance of *quality* over quantity that – though

it spoke to a largely sympathetic audience – was clearly lacking the analytical rigour of the geneticist or the practiced phrasing of the Monsanto rep. The presentation erred on the side of sentimentality and in the given panel came across as lacking 'substance' [4].

I was left feeling that this was a clear example of the seemingly impossible task of bridging professions, or paradigms, and that the speakers were 'world's apart' and their perspectives irreconcilable.

In the discussion that followed the presentations, the dialogue (which became somewhat heated) changed from being an initially convivial sharing of perspectives to an entrenched withdrawal behind various arguments and platitudes. All three speakers found themselves in an increasingly polarized platform, with a certain pulling together between the geneticist and the Monsanto representative.

I was struck, and quite affronted, by a statement by the geneticist who resorted to a comment to the effect that unless we (the audience) were trained genetic scientists we did not – in the end – really have a voice or opinion in the question of the appropriateness (or otherwise) of genetically modifying organisms and we should 'trust' the expertise of the scientists who 'knew' what they were doing. As we were discussing the manipulation of foodstuffs intended for public consumption this comment felt, to me, like a slap in the face and articulated a certain arrogance in the unquestioning authority of science.

I was left with a host of questions that have simmered along in my mind for many years.

Do the scientific specialists know what they are doing? How do they know what they are doing?

What is the relationship between science and agriculture? Is agriculture a science? Is the ever more prevalent marriage between science and agriculture well founded?

With regards to the way in which Biodynamics was represented in the Town Hall meeting, I was left with the questions:

[4] I do not intend to criticize individuals in this formulation, merely to describe the experience – as a listener – of the various perspectives presented.

Can Biodynamics 'come to the table'? Can Biodynamics be understood by the same scientific consciousness that has developed out of the study of the phenomena of the inanimate world[5]?

Big questions, and not easily addressed.

New solutions?

The second example makes more concrete the conundrum presented by the contrasting approaches presented by the conventional world of agriculture and the very different methods of the biodynamic farmer. Both approaches have produced 'solutions' intended to ameliorate specific agricultural problems. In the following two examples I illustrate two of these new syntheses, 'creations' whereby human ingenuity has stepped into the natural world and brought together different elements in order to create a new organism (in the first example) or application (in the second) in order to address imbalances in agricultural environments.

These two examples of new syntheses are briefly described below.

Example 1

The Enviropig (from the University of Guelph website):

> The Enviropig™ was developed by the introduction of a transgene construct composed of the promoter segment of the murine parotid secretory protein gene and the Escherichia coli phytase gene (Golovan et al 2001) into a fertilized porcine embryo by pronuclear microinjection, and this embryo along with other embryos was surgically implanted into the reproductive tract of an oestrous synchronized sow. After a 114 day gestation period, the sow farrowed and piglets born were checked for the presence of the transgene and for phytase enzyme activity in the saliva. When the mature genetically modified pig was crossed with a conventional pig, approximately half of the pigs contained the phytase transgene. This showed that the transgene was stably inserted into one of the chromosomes of the pigs and was inherited in a Mendelian fashion. Through breeding, this line of pigs is in the 8th generation. (University of Guelph website)

Example 2

Preparation 505 (from the Agriculture Course)

[5] I will return to, and expand on, this formulation in the chapter the Art of Knowing. I am here making reference to the fact that the study of physics and analytical chemistry informed, and continues to be taken as the basis for studying, a wide range of phenomena in the natural world as well as in efforts to understand the human body and psyche.

> We collect oak-bark, such as we can get. We do not need much — no more than can easily be obtained. We collect it and chop it up a little, till it has a crumb-like consistency. Then we take a skull — the skull of any of our domestic animals will do, it makes little or no difference. We put the chopped-up oak-bark in the skull, close it up again as well as possible with bony material, and lower it into the earth, but not too deep. We cover it over with peat moss, and then introduce some kind of channel or water pipe so as to let as much rainwater as possible flow into the place. (We might even do it as follows: Take a barrel where rainwater is constantly flowing in and out. Put in it vegetable matter such as will bring about the continued presence of some vegetable slime. Let the bony vessel, which contains the crumbled oak-bark lie in the slime in the water). This, once again, must hibernate. Snow-water is just as good as rainwater. It must pass through the autumn and winter in this way. What you add to your manuring matter from the resulting mass will lend it the forces, prophylactically to combat or to arrest any harmful plant diseases. (Steiner, 1993, p.101)

The Enviropig and preparation 505 (or what is often referred to as the Oak Bark prep) come into the agricultural domain through, it would appear, a synthetic thinking process that is attempting to create, out of this new synthesis, a beneficial solution to specific farming issues. Out of 'parts' – genetic information from mice, ecoli bacteria, skulls, oak bark – a new synthesis or 'whole' is created. In the case of the Enviropig a thought process is evident and explicit that, through its mechanistic or 'cause and effect' elements, reveals a familiar type of logic. It runs something like this (in a much abbreviated version); pigs don't digest phosphates in their feed well - pig effluent is high in phosphates - these become an environmental pollutant - through genetic engineering pigs can be genetically altered to produce phytase in their saliva – through this intervention a more complete digestion of the phosphates can be achieved – lower levels of phosphates pass into their effluent – lower environmental pollutant risk[6].

In terms of the Oak Bark preparation it is not so easy to grasp the synthesis of plant and animal substances, their process of preparation or, in fact, their application protocol. The familiar logic that seems to lie behind the choice of 'parts' and their combination that the creators of the Enviropig have chosen seems to be missing in the instance of preparation 505. A causal connection between the skull of a domestic animal, oak bark, and a specified period of time for internment in the ground is not initially apparent. What is Steiner proposing?

[6] more detail about the Enviropig and the background for its breeding can be found on http://www.uoguelph.ca/enviropig/

In pursuing this question it will be essential to clarify the relationship between the 'part' and the 'whole' as illustrated in the two examples above. How 'parts' are derived, perceived and re-combined lies at the heart of the issue.

Research Aims

The experience of the Town Hall meeting on the one hand, and the conundrum presented by the nature of the 'parts' which comprised the Oak Bark prep on the other, spurred me on to seek for ways of understanding the innovations proposed by Rudolf Steiner in his agriculture course. It was not enough for me to be sympathetic to Biodynamics, I needed to find out more about the principles on which it was founded. As a child of the twentieth century, schooled in materialism, reductionism, positivism and very conscious of the fact that my way of seeing the world is still largely informed by these perspectives, I needed to see if I could find a way of 'standing inside' the Biodynamic perspective. This is therefore, on the one hand, a *personal* aim of my research. It arises from the recognition that Biodynamics presents methods and practices (such as the creation and use of the preparations) which are very different from those which derive from analytical, mechanistic modes of thought and that by their very nature, these methods and practices present the challenge to the practitioner of *understanding*[7].

As Biodynamics becomes more prominent in the public domain it becomes more important that proponents of this method are able to present its principles and practices with clarity and transparency. Biodynamics will, otherwise, be denounced as 'bad science', witchcraft and mysticism, or be merely followed by rote, without *understanding.* It is my hope that I can contribute in some manner to making Biodynamics more accessible to those as yet unfamiliar with its principles.

Alongside the considerations explored above, I have found, as a teacher in the field of Biodynamics, that this wish for *understanding* lives ever more deeply in students and apprentices coming towards this method and that for many it no longer suffices to teach

[7] Opinion differs on this point. In a documented dialogue with scientist Ehrenfried Pfeiffer, Rudolf Steiner expressly indicated that he felt the efficacy of the preparations was such that they should be applied to "as wide an area as possible" (Pfeiffer, 1983, p.4) even before they had been tested experimentally or, presumably, understood in all detail. However, Pfeiffer, Kolisko and others set about researching the preparations from the outset and strove to put Steiner's indications on a rigorous footing.

practical methods and applications where a depth for understanding *why* these particular methods are used is not also cultivated.

The aims of my research are, therefore, two-fold:

Firstly I aim to identify for myself some of the principles that inform the design and production of the biodynamic preparations with a view to then identifying competencies necessary as a practitioner in Biodynamics, to work effectively and creatively in this discipline.

This personal objective is undertaken in order to attempt to identify more broadly what Biodynamics asks of the learner and practitioner seeking to grasp its principles.

Secondly, as a teacher in the field of Biodynamics a further aim of my research is to contribute to the quite specific field of education in the discipline of Biodynamics by identifying possible methods and principles of course design that can contribute to the work of educators in this field.

Research Question

Arising from all that I have articulated above, my root question is the following:

What way of knowing stands behind the Biodynamic impulse; how can this be understood, learned and experienced by myself in order that I might also effectively contribute to Biodynamic teaching, learning and research?

The approach that I am taking is a form of self-guided apprenticeship with a view toward turning the fruits of that apprenticeship into the social domain of teaching. Aksel Hugo has referred to such a process in the terms “participatory exploration yields professional *and* personal development” (Hugo, 2011).

Chapter 2 ~ Theoretical considerations

Opportunities for learning Biodynamic methods have been available ever since Rudolf Steiner gave the Agriculture Course in June 1924. Arising out of almost 90 years of practice and research into Biodynamics, there is now a sizeable body of literature covering a wide range of aspects of the Biodynamic principles and methods[8]. As the focus of my research is on the theme of *education* (both self-education and formal education) it is not my intention to review the existing literature on Biodynamic farming and gardening *methods* in any depth. Learning about Biodynamics includes, of course, a study of the currently available literature and this has featured in my own path of self-education and research. However, when it comes to the question of the aims, objectives and methods of *educators* in this field, there is less to draw on.

Early students of this impulse, such as Ehrenfried Pfeiffer, Podolinsky and others, developed both research and teaching initiatives that contributed greatly to the development of the method. Biodynamics is now taught and practiced in a wide range of contexts in as wide a range of countries. In the United Kingdom there are educational initiatives dedicated toward Biodynamics for those who are either new to this method, or who are seeking to deepen their understanding and practice. These include apprenticeships (where a strong emphasis is placed on the practical learning through daily work in a garden or on a farm), seminars or workshops given as intensives with a focus on particular themes (i.e. making preparations), or even institutions dedicated to teaching the theory and practice through a combination of class work and work on the land (i.e. the Biodynamic College in Forest Row, Sussex).

The methods used in these various teaching contexts vary greatly and I have (as someone who has taught in all three of the above venues) encountered both the very practically oriented learner who comes seeking for ways to bridge a gap in their cognitive understanding of the *principles* underlying their work, as well as individuals who grasp theory and concept readily but who struggle to apply their knowledge 'in the field'. It is my experience, therefore, that

[8] The Biodynamic Association (BDA) has published a list of literature on their website, http://www.biodynamic.org.uk/shop/full-booklist.html, which is one source for an overview of existing literature.

the task of bridging 'thinking' and 'doing' lies at the heart of the work of the Biodynamic educator and practitioner. Three individuals who are teachers in this realm succinctly describe the challenges and opportunities presented by this task.

Paradigm of biodynamics

Dr. Andrew Lorand is a farmer, gardener, university professor, anthroposophical teacher, and researcher in Biodynamics. Dr Lorand's PhD dissertation presented a *paradigmatic analysis* of the Biodynamic method. He writes in the introduction to a condensed version of his dissertation:

> When the author mentioned biodynamic agriculture in conversations with extension agents and teachers of agriculture around the United States, most have not heard of it. With the passage of the 1990 Farm Bill, which includes the regulation and certification of organic produce, however, more agents and teachers can expect questions about this worldwide movement. Primary sources on biodynamic agriculture are not easy to find. Furthermore, these books use language and describe concepts that are outside most agricultural educators' frames of reference. The problem is to describe biodynamic agriculture in terms that are accessible to extension agents and teachers of agriculture. (p.1)

With this objective in mind, Lorand undertakes a paradigmatic analysis (after Guba[9]) of Biodynamic agriculture with the specific aim of providing:

> a basic foundation for practitioners and professionals to develop a comprehensive framework and understanding of the paradigm for biodynamic agriculture. The specific objectives are to describe:
>
> 1. The beliefs about the nature of reality with regard to agriculture (ontological beliefs).
>
> 2. The beliefs about the nature of the relationship between practitioners and agriculture (epistemological beliefs).
>
> 3. The beliefs about how the biodynamic practitioner should go about working with agriculture (methodological beliefs).

Lorand's work clearly articulates the perspective that Biodynamics represents far more than merely the learning or application of a set of practical methods or interventions, and states in his conclusion:

[9] "Guba maintains that paradigms (the set of beliefs that guide action, whether they are everyday actions or action taken in connection with a disciplined inquiry) can be best analyzed by answering three specific questions: (a) what is the nature of reality (ontology), (b) what is the nature of the relationship between the knower and that reality (epistemology), and (c) how should the knower (the practitioner) use that knowledge concerning that reality in practice (methodology)?" (Lorand, p. 2)

> The biodynamic paradigm of agriculture is complex, difficult to understand, and requires substantial study of the pertinent principles and practices. The seminal works (Steiner, 1925, 1929) contain esoteric concepts written, originally in German. These concepts are not well connected to the current knowledge and experience base of agricultural educators.
> A second conclusion was that biodynamics is a comprehensive and systematic paradigm of agriculture. It is an integrated whole where the methods are derivative of the ontology and epistemology.

Lorand illustrates in three tables the ontological, epistemological, and methodological differences among traditional, industrial, organic, and biodynamic paradigms of agriculture that emerge from his enquiry (see Lorand, 1996). A knowledge map of biodynamic agriculture (reproduced in Appendix I of this paper, with kind permission of the author) is also provided by Lorand as a contribution toward the translation of difficult terms and concepts into a concise, understandable form. The implication for *education* arising from Lorand's work is therefore that this process must include epistemological and ontological considerations as well as the methodological considerations one would expect in an 'alternative' agricultural approach.

Bridging the Gap

In terms of ontological beliefs, Dr. Lorand states; "The core concept in the inquiry of the ontology of biodynamic agriculture is the concept of a 'spiritual-physical matrix.' This term was developed… to capture a unique concept that has widespread theoretical and practical implications for the study of biodynamic agriculture." (1996, p.2) Aksel Hugo, Professor at the Life Sciences University in Oslo, contributes to the ontology of Biodynamics the following perspective; "biodynamic agriculture…(recognizes) the reality of the spiritual realm of *beings*, focusing on an agriculture serving *them* – and not vice versa as in conventional agriculture, where beings (humans, plants, animals) become means to serve the material production" (Hugo, 2000, p.1) That industrial agriculture (and much of contemporary science) does not takes its start from an ontology such as that described by Lorand and Hugo is attributed to the fact that "the bridge between knowing and doing is broken" (Hugo, p.1). Industrial agriculture has adopted and been shaped by materialistic ways of thinking and an economic model which has tended to displace land stewardship (essentially a duty of *care)* for

the narrower objective of maximization of output and profitability. This, for Hugo, has made agriculture 'sick' and in need of attention;

> If every disease is somehow a falling out of the context of life, then the insanity of modern agriculture is a result of a mental and emotional falling out of the stream of life. The healing forces will neither be found in pure intellectual endeavours, pure spiritual ideas, nor pure emotional magic. (2000, p.3)

Hugo concludes by stating that "a human touch can only be achieved through the individual agricultural scientist or farmer" who strives to bridge "science (knowing) and existence (being) in order to stay in touch with human life" (2000, p. 3) This bridging is, for Hugo, not just a theoretical exercise and nor is it just a matter of changing what the farmer or gardener *does,* but is a deeper transformation that takes place – one that amounts to a double healing;

> It is the experience of bringing the different realms of knowing and being together that will bring about the healing of the agricultural scientist. Now the conversation can start – the cultivation of relations encompassing all dimensions of experience among beings. What we will discover then is that we deal with a double cultivation process. As we cultivate our relation to nature, she will cultivate something in us. It leads to a double healing, touching nature and the human being at the same time. (2000, p.3)

It is precisely the aim of my research to explore – initially for myself – how to build this bridge and then, as an educator in the realm of Biodynamics, to identify teaching methods that could facilitate this process for others. Hugo and Lorand contribute significantly to this aim by highlighting the need for epistemological, ontological and relational considerations in the task of *learning* Biodynamics.

Science and Spiritual Science

Dennis Klocek is a significant individual to name in the context of Biodynamic education. Klocek is a gardener, teacher, artist, researcher and consultant in Biodynamics. Klocek gives workshops with a strong emphasis on bridging the gap between the understanding of substances and processes as revealed through modern, analytical scientific methods with those statements and indications made by Rudolf Steiner in his books and lectures. Klocek bases his work firmly on a study, research and experiential understanding of the alchemical world-view. When asked in a recent interview[10] about his approach to teaching, Klocek replied "my

[10] The interview from which the following excerpts are taken is reproduced in full in Appendix II.

role as a teacher is to find those little places where science goes 'we don't know what is going on' and then see if there is a place in Steiner and alchemical thought that we can place in there and say 'this is what they are talking about'." (2012). Klocek's approach is not one of denying the role of modern science on the ground of over-abstraction or reduction, nor of denying Steiner's *spiritual* science on the grounds of mysticism or irrationality but rather he seeks to build a bridge – through the alchemical world-view – between these scientific perspectives. Klocek gives the following example of his teaching method in the following:

> As a teacher I think it is important for young people coming in who have maybe a biology background or a soil science background or something, to have the experience that you can speak that language…I gave a chemistry course to wine growers up in Portland a couple of months ago, and there was a young woman who was a graduate of Davis who was the manager for a winery and she majored first in soil science, she had a very strong background in soil science and then she moved to viticulture and she was in the front row and she came to me afterwards and she said 'Boy, I wish I had heard you speak before I went to University'…she said the struggle to integrate so much information at University that is linear and abstract, she said that 'the diagrams you brought showed me that they are not linear they are reciprocal' she said 'all the things you were saying I already knew, but the way you were saying them and putting them brought new insights to me that I wish I had had when I started studying, it would have made it so much easier'. (Klocek)

Klocek describes his approach to *understanding* Biodynamics as one rooted in *a method of analogy*. His very dynamic and engaging workshops make evident the strong bridging potential of this method and once again articulate an emphasis on epistemological and ontological considerations at the outset of a study of Biodynamics. Klocek makes clear the importance of self-education – through study, meditation, observation and practical research – and states that these disciplines combine to develop the capacities required for gaining an understanding of the principles underlying Biodynamic agriculture (unrecorded conversation). Complemented with years of experience as a gardener and more recent work as a consultant to wine growers in the Napa Valley, Klocek's work is a strong example of the potential for Biodynamics to be practiced out of a weaving together of hands-on work in the field and dedicated attention to cognitive development.

Drawing together

In light of the perspectives on learning and teaching Biodynamics provided by Lorand, Hugo and Klocek, I decided to approach my question 'What way of knowing stands behind the Biodynamic impulse; how can this be understood, learned and experienced by myself in order

that I might also effectively contribute to Biodynamic teaching, learning and research?' through three distinct lines of enquiry.

A – *ways of knowing* - Epistemology

I initiated this research project in the autumn of 2009 with a study of *epistemology* and *modes of thinking.* This aspect of my research is informed by the first part of my question, stated above, which focuses on the theme of *way(s) of knowing*;

What can I discover from a study of epistemology that could contribute to an articulation of the *way of knowing* that informs our contemporary methods of investigating and interacting with the natural world?

This line of enquiry was undertaken at the outset of my research process and forms the foundation for a subsequent focus on the Biodynamic preparations. It is initiated with a general question regarding the significance of epistemology and seeks to identify contemporary epistemological formulations in order to shed light on the ways in which our knowledge arises. In many respects this study of epistemology is my response to the 'Town Hall' experience and a sense that developed for me after that meeting that the unspoken domain of epistemology contributed to the unbridgeable gap between the perspectives presented. Following Lorand and Hugo, I saw the need for a study of contributions to the contemporary field of epistemology as an essential stepping off point to subsequent aspects of my research. I have added to this study a brief section to contextualize its findings with regards to my focus on learning and teaching Biodynamics.

B – *first hand experience* - Spagyrics

Klocek's work and the emphasis he places on the alchemical worldview inspired me to undertake practical laboratory work in an alchemical process for the making of plant remedies. This direction for furthering my research found further impetus in a statement made by Rudolf Steiner in the fifth lecture of the Agriculture Course. Steiner writes; "there is a hidden alchemy in the organic process. This hidden alchemy really transmutes the potash, for example, into nitrogen, provided only that the potash is working properly in the organic process"(Steiner, 1993, p.102). Rather than take this as a convenient metaphor or analogy (or just bad science) I had the question as to what contribution alchemy makes to the biodynamic

method – and to a *way of knowing* that informs Biodynamics. This second strand of my research is therefore informed by the question: what is the contribution of alchemical practice and thinking to Steiner's proposals for re-enlivening the agricultural domain?

I chose to research this particular facet of my question through an immersion in the practical processes involved in the preparation of a spagyric[11] remedy. My hunch or hypothesis for this aspect of my work is that the practical and experiential engagement with the spagyric process can contribute to a 'bridging between knowing and doing' and the 'deeper transformation' alluded to by Hugo (above).

C – *methods for teaching and learning* - Biodynamic Education

The third strand of my research arises from my work as a teacher and adult educator.

My work as an adult educator includes teaching aspects of the Biodynamic approach to land stewardship to a diverse range of learners. The challenges in teaching Biodynamics arise from questions that have already arisen throughout this introduction. Is Biodynamics a science? A set of 'recipes' to be followed – and transmitted?

The question that guided this aspect of my research was;

What competencies have been identified in the previous two sections of my research which could benefit students of Biodynamics and what aspects of course design and teaching method might provide a context in which these competencies could be fostered?

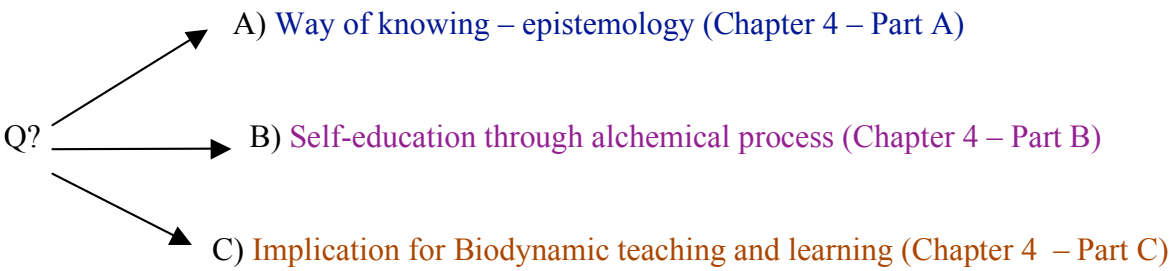
[11] Spagyrics is defined in Part B of Chapter 4, page 46.

Chapter 3 ~ Structure and Methods

Structure of the whole

As I have described above, the structure of my thesis arises from approaching my core question through a process of *separating out* three distinct aspects of that question to be pursued separately. This structuring can be schematically pictured as follows:

Q? - What way of knowing stands behind the Biodynamic impulse; how can this be understood, learned and experienced by myself in order that I might also effectively contribute to Biodynamic teaching, learning and research?



The *separating out* or analysis of my core question into three themes contained therein is in order to address succinctly the distinct contributions that each theme contributes to the question as a whole. This structure arises due to the considerations raised in the Introduction (preceding), which highlights various challenges presented by Biodynamics for contemporary thinking and practice. Thus, before addressing questions of teaching Biodynamics and the specifics of Biodynamic methods, key questions regarding the 'way of knowing' that informs Biodynamics needed to be explored and addressed. The findings that emerged from this first path of enquiry then presented possible practical directions for pursuing the subsequent section.

By *separating out* the three elements of my research question and pursuing them individually I am aware that the challenge of fragmentation arises, and the overall thrust of the research is lost. It will be seen in Part B that a very similar process emerges in the field of alchemical research, and the same issues present themselves. A unity is separated out into three distinct parts that, because of their unique qualities, are in danger of being perceived as unrelated to

the primary unity from which they were isolated. Rather than avoiding this danger by not researching the themes of my question separately, it has become clear to me that this challenge lies at the very heart of my enquiry and by pursuing it, insights arise that shed light on the core issues that my question sets out to address and possible paths of resolution arise. This will be further explored in Chapter 4.

The overall structure of the thesis is thus 'three-in-one' – a nesting rather than sequential ordering. However, this said, there is by necessity an order in which these three paths of enquiry appear in the body of this text, arising from the sequence *in time* in which the various questions and sections were pursued. Part A was undertaken at the outset of this research process in the autumn of 2009, Part B followed (undertaken in 2010/11). The third aspect – Part C – developed alongside the other two research processes and was informed by insights arising from those paths of enquiry.

Methods

The over-arching approach that I have applied throughout the course of this research is that of *action research*. The following quote from the Handbook of Action Research clearly articulates the intention of this approach to research:

> A primary purpose of action research is to produce practical knowledge that is useful to people in the everyday conduct of their lives. A wider purpose of action research is to contribute through this practical knowledge to the increased well being – economic, political, spiritual – of human beings and their communities, and to a more equitable and sustainable relationship with the wider ecology of the planet of which we are an intrinsic part. (Reason and Bradbury)

I have sought to produce practical knowledge in the field of land stewardship with specific focus on understanding, learning and teaching Biodynamics. My research questions and methods evolved during the course of this research period (autumn 2009 – spring 2012) and the three inter-related, and yet distinct, 'strands' of my research reflect the development of my questions as I pursued them. The different sections often developed in combination with one or other research methodologies.

The Art of Knowing (Chapter 4, part A – arising from studies in the autumn/winter of 2009/10) arose through a *comparative* study of three separate perspectives on epistemology and an analysis of the epistemological underpinnings of the alchemical world-view as

depicted in an alchemical emblem from the 16th century. Arising from this theoretical investigation of ways of knowing I came to realize the significance of the *imagination* in teaching and learning – in education.

Spagyrics (Chapter 4, part B – arising from studies undertaken in the summer/autumn of 2010 and the summer of 2011) arose through an enquiry into the alchemical world-view via a theoretical and hands-on exploration of Spagyrics. By undertaking a hands-on exploration of the spagyric process I was studying both the practical procedures described by experienced practitioners in order to obtain a spagyric remedy while also paying close attention to the inner development in my own understanding, emotional reactions, and insights that arose through undertaking the process. This strand of my research is thus also informed by *heuristic* research methods. Avrom Altman, director of research at Pacifica Graduate Institute, provides the following definition of *heuristic* research in his overview of research methodologies[12]:

"Methodologically the first step (in heuristic research) is the initial engagement of the research to discover a question with intense interest" (p. 6). This manifested for me in an intense interest in the spagyric process and a wish for "total immersion" (the second step) in the process without having a specific question - beyond a curiosity for what this total immersion would reveal – or desired outcome. "The third step is incubation and is like tending to or sitting on one egg waiting for it to hatch." (p.6) This phrase very closely describes my own experience which led to the fourth step, "illumination and a change in consciousness in which the constituents of the experience come alive and rearrange themselves with new meaning and relevance". Part B of Chapter 4 in the following thus manifests as the fifth and sixth steps in the heuristic process where (in the fifth step) "the researcher examines the various levels of meaning arising through the (heuristic enquiry), and (through) creative synthesis…expresses the findings"(p.6)

Throughout the above process I kept a journal and notes regarding the practical processes and any insights, experiences, or questions that arose along the way.

[12] This overview is a document obtained from the Pacifica Graduate Institute website.

Finally, Part B on spagyrics concludes with a survey of literature where key aspects of the spagyric process are referred to by a number of scientists seeking to develop their disciplines beyond reductive, analytical and materialistic modes of interpretation.

Teaching BD (Chapter 4, part C – arising from specific workshops and seminars in Biodynamics designed and delivered by myself in 2010, 2011 and 2012)

The overall method employed in this section of Chapter 4 is the analysis of Case Studies. Epistemological insights arising from Part A of Chapter 4 (The Art of Knowing) and research into the theory and practical implications of spagyrics in part B of Chapter 4 informed my research into appropriate methods for the design and delivery of workshops and seminars in Biodynamics.

This aspect of my research utilises three different case studies in order to attain empirical results for the proposal that both Part A and Part B of this research provide effective means for informing education in Biodynamics. The three case studies involved learners with a wide range of familiarity with the theory and practice of Biodynamics.

The first case study is from an introductory course in Biodynamics. The course, for staff of Ruskin Mill Trust, is the second of three accredited units in the Practical Skills Therapeutic Education programme. The programme as a whole was developed by myself at Ruskin Mill Trust (RMT) in order to provide staff with both instruction and a research process into the Trust's Vision and Values. These, informed by the work of Rudolf Steiner, John Ruskin and William Morris, provide the theoretical and inspirational basis for the pedagogical approach developed by the Trust for work with young adults with learning and behavioural challenges. Biodynamics is central to the Trust's vision, values and method and hence is central to the Practical Skills Therapeutic Education programme.

I designed a feedback form and questionnaire for staff that had completed the second stage of the programme (on Biodynamics) to provide my data for analysis. However, while assessing staff's written assignments and in the ongoing tutoring and mentoring for the programme I realized that significant reflections were arising from a number of sources. These reflections contributed significantly to the forming of a meaningful framework for articulating the

capacities that I am seeking to develop both in myself and to offer to my students through the design and facilitation of transformative education processes in Biodynamics.

The second Case Study is chosen from seminars for Biodynamic apprentices – weekend workshops in which *specific exercises* where developed based on the alchemical perspective of the Four Elements and Three Processes as encountered in my research into spagyrics. It is an enquiry into the effectiveness of these hands-on exercises that prompted me to choose this workshop as the second case study.

Feedback sheets from participants provide the data for this analysis, as does the transcript of an interview held with a group of participants who attended the weekend workshop.

The third Case Study was chosen with *course design* as the primary focus, as the design of this seminar was informed directly by proposals from Part A, i.e. that a fruitful direction for education would be to engage a combination of scientific, artistic and contemplative methods. I designed a feedback sheet for participants in this workshop to fill out at the end of the last session of the seminar. These feedback forms provide my data for analysis.

Chapter 4 ~ Separating Out - *Solve*

A) Ways of Knowing

The following study of epistemology and *ways of knowing* is placed at the outset of this articulation of the fruits of my action research process much as it was first written in the late autumn and winter of 2009/10. Only a small section has been added at the end (‘*Significance for Research into Biodynamics’*) that serves as a bridge to aspects of the thesis that were undertaken, and articulated, later. From my current perspective (two years further along the path of research than when I started The Art of Knowing), I may phrase aspects of this section differently, however, that would then be a case of back projecting into this earlier work insights derived more recently.

Regarding the central theme of my research - understanding, teaching and learning Biodynamics – it does not feature in this first ‘strand’ overtly or explicitly. However, as I state in the Introduction, questions of Biodynamics, of science - of the marriage between science and agriculture - have long been a concern of mine and at the outset of my research I felt the need for a deeper look at processes in consciousness that necessarily lie at the root of any discussion or consideration of science or, for that matter, agriculture. In his doctoral dissertation, Dr. Lorand also came to identify the study of epistemology as a significant contribution to understanding Biodynamics. The following research therefore creates the foundation for subsequent sections of this thesis.

The question (page 16) ‘what can I discover from a study of epistemology that could contribute to an articulation of the *way of knowing* that informs our contemporary methods of investigating and interacting with the natural world?’ informs the following line of enquiry[13].

[13] An alternative formulation for this question in the context of my research is ‘do we know what we are doing?’. This formulation arises for me with particular reference to the Town Hall meeting (page 6) and the inference that we (the audience) should trust the geneticist and their work in plant breeding on the grounds that they ‘knew what they were doing’ based on sound scientific principles and procedures. As someone interested and working with Biodynamics, the question applies equally to myself (and Biodynamic practitioners) ‘do we know what we are doing?”

The Art of Knowing

Epistemology, also known as "theory of knowledge", is generally regarded as a branch of philosophy, concerned with understanding the act of knowing and the limitations inherent in the act of knowing. Through posing questions such as "how do we know what we know?", "how is knowledge acquired?" and "what is knowledge?" the epistemological enquiry turns attention to the very activity which lies at the root of all sciences, arts and – in actual fact – at the very foundation of our everyday cognitive activity. Addressing as it does the very nature of how we know the world, and ourselves, the question arises as to whether we are in fact dealing with merely a "branch" of the discipline of philosophy or something of much more far-reaching importance.

The context for epistemological enquiry

In my personal experience of formal education – representing a not-insignificant sixteen years of my life – epistemology only peripherally factored in importance, it's formal engagement only featuring in my mid-twenties. Furthermore it was generally the case that all of the literacy, mathematics, history, science, language, arts – all of these were taught in such a way as to seem "free" of epistemological considerations. For much of our early educational career (i.e. throughout childhood and young adulthood) this is clearly essential – as an engagement with epistemology requires a certain maturity of cognitive development and reflective capacity. It is quite remarkable, however, that once the self-reflective learner emerges, epistemology as a subject of study is not engaged along side the sciences, studies in medicine, politics, economics etc. which become shaping influences in all of our lives. The seemingly optional stance taken to epistemological inquiry continues beyond the bounds of formal education to be currency in much of mainstream cultural life. What is the significance of this stance toward epistemological enquiry?

Consider the following statement by the author and educator Parker Palmer (1993): "Every way of knowing becomes a way of living, every epistemology becomes an ethic."[14] This far-reaching statement strikes me as being poignantly relevant for several reasons. Firstly, we have on any given day access to a number of accounts of events in both the human and natural

[14] Quoted by Zajonc (2006, p. 3)

worlds which reveal threats to the integrity of social and ecological systems.[15] In many instances, concerted efforts are extended to ameliorate, mitigate or diffuse these potential threats. However, the question arises as to how often, in seeking the source or solution to the evident dissonances experienced in our everyday lives, an investigation of our "conventional epistemology" is undertaken. How often do we find a call to investigate and re-evaluate the very epistemological roots that inform our individual and cultural actions? These questions bring me to the second significant aspect of Palmer's statement, one that I have already alluded to above.

In contemporary western cultural life, the disciplined engagement with philosophy and epistemology has largely become sequestered in university departments, often as specialized branches of the social sciences undertaken by professional academics. This is to say that only very rarely do we explicitly find mention of the "cutting edge" discoveries in the realms of epistemology, or politicians making reference to important philosophical points of view that are being considered in the shaping of policy – of peoples lives.[16] Furthermore, when weight of opinion is given to, for instance, science or medical opinion these disciplines are themselves rooted in epistemological frameworks that are very rarely made explicit and are often unexamined. This has radical implications, and raises the third key element in Palmer's statement, that ways of knowing are *fundamentally* ethical – even when they claim to be "objective" in the sense that this is sometimes meant, i.e. of being free of moral or ethical considerations. The implication that lies at the heart of Palmer's statement is that, far from epistemology being an activity that is best left to academic specialities or even, and this perhaps is more challenging, far from being optional, epistemology is everybody's business and this because it is *essentially* ethical.[17]

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[15] It is not the intention to go into these in detail in the body of this paper, we need only consider the many themes that "headline" in our current culture of reporting – pollution, political turmoil, climate change, peak oil and its implications, genetic modification of living beings, hunger etc.

[16] It is the authority of science that is called upon in contemporary political discourse or decision making, no longer the authority of the church and certainly not the authority born of self or collective epistemological reflection.

[17] The distinction that is being made here is a direct reference to Palmer, i.e. one that contrasts a separation of ethics as an autonomous, specialist discipline or consideration that is optionally brought to bear on our knowing activity with the realization that the activity of knowing, and that which emerges from that activity as action or insight, is essentially ethical in its implications.

If there is truth in Palmer's statement, epistemology and the epistemological foundation for our way of living – both public and private – requires a much deeper engagement and examination than it is commonly given. In what follows I will describe three perspectives from contemporary thinkers which, in my view, contribute to a penetrating study of epistemology and how ways of knowing arise along with the development of consciousness. The study of the three perspectives articulated below will in turn reveal implications for the development of consciousness and "ways of knowing" in the fields of art, science and the contemplative life. I will conclude with a further look at education as it is in the realm of education that many challenges are arising due to a one-sided engagement and emphasis on a contemporary "epistemology of separation" (Bortoft, 1996) and, along with these challenges, opportunities for redefining the way we learn, the way we know, the way we live.

Ways of knowing: three perspectives

The demotion of direct experience: Ronald Brady

Through a personal journey that engaged the natural sciences and encountered problems in the way scientific knowledge is defined, philosopher Ronald Brady arrived at a realization of the need for a thorough investigation of the basis to our cognitive life. In the book *Being on Earth* (2006), he traces the historically significant developments in the western mind that have given rise to a "one-eyed colour blind onlooker"[18] approach to science, and the concurrent positivist and empiricist mindset. It was this mindset that Brady met in several professors when he sought to engage in an experiential (sense-based) and qualitative study of natural phenomena. Brady encountered what still lives in much popular reporting and teaching of science, as well as through education generally, in much of our western culture. This is an inherent distrust of our un-mediated sense life as a door to knowledge about "the world". Brady writes in the chapter titled "Direct Experience":

> One of the difficulties with scientific accounts of the world is their apparent insistence on an "objective" reality that cannot be directly experienced, with the resulting demotion of experience – what our senses make out of the world – to a mere show that differs substantially from "what is really there". This is something we all know and do not think

[18] See Lehrs (1985) for a further elaboration of this term. It refers to the resulting mind-set that the scientist adopts if rigidly following the tenets of a science based on the removal of the subject (the subjective) in the attempt to obtain objective, universally applicable knowledge of the world.

about very much. (2006, p. 12)

Brady traces a particularly poignant contribution to this development of consciousness and its view of the role of the senses in cognitive life in the work of Galileo.[19] Galileo's significant act of distinguishing primary and secondary qualities in observed phenomena are often referred to as an essential contribution to the development of modern science, of the modern scientific method. Brady refers to this moment as that of the *demotion* of direct experience, a demotion resulting in the fact that from the time of Galileo the human being "begins to appear for the first time in the history of thought as an irrelevant spectator and insignificant effect of the great mathematical system which is the substance of reality" (Burt, 2003, p. 90). It is this relegation of the subject and his or her unmediated sense experience to a secondary (and either insignificant or potentially inappropriate) role in the acquisition of knowledge and truth that Brady wrestles with in *Being on Earth*.

To a large extent the experience of being a subject separate from a world of objects – many of which seem to not present their essential being to our senses – seems self-evident. It is, as it were, the nature of reality we emerge or mature into as a *given*. This naïve realistic stance to the perceived world lies at the basis of much of modern cultural experience. It is the experience that I have of being a distinct subject who perceives a world of objects separate from myself and external to each other. Furthermore this world seems self-evidently to exist – to be *there* – without my contributing to its manifestation in any way. On the contrary I experience it as manifest and myself as a (on the whole) passive receiver of impressions arising from my encounter with it. There is, however, more to this experience than meets the eye.

Cognitive amnesia: Henri Bortoft

The problems – of knowledge, of philosophy, of science, of living – that derive from the subject/object divide, upon which both our everyday cognition as well as our disciplined scientific research are founded, have been articulated at length by a wide range of authors. It

[19] Galileo's thinking, and its subsequent influence on modern science is complex. E. A. Burt gives a thorough description of Galileo's view that "nature is the domain of mathematics" (Burt, 2003) – an essentially epistemological statement. Galileo, in this light, is one of several influential thinkers whose science derives from a philosophical stance we could call mathematism.

has occupied the human mind from the time when the medieval view of Man as Microcosm of the great Macrocosm began to wane. The earlier unified worldview essentially gave way to the later – and still dominant – dualistic worldview. Though it does a disservice to this vast chapter of human thought and expertise to not go deeper into the various voices who have engaged the significant issues raised regarding the nature of knowing, of consciousness, and of conscience, there is not the space in this paper to do so. Suffice it to say that since the time of Galileo[20] we have struggled with the problem of whether it is either our *thinking* or our *sense activity* that can be relied upon to give us "true" knowledge of our own unique self, and the universe in which we find ourselves.

Coupled with this deep-seated problem is that of subjective versus objective knowledge, articulated by Brady so clearly in his work (Maier, Brady, & Edelglass, 2006). In the twentieth century, work undertaken in the history and philosophy of science contributed new light to these thorny issues. Henry Bortoft is one author who has made significant contributions to the problems of knowledge. Setting out to look, from a philosophical point of view, at the way in which J. W. Goethe approached his studies in natural science, Bortoft has shed light on significant aspects of our cognitive life.

Using an ambiguous figure of what appears to be a "random patchwork of black and white areas" in a circular frame, Bortoft (1996, p. 50) presents a very striking experience of the relationship between our *sensory* activity and our *thinking* activity. After a time, and with our intentional activity directed toward the image, a figure emerges from the previously chaotic ground of black and white patches. A giraffe's head is "seen".[21] There is much to be gleaned from this experience, as in time the initial effort expended to attempt to see some organization

[20] I think it important to reference Galileo in this manner as rather than to say "since Galileo" I have chosen "since the time of Galileo" to indicate the possibility that Galileo was *one* exponent of a shift in consciousness that was, on all levels – physiologically, psychologically and spiritually – giving the human subject a greater awareness of themselves as separate cognizing beings, centred within their own individual point of view. This idea references the research of Rudolf Steiner and the substantial evidence for the evolution of consciousness articulated in his own work as well as in the work of Ernst Lehrs, Owen Barfield, and others. The choice of wording is such as to indicate that the shift in consciousness is a supra-personal event, Galileo, however, is one of the earliest and clearest proponents of modes of thinking arising from this new experience of self and world – with profound implications. Burt writes: "The form of the primary-secondary doctrine in Galileo is worth a moment's pause, for its effects in modern thought have been of incalculable importance. It is a fundamental step toward that banishing of man from the great world of nature and his treatment as an effect of what happens in the latter…" (2003, p. 89).

[21] See Bortoft (1996, p. 50)

within the seeming chaos of black and white shapes, which gives rise to "seeing the giraffe" – eventually reverses so that a considerable attentional effort is required to *not-see* the giraffe. This becomes a bridge to the realization that whereas much – in fact the majority – of our everyday cognitive life is rooted in the experience that we encounter the world and its objects as if they were just "there" (naïve empiricism), in actual fact what we are no longer aware of is the organizing activity through which these objects become apparent. The difficulty is that we are no longer aware of that side of the cognitive act which contributes to the "seeing", as this is no longer reliant on an activity of will. Bortoft refers to this conundrum as "cognitive amnesia" (1996, p. 139) – amnesia because in our cognitive perception as we naively experience it, we no longer are conscious of the fact that we only see or experience anything due to the *organizing idea* that imbues with meaning the otherwise chaotic life of pure sense perception. I quote Bortoft at length in what follows due to the succinctness of his explanation, and the significance that this has for cognitive activity:

> All scientific knowledge, then, is a correlation of *what* is seen with the *way* it is seen. When the "way of seeing" is invisible […] then we live on the empirical level where it seems to be self-evident that discoveries are made directly through the senses. In this "natural attitude" we have no sense of our own participation, and hence we seem to ourselves to be onlookers to a world which is fixed and finished. Forgetfulness of the way of seeing is the origin of empiricism, which is still by far the most popular philosophy of science, in spite of all the discoveries in the history and philosophy of science, which show that it is a philosophy of cognitive amnesia. (1996, pp. 138-9)

The realization of the nature of cognition revealed in the above, and developed much further by Bortoft in his book, has massive implications for consciousness – be it scientifically engaged or otherwise. Bortoft's articulation of the role of the *organizing idea* in cognitive perception – only briefly touched upon above – allows him to come to the striking realization that "we live within a dimension of mind which is as invisible to us as the air we breathe" (1996, p. 141).[22] This realization could profoundly influence the way in which we do science[23], to the way we teach science (to the way we educate in the broadest sense) and

[22] The role of what Bortoft refers to as the organizing idea in cognitive perception has also been revealed through the work of Von Senden, Oliver Sacks and others. These studies, which focussed on the experience of individuals who were blinded from birth but whose sight was eventually restored through medical science are relevant to mention. Annie Dillard makes reference to Von Senden's research *Space and Sight* when she writes that for the newly sighted vision is "pure sensation unencumbered by meaning" (Dillard, 1974).

[23] This insight is particularly relevant to my experience of the Town Hall meeting for, with this insight in mind, it is possible to propose that the geneticist from UC Davis and our Biodynamic gardener were undertaking their studies of natural phenomena with quite radically different *organizing ideas*. The fact that this was not

indeed the way in which we engage in everyday life. It allows us to posit the idea that in order to address the issues we encounter in the realms of nature and society that are inimical to health and wellbeing, we would be wise to undertake a concerted investigation into the aforementioned "dimension of mind". As with Palmer's statement above it suggests that working to make our epistemology explicit is a crucial step in becoming ethically responsible for our stance in the world.

A collective disease: Georg Kühlewind

Where Brady highlights the origins of the "split"[24] and Henri Bortoft follows at great length and with true virtuosity the epistemological intricacies of the contemporary mind, Georg Kühlewind is, I feel, an essential thinker to mention in the present context due to the way in which he has examined and described the process by which this state of affairs has developed.[25] He does so through a study of both the biographical and historical development of consciousness, as revealed through such diverse phenomena as the development of language and speech, the phenomenology of the processes of thinking and perceiving, and the nature of art. Kühlewind's conclusion, reminiscent of Bortoft's *cognitive amnesia*, is that modern consciousness is diseased. This quite striking pronouncement appears and is elaborated at some length in his book *From Normal to Healthy* (1983). Kühlewind describes the diseased consciousness as being a collective disease – and as such it generally goes un-recognized. Having a certain resonance with Bortoft's articulation of everyday cognition, i.e. a cognition that no longer experiences the role of thinking in the objects we perceive and therefore mistakes the perceived object as a *given*, Kühlewind attributes the causes of the disease to mistaken experience or mis-identification. His argument is rooted in both historical (cultural) and individual (developmental) observations that differentiate between two levels of consciousness. The superconscious, Kühlewind proposes, is the realm

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recognized or stated as a contributing factor to the different perspectives meant that no fruitful meeting or dialogue could take place. (footnote added March 2012)

[24] The term "split" is used here to refer to the separation of perception into primary and secondary qualities, the separation of thinking and perceiving and the development of the subject/object consciousness. "The world is […] a non-dual world that we split – or is split by our "ego" or "me" consciousness – into subject-object, self-other, friend-enemy, humanity-nature and so on" (Kühlewind, 2008, p.11)

[25] Kühlewind's statement that "People live in the same way they cognize […] consciously or unconsciously, they always shape their world according to how they know it. Cognition creates reality in this way and, as far as it is creative cognition, it makes morality possible" (1988, p.152) resounds strongly with both Palmer and Bortoft.

from which all other elements of consciousness arise. The superconscious is the realm of the living activity of the "I" of the human. As the living, dynamic source and seat of consciousness the superconscious is not generally witnessed or included in our account of our experience because of its primacy and the fact that it is the very wellspring of consciousness itself. In trying to illuminate the elusive and difficult task of bringing this aspect of consciousness to experience one encounters such sayings as "you're looking for the ox you're riding on" (Kühlewind, 1988, p. 53). In Zen Buddhism *koans* were used to engage the mind in such a way that that which is not normally experienced was revealed through a type of *metanoia* brought about by the intense contemplation of an illogical story or question. Kühlewind offers something of a *koan* for our modern mind with the phrase "the past *is,* the present *becomes*" (1988), a phrase which seeks to point consciousness toward its source as well as highlighting the challenge of experiencing the superconscious *becoming* of our everyday awareness. The question arises from the above; how then can we say that the superconscious exists if it cannot be experienced directly?

Let us look at how the superconscious may *indirectly* be revealed. Kühlewind (1988, p. 25) points toward such a possibility with the question: "how can a being who neither speaks nor thinks learn words, language and thinking?" This is for linguistic science quite a conundrum to this day. The first words that a child speaks must be learned without words or explanations!

> Children understand their first words directly, without words, intuitively. Or, to put it another way, they understand through such a deep internal imitation of the speaker that they "imitate" not only the words but the meaning of the intended speech. They identify themselves with the source of speaking, which is the "I" of the speaker. They have no other way of understanding anything: no explanations are possible. (Kühlewind, 1988, p. 25)

Through the above exploration, much abbreviated it must be said, Kühlewind goes on to conclude that:

> By observing the child's acquisition of speech and thought, we can see that this process requires the faculties of thinking, feeling and willing in order for the child to develop into a speaking adult. Yet these faculties function quite differently in the child and adult. We might say that they are not yet separated from one another for the child, but form a single faculty […] it might be called a superconscious ability. (1988, p.28)

From this example of early speech acquisition Kühlewind goes on to follow the development of consciousness whereby these initially superconscious faculties and capacities give rise to formations and habits of thinking, feeling and willing which are no longer form-free but very much individualized and often quite fixed or formed (Bortoft's ambiguous image of the

giraffe was designed to illustrate this process). This realm of soul is designated by Kühlewind as the *subconscious*. Everyday consciousness, for the adult at least, is positioned between the two realms of consciousness and – as in the example of cognitive perception given above – everyday experience is generally oriented toward the finished forms of thought and feeling and does not experience that activity by which these contents of experience arise. It is the superconscious from which the everyday contents of consciousness are surveyed and witnessed but as consciousness is conscious of these contents and not of its present awareness, the former has the characteristic of being much more "real". Kühlewind's far-reaching study can be encapsulated in the sentence "Our consciousness is a past consciousness, conscious of its own past" (Kühlewind, 1988, p. 15).

Summary

Having initiated the above discussion through an enquiry into the potential far-reaching implications of epistemological reflection, and having offered three contributions toward an understanding of contemporary ways of knowing, we find the following situation. In the realm of science (as for our everyday cognition), the "objects" of our awareness are experienced as "given", the process of consciousness that "objectifies" them in the first place is not experienced (Bortoft's *cognitive amnesia*), the self or subject lacks true self-experience due to the "disease of consciousness" (Kühlewind) and comes to doubt its own existence,[26] the superconscious capacities out of which self and object arise are no longer experienced and "reality" becomes ever more displaced into an abstract, quality-less realm accessible only to the dis-embodied mind (Brady). This state of affairs is further complicated by the fact that questions of ethics with regards to our knowing activity, and the manifestations of our knowing in our actions, has also been subject to the great separation – left to the discretion of the individual thinker or relegated to a specialist realm of philosophical enquiry. The implications are striking, for the way we experience the world, the way we do science, the

[26] We refer to the Human *being*, and in earlier times Nature itself was perceived to be populated by *beings,* whose works were the phenomena of nature perceived by our senses. As a result of the quantitative way of seeing (Bortoft) nature is no longer understood to be peopled by beings but is the manifestation of forces and physical processes lying beneath their manifestation to our senses. The Human *being* has also largely disappeared from view and is at best an epiphenomenon of genetics and complex biological processes.

way we educate, in short – the way we live – is informed by this epistemology of separation. Kühlewind sums up the above in the statement that;

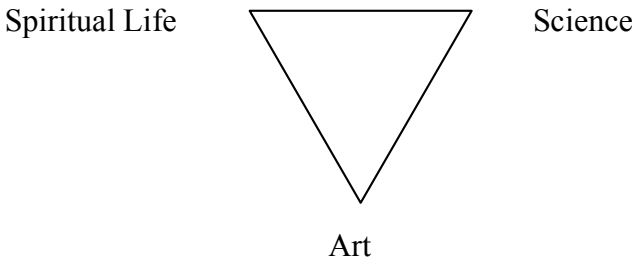
> Science has been established on a level of consciousness where it cannot be adequate to the reality of Nature and the human Being. (1993, p. 5).

In view of the path outlined above we could expand on Kühlewind's statement and ask whether, in more general terms, our way of learning, knowing and living is adequate to the reality of Nature and the Human Being? Has such a way of knowing existed, and been lost or is it the case that such a way of knowing has yet to emerge? How can such a way of knowing, if it can be identified, be cultivated? What would the implications of such a way of knowing be for the various realms in which human consciousness is engaged?

The pursuit of these questions led me to a significant encounter, an encounter with a way of knowing articulated in the form of an image.

Ways of knowing: science, art and the spiritual

Reproduced in Appendix III is an image from the work of Heinrich Khunrath, a physician, hermetic philosopher and alchemist from the 16th century. The image encapsulates within the circular frame those elements deemed necessary by Khunrath and alchemists of the time for progress on the path of knowledge. These are depicted in the three primary sections of the emblem (see Appendix III for the caption for this emblem that appears in Alexander Roob's book on *Alchemy and Mysticism*). In brief we find in this emblem a depiction of the tri-unity of *spiritual practice*, the *study of natural phenomena*, and *art*. To see this visually, in a condensed form, we see in the emblem the following:



I propose that the emblem can be understood as follows (bearing in mind that images such as this are complex and reveal multiple layers of meaning through repeated study).

It was understood by the natural philosopher of the time that our insights come via "grace". We can work, strive, question and pursue knowledge of the world though we must at all times be aware that our knowledge arises by grace. Thus a conscious, contemplative attitude is essential, and is in fact the first step in the alchemical process of enquiry.[27] We find this emphasis in contemporary language in Kühlewind's articulation of the superconscious and its role in the formation of both everyday consciousness and scientific consciousness (both of which function on the same "plane", though differ in intensity). Insight, from this perspective, arises from the superconscious as grace – a received gift. Working in the laboratory, between the pillars of experience and reason, we investigate the mysteries of nature. Referred to as a whole as the Art, the hermetic methodology included the instruments of expression (depicted as musical instruments in *amphitheatrum*), expression both of insights derived from the Work and of the divine harmonies informing Nature's creative unfolding – the Harmony of the Spheres. This then is an epistemological process comprised of three mutually interpenetrating activities each with their own "laws", methods and materials.

In Khunrath's emblem I suggest that a way of knowing is articulated which embodies an integrity that was subsequently fragmented and lost due to changes in human consciousness (see note 7). This change represents a massive chapter in the history of ideas and has been referred to in several passages above. The approach to science articulated by Brady in *Being on Earth* has, in this light, grown out of the fragmentation of the relationships depicted by Khunrath. The disciplines of the artist and the scientist are still largely viewed as being separate and incongruent in method and intent.[28] To draw Khunrath's image as a depiction of the relation of these disciplines in the modern sense, we would need to isolate the three elements into quite separate compartments. Fragmented and compartmentalized, science, the spiritual life (including religion) and the arts have been relegated to different quarters, and it

[27] The alchemical mantra *ora, lege, lege, lege, relege et labora* is often quoted, notably with *ora* preceding either of the other two endeavours.

[28] Goethe is a clear example of a scientist/artist who made significant contribution to both fields of human endeavor but who is largely given credit and respected for either his artistic works or his scientific method, but rarely both.

has been science that has claimed the authoritative voice in questions of truth and certainty[29]. This science, severed as it has been from the earlier recognition of the necessity of engaging the superconscious through contemplative practice and prayer, has become inimical to these realms.

When I first encountered this image and the methodology it articulated, I felt that here was an epistemology and a method that held within it certain key points of reference. It asked of the individual student of Nature and of the Human being three very important questions; 1) what is your study/research? 2) What is your art? 3) Do you cultivate a conscious connection to the spiritual (or superconscious) source of both of these? Through *study*, by which I mean science in its commonly understood sense as well as in the sense of the study of the insights of other researchers, we can develop our thinking and cognitive capacities. I would also emphasize the crucial activity of epistemological self-reflection in this realm, as any act of consciousness is subject to the dynamics that have been explored above through the work of Brady, Bortoft, and Kühlewind. Through the *arts,* we bring to expression both something of our own personal experience and strive to lift this to speak of/to that which is universally human. Through the *spiritual life,* I understand this to mean both a contemplative method with regards to our subject matter as well as a conscious attitude of mind and heart that is cultivated when we apply ourselves in either of the aforementioned ways. As Arthur Zajonc has described so clearly in his article *Love and Knowledge* (2006), a contemplative methodology in the sense meant above includes and seeks to cultivate an ethical stance to both one's science and one's art. It is the contemplative method and practice which places our work on an ethical ground and ensures that it doesn't get caught in the traps of either an objective, impersonal and "value-free" science which becomes antithetical to life,[30] or an artistic practice which merely embellishes the subjective, personal and egoistic life of the individual.

In Heinrich Khunrath's articulation of the hermetic path of knowledge there lay, it struck me, an indication for a way of knowing which may be adequate to understanding Nature and the

[29] It was my meeting with this attitude in the Town Hall meeting (see page 6) that struck me as an affront to other ways of knowing besides the reductive, analytical, quantitative and largely mechanistic stance that underlies much of contemporary scientific enquiry. (comment added March 2012)

[30] "Surely, science has brought enormous advances, but we cannot turn away from the central fact that the modern emphasis on objectification predisposes us to an instrumental and manipulative way of being in the world." (Zajonc, 2008, p. 3)

Human Being. This way of knowing would engage and honor the disciplines of science, art and contemplative practice in their own right – in isolation as it were – while also recognizing the value, importance even, of finding a synthesis of insight arising from that prior engagement. From the perspective of the 16th century alchemist this way of knowing mirrored processes in the laboratory, in living organisms, in the natural world as a whole. They would have used the terms *solve et coagula* where we would now use the words analysis and synthesis.

I am not suggesting, however, by introducing Khunrath's emblem to the question of what may be an epistemology adequate to the reality of the Human being and Nature that some kind of re-invigoration of medieval thought is in order. Nor, however, do I suggest that the alchemical worldview is merely of historical interest. Rather, I have found that the theory of knowledge being made explicit in the *amphitheatrum* emblem offers a rich reference and provides valuable insight for someone seeking, in a very different period of history, for methods of overcoming the fragmentation so prevalent in much of modern thought and life. It is essential to note that from the hermetic point of view the *methods* for realizing the complementary processes of *solve* (analysis – separation) and *coagula* (synthesis) were not the same[31]. Overlooking the importance of this fact in relation to the ways in which we gain knowledge of the world is a significant aspect of the "collective disease" of consciousness diagnosed by Kühlewind and Bortoft.

For Khunrath and his contemporaries the path of knowledge was referred to, as a whole, as the Art. This term encompassed the study of natural phenomena – what we might now refer to as "science" – as well as the place of contemplative practice in the pursuit of knowledge. Significantly, the Art also referred to the development, practice and refinement of not only techniques in the laboratory, but in the inner life of the individual who was on the path of knowledge. The Art was the art of human development inseparable from the acquisition of knowledge and experience. I will also return to this theme in what follows.

[31] The terms *solve* and *coagula* are explored at length in Chapter 4 part B, as is the statement regarding the different methods through which these processes are undertaken.

Implications

Modes of consciousness and implications for education

It is widely recognized that the separation or distinction between science, art and religion (the spiritual life) is a recent event in the history of culture and consciousness. This separation arose along with the development of rational thinking (Lehrs). Rational, discursive thinking then became the dominant capacity applied to questions of knowledge and claimed for itself a greater authority in being able to arrive at the truth regarding self and world than either the activity of the artist or the practice of spiritual contemplation. It is not at all insignificant that this rise of rationalism brought about a concurrent demise of the hermetic Art, although individuals at the time of transition were often engaged with both ways of knowing (Newton for instance[32]). That the rational, analytical way of knowing has become more and more prevalent as a shaper of both individual and society is not a result of an intrinsic superiority to other ways of knowing, but is due more to the pride of place it is given in our social institutions and activities (Bortoft, 1996, p. 31). It is also, as described by Georg Kühlewind, a product of developments in consciousness that have occurred over time, shaping both individual and collective ways of knowing (1998). Bortoft writes that:

> There is now a growing body of evidence to support the view that there are two major modes of human consciousness which are complementary. In our technical-scientific culture we have specialized in the development of only one of these modes*, to which our educational system is geared almost exclusively*. This is the analytical mode of consciousness, which develops in conjunction with our experience of perceiving and manipulating solid bodies. (1996, p. 61)

Bortoft also gives this mode of consciousness the name "the verbal-intellectual mode", characterised as it is with the development of the intellect and a concurrent focus on reading, writing and the spoken word.

There is, however, a growing concern amongst some scientists, teachers, parents and policy makers about the above-mentioned pride of place given to the analytical mode of consciousness in a wide range of social endeavours. Speaking from an acute awareness of the current issues faced by business, leadership and social innovators globally, Sir Ken Robinson,

[32] "It used to be an embarrassment that this person (Newton), who above all others set the seal on the future development of science in the West, in fact spent more of his time on occult researches and alchemy than he ever did on experimental and mathematical physics." (Bortoft, 1996, p. 30)

author of *All Our Futures: Creativity, Culture and Education* (The Robinson Report, 1999) perceives a root of this crisis in the realm of education. He perceives the crisis as arising from a one-sided attention on the cultivation of the intellect; of analytical modes of thinking and from the influence these have not only on the content, but also on the very methods of educationalists and the institutions in which they work. In his hugely popular and widely viewed TED talks, Robinson makes the following statement regarding education:

> We have what is essentially an industrial model of education, a manufacturing model, which is based on linearity, and conformity, and batching people… This falls in with a general tendency to focus on critical thinking and outcomes-based learning and to impose standardized testing at an increasingly young age. The computational theory of mind finds no room for the intelligences of the imagination, community, and spirituality. (Robinson, 2006)

Now, I am not proposing an outright critique of the verbal-intellectual mind and method – either in science, education or in other arenas of social activity. This way of knowing and the methods that derive from its development have inarguably contributed to aspects of our knowledge and understanding. What I wish to emphasize is that a critical review of this mode of consciousness – as critiqued by Robinson in the context of education, by Bortoft in the context of science and by Kühlewind in the context of general psychological health and well being – is presented in order to highlight the imbalances that arise if this mode of consciousness does not also find its complement. That such a complementary mode exists in the domain of science, for instance, is explored in some detail in *The Wholeness of Nature*. In this very accessible study, Bortoft presents clear descriptions and arguments for a deeper understanding and engagement with the method of "exact sensorial imagination" that informed so much of J. W. Goethe's research. In the realm of education, as a consequence of the issues such as those articulated by Robinson in his talks and publications, new educational initiatives and research groups are taking on the challenge to rethink overall approaches to teaching and learning. For several of these, it is also the *imagination* that is gaining focus and attention.

Ways of knowing: towards imagination

An example of such an initiative is the Imaginative Education Research Group, based in British Columbia, which has held several annual conferences with an international group of contributors and a focus on the role of the imagination in education. Groups such as the IERG

take references to "*imagination as a form of intelligence"* (Robinson, 2006) very seriously. For the contributors to this research group, "engaging students' imaginations in learning, and teachers' imaginations in teaching, seems to us crucial to making knowledge in the curriculum vivid and meaningful to students" (IERG, 2009). Numerous papers given at IERG conferences on the theme of imagination and education are available on their website. The significance of initiatives such as the IERG and the work of Sir Ken Robinson for this present discussion is that by focusing their attention on the role of the *imagination* in education, a direct engagement with a mode of consciousness complementary to the verbal-intellectual mode is cultivated. It is a mode that can allow meaningful synthesis to emerge out of the products of the analytical mind. This new synthesis or perception of meaning is different from that which the verbal-intellectual is able to produce because it arises from a fundamentally different mode of consciousness. It is, as Goethe demonstrated in his work, suited to gaining insight into the realms of *life* and *dynamic relatedness* where the intellect has excelled in revealing the laws of the inorganic. Due to these potentials of this complementary mode of consciousness, Bortoft refers to it as the "holistic mode" and he describes it as follows:

> This mode is nonlinear, simultaneous, intuitive instead of verbal-intellectual, and concerned more with relationships than with the discrete elements that are related. It is important to realize that this mode of consciousness is a way of seeing, and as such it can only be experienced in its own terms. In particular, it cannot be understood by the verbal-intellectual mind because this functions in the analytical mode of consciousness, for which it is not possible to appreciate adequately what it means to say that a relationship can be experienced as something real in itself. In the analytical mode of consciousness it is the elements which are related that stand out in experience, compared with which the relationship is but a shadowy abstraction. The experience of relationship as such is only possible through a transformation from a piecemeal way of thought to a simultaneous perception of the whole. Such a transformation amounts to a restructuring of consciousness itself. (1996, p. 63)

Whereas, as previously stated, the separation or distinction between science, art and religion (the spiritual life) arose along with the development of rational thinking, in the cultivation and education of the imagination there presents the potential for a way of knowing whose core mode is synthesis and not analysis[33]. Whereas the verbal-intellectual mind is suited to perceiving and manipulating solid bodies, the holistic mind, through the cultivation of the imagination, can begin to engage the meaningful relationships intrinsic to the realms of life.

[33] This proposal is followed up in Chapter 4 part C and in the Discussion.

The art of knowing

I have given the title "the Art of Knowing" to this section precisely for the reason of wishing to support the view that knowledge or knowing cannot, without serious implications, be a purely intellectual or analytical activity. When the medieval alchemist referred to their science/art/contemplative work under the one term The Art, they were alluding to this fact. The imagination was central to the hermetic way of knowing, and the tendency to depict both method and findings in often complex and ambiguous images attests to the imaginative nature of the way of knowing cultivated in their work. In time, through the development of rational, analytical thinking and the separation of science, art and the spiritual life the term "Art" no longer applied to a way of knowing which encompassed all three disciplines. Imagination gradually became associated with "fantastical" or "made-up" and personal interpretations of the external world, or was seen as being a product of the strictly subjective consciousness. Because of these connotations, the imagination was not seen as being suited to obtaining true and factual knowledge. That this strict evaluation of the imagination is changing is attested to by recent dialogues opening up between disciplines seen as distinct from the early years of the Scientific Revolution.[34]

Once attention turns to investigate the potential for the imagination as a way of knowing, it can be seen to offer a complement to many of the challenges facing consciousness outlined in the first section of this thesis. Imaginative cognition can bring into meaningful relation the insights gained from the disciplines of science, art and the contemplative life. This synthetic potential is exemplified by the Romantic poets – Goethe, Novalis, and Coleridge are but a few examples – who saw a "spontaneous, sober observation of the world" (Allison, 2003, p. 14) as essential to their work. These poets were often very deeply engaged in the study of natural phenomena – Novalis in mineralogy, Goethe in botany and color phenomena. This deep investment in the sense life and in phenomena as revealed to the un-mediated senses is a very opposite gesture to the demotion of direct experience articulated by Brady in his encounter

[34] A conference held in Herefordshire in the UK in 2010 titled *Ways of Knowing: Art and Sciences Shared Imagination. Perspectives from the Sciences, Humanities and Creative Arts* attests to this emerging dialogue in the halls of higher education and research.

with the science of his time. The development of imaginative cognition requires a heightening of perceptive capacity, "plunging into perception" (Bortoft, 1996, p. 64).

Along with the heightening of perception through an investment of attention in our sense life, the development of imagination in the sense proposed above also re-orients awareness toward the superconscious pole of consciousness (Kühlewind, 1988). This for Kühlewind is the basis for the pathway from *normal* consciousness (which he also classes as subject to the collective disease of consciousness – cognitive amnesia) to a *healthy* consciousness. It places the awareness back in touch with the living, dynamic source and seat of consciousness and loosens the rigidity of the subject-object separation, which arises due to the gradual orientation to and identification of consciousness with the products of its activity.

For educators, engaging the intelligence of the imagination with equal consideration to the cultivation of verbal-intellectual intelligence ensures that teachers and learners become skilled in both analytical and holistic ways of knowing. Knowing, in this sense, becomes an Art that honors both the rigor and accuracy demanded by science in the modern sense of this term, while preserving the integrity of individual aesthetic expression championed by the arts. A way of knowing that embraces both the analytical prowess of the intellectual mind with a concurrent cultivation of the dynamic vitality of the imaginative intelligence ensures that our way of knowing stays in touch with the realms of life, and in so doing informs a way of living adequate to Nature and the Human Being.

Significance for research into Biodynamics

The findings and insights articulated in the The Art of Knowing (above) arise from my pursuit of the question 'what can I discover from a study of epistemology that could contribute to an articulation of the *way of knowing* that informs our contemporary methods of investigating and interacting with the natural world?'. These findings include the following:

- The distinction between two modes of consciousness – the verbal-intellectual and the holistic (Bortoft)
- The need to be conscious of which *way(s) of knowing* are being brought to bear on the enquiry into a phenomenon – "what is seen depends on the way it is seen" (Bortoft)

- The potential for knowing to be informed by the intertwined disciplines of artistic activity, contemplative practice and scientific enquiry, as evidenced in the work of J.W. Goethe, Heinrich Khunrath and the alchemical method.
- The need to consider the *superconscious* in the act of cognition and to create situations in which knowledge or insight can arise from this superconscious realm. (Kühlewind)
- The importance of recognizing the imagination to be a way of knowing and that the development of imaginative cognition "amounts to a restructuring of consciousness itself". (Bortoft, 1996, p. 63)

The examples of the Enviropig and the Oak Bark Prep as illustrated in the Introduction (page 7-8) can be looked at once again in light of the above findings. It begins to emerge that these two 'solutions' arise from different ways of knowing, and that the analytical mode of consciousness stands behind the creation of the Enviropig. I will briefly return to this example of scientific innovation in order to pursue this proposal further. I will then look at what a 'restructuring of consciousness' might entail and whether the Oak Bark preparation is in fact a creation of this 'transformed' consciousness.

'New Solutions' Revisited

First, a brief look once again at the Enviropig and the thinking or way of knowing that has contributed to its creation.

Biologist Craig Holdrege, in his article *The Gene: A Needed Revolution* articulates from a number of references the dominant role that the verbal-intellectual (and analytical) mode of consciousness has played in informing much of the early thinking about genetics that has given rise to the genetic modification of organisms. The reduction of complex biological organisms to the functional units of clearly identifiable, and thus transferable, 'genes' arises from "a mechanistic model of the gene and of gene action that inaugurated the age of molecular biology" (Holdrege, p. 14) This perspective is not limited to biologists or specialists in genetics but is widespread:

> Most people today are familiar with the term "gene" and have learned in school and through the media that genes determine the characteristics of organisms. There are genes for hair and eye colour, genes that direct the formation of our body's substances, and many genes that are somehow defective and cause disabilities and illnesses – genes for diabetes, cancer, schizophrenia, and more. No one talks about human, animal or plant

physiology today without ascribing a central role to genes. (Holdrege, 2005. p. 14)

Holdrege refers to the gene described above as the 'deterministic gene' (p.15) and states that the way of seeing this 'gene' as a key to "deciphering the mechanism of life…lives in the minds of many students, lay people and – at least as a desire – in the minds of many biologists" (p.15). This is the same type of consciousness encountered – and critiqued – by Brady in *Being on Earth*. The reductive tendencies of the verbal-intellectual mind, which reduce (in the above example) life to 'mechanisms' governed by distinct and identifiable 'genes' lies as the main focus of the many criticisms that have been brought to bear in considerations of the appropriateness (or otherwise) of the genetic modification of organisms. This applies to the Enviropig. From this perspective, it is but a further reduction that undertook the initial abstraction of the pig from its natural environment[35]. The Enviropig, in light of the above, arises from the analytical, reductive and mechanistic modes of thinking characteristic of the verbal-intellectual mode of consciousness. It is an illustration of the tendency for this mode of consciousness to give primacy to 'parts' and to view organisms as complex mechanisms with a degree of inter-changeability of those parts. A new 'synthesis' is possible, from this perspective, by the re-arrangement or re-combination of parts (such as 'genes') in order to create a new whole with more 'desirable' traits.

But what of the Oak Bark Prep. Clearly there is a type of abstraction or separation evident in this example as well. The skull was once part of a living being, the oak bark is separated off from the tree on which it has grown, the two are placed in the ground in the contact of flowing water. Parts brought together for certain, but it is difficult to find the causal, mechanistic line of thought that may have been informing this new 'creation'. Is this a result of the same way of knowing, and way of seeing, that lies behind the creation of the Enviropig?

Steiner's reference to "a hidden alchemy in the organic process" (Steiner, 1993, p.102) and Klocek's workshops wherein alchemical thinking was made explicit were two influences that

[35] I am not going to undertake an exhaustive critique of the Enviropig as this has been undertaken by others. Suffice it to say that on closer examination, the initial problem of overly phosphate rich effluent from pigs and the potential pollution hazard that ensues has more to do with the ways in which the pigs are raised - (so called intensive or factory farming), the type of feed they are given (grains high in phosphate which would not normally be consumed by pigs and certainly not in the quantity given in feedlots) and the fact that they are removed from ecological relationships in which their faeces would be naturally processed and incorporated by other organisms, plants etc - than to do with the pigs themselves. For more on this perspective of the issues raised by the modification of what is now the Enviropig see http://howtoeliminatepain.com/ibs/enviropigs .

led me to think that a fruitful direction for further research into the way of knowing that informed the creation of the Oak Bark preparation lay in an investigation of the alchemical world-view. Steiner indicated in the passage above that a way of seeing/knowing informed his suggestions for agricultural innovation, a way of seeing that modern science, with its emphasis on the verbal-intellectual mode of consciousness, has tended to see as having merely historical interest. With the contributions of Heinrich Khunrath added to the references above I had in hand the *theoretical perspective* that it was the holistic mode of consciousness as evidenced in the alchemical world-view (see pages 33-34 above) that could shed light on the principles informing the creation of the Oak Bark prep.

What I wanted, however, was a practical means of pursuing this theoretical stance further and of grounding the perspectives presented in The Art of Knowing in first-hand experience. This I undertook through two paths. On the one hand I made several of the Biodynamic preparations[36] (as described in the Prelude) with a deeper consideration of the various elements involved (source of materials, place of production, timing of production) and kept notes of my thoughts, activities and reflections in a journal. Parallel to this process I decided to investigate further the alchemical world-view through the practical preparation of a spagyric herbal remedy. My hunch was that a hands-on study of alchemical processes would contribute to a grounding of my theoretical stance and contribute to my search for methods for understanding Biodynamics in both its application and in the realm of education. As stated above, I wanted to know if Spagyrics could contribute to building the bridge between 'knowing' and 'doing'.

The section that follows is undertaken with reference to the question (page 16);

What is the contribution of alchemical thinking to Steiner's proposals for re-enlivening the agricultural domain?

[36] Specifically 501 (horn silica), 500 (horn manure), CPP (Cow Pat Pit) and the yarrow prep (502). I also assisted with the Oak Bark Prep (505)

B) Spagyrics

The vast field of spagyrics presents itself…like a mosaic that is only slowly completed by the collaboration of the reader.

Manfred Junius (2007,ix)

That alchemy has long had an association with agriculture, and was hence a potentially fruitful avenue for my research, is alluded to in a statement by Manfred Junius, author of a significant book on Spagyrics and plant alchemy: " the old masters recommend that we always follow Nature and let her do the work of her own, *like a farmer.* The closeness of alchemy to agriculture has often been emphasized, and there were alchemists who assumed the nickname 'Agricola'" (Junius, p. 18).

On the basis of the above, I renewed my practical research into this method of producing medicinal plant essences in the spring of 2010. These studies reached a particularly productive phase in August 2011 and throughout they have comprised (and continue to consist) of the following activities:

- Study of key texts, which articulate the theory, and practical laboratory procedures, which are engaged in order to produce a spagyric remedy. Central to these has been *Spagyrics: The Alchemical Preparation of Medicinal Essences, Tinctures and Elixirs* by Manfred Junius.
- Practical work with the spagyric processes in my own workshop. I will describe these processes below with a particular emphasis on the insights and results arising from the processes of obtaining the salts from a medicinal plant.
- The articulation of the spagyric process in my teaching and facilitation of workshops in biodynamics for a variety of learners in order to gauge the contribution that spagyrics makes toward a deepening of an understanding of the biodynamic preparations. This aspect of my research will be touched on in greater depth in Part C of this Chapter, Teaching Biodynamics.

My research into Spagyrics was informed by a heuristic research approach (as described on page 19). This is to say that I did not have a specific question or hypothesis I was pursuing, but rather was following the theoretical threads referenced above, and wanted to immerse

myself in the process in order to allow any insights or understandings to emerge out of that immersion. Furthermore, I place this aspect of my research in the context of a heuristic methodology as I undertook my research in spagyrics not only to verse myself in or study the practical procedures and work with plants, but to study the way in which my inner life of thoughts, feelings, reactions etc. was engaged, affected and influenced by undertaking the more 'outer' processes in the lab[37]. I was drawn to study spagyrics because it seemed to be a process that offered a bridge between the study of matter and mind – between 'knowing' and 'doing' (Hugo). This, at least, was the hunch that launched my work in this realm.

I will begin with a description of the spagyric process as a whole from a practical point of view. This makes explicit the practical and technical aspects of the process. I will follow this with a more detailed description of my first hand experience of the various different stages of the work with a particular emphasis on the last stage, obtaining the salts from an herb.

I will then describe two significant themes arising from this work that have direct relevance to my research question regarding the Biodynamic preparations.

Practical Procedures[38]: A brief synopsis

Manfred Junius gives the following succinct introduction to the spagyric process in the following passage:

> In the word *spagyrics* two Greek words are hidden: *spao,* to draw out, to divide; and *ageiro*, to gather, to bind, to join. These two concepts form the foundation of every genuine alchemical work, hence the often quoted phrase "*solve et coagula, et habebis magisterium!"* (Dissolve and bind and you have the magistery). The alchemical work always takes place in three stages: (1) separation, (2) purification, (3) cohobation (recombination, or the "chymical wedding"). (Junius, 2007, p. 1)

The language of spagyrics, as it is closely linked to alchemy, has for some ears an archaic ring to it and could be dismissed as of historic interest only. Junius is clear however, that "we must not consider spagyrics and alchemy as a whole merely a preliminary stage of the later

[37] "Heuristic research seeks immediacy and meaning for the individual". (Altman)

[38] all of the procedures listed below are described in detail by Manfred Junius in chapter 5 of his book *Spagyrics*, titled 'The extraction of the three Philosophical Principles from Plants'.

scientific chemistry. It is rather another way of looking at nature and its powers."[39] (2007, p. 3). I will not here embark on a discussion of how alchemical thinking relates to modern scientific conceptions of matter and substance, as Manfred Junius has more than done this justice in the first chapter of his book. My emphasis will be on what I have gleaned from engaging with the process with an open mind and curiosity. I will briefly note, however, that the practice of spagyrics is, in fact, very current and there are several fully licensed spagyric pharmacies producing and marketing their products worldwide[40].

Making Spagyric Plant Essences: Solve – separation and purification

I have written in bold text descriptions of the more technical steps of the process. These are followed by brief descriptions of my experiences that arose through immersing myself in the process[41].

A plant is chosen for its medicinal properties.

I chose several plants to work with, all from the mint family due to their high concentration of essential oils. I worked with mint (*Mentha spicata)*, sage (*Salvia officionalis)* and lavender (*Lavandula augustifolia)*. The plants were harvested in bulk from different locations, chosen for their vigour and optimum harvest time. This was determined by their state of flowering or growth as the plants maximize their essential oil production at different times of year and in different plant organs (flowers in the case of lavender, leaves in the case of mint and sage).

The parts of the plant containing the greatest concentration of essential oils are separated from the main plant body and put into a distillation vessel to obtain the essential oils through steam distillation.

[39] this is another instance of what Bortoft has described in terms of different *ways of seeing* which gives rise to different *organizing ideas* and thus differently organized perceptions/conceptions of *what is seen*

[40] see for instance SOLUNA laboratories and Phylak laboratories.

[41] There is an old saying that informed my process throughout this work; "the making of the medicine is the medicine" (source unknown). I understand this to mean that even when purely technical aspects are described there is an inner parallel process unfolding. Distilling essential oil is also, in this context, a 'distillation' inwardly – of meaning, of more essential methods, of questions etc. I will return to this in what follows.

Plant matter not processed through distillation was put to one side.

I adapted a large pressure cooker with a pipe fitting to distil in bulk, used a glass reduction adaptor to link the pressure cooker to the glass still head and condenser. A separating funnel positioned below the condenser allowed for a very precise collection of essential oils and separation of the floral waters (images in Appendix IV). In the subsequent distillations I obtained 15ml of mint oil, 20 ml of sage oil and 50 ml of lavender oil.

These were each labelled and stored in brown glass bottles.

The plant matter is placed in a fermentation vessel to undergo alcoholic fermentation.

All of the plant matter – that from which the essential oils was removed as well as stems, stalks, even roots set aside before distillation – was placed in a fermentation vessel. Water was added to the vessel as well as grape sugar[42] and wine yeast. The vessel was fitted with a lid or cork with an air lock. The vessel was kept in a room with a steady temperature of around 20-25 degrees Celsius. At this temperature the fermentation proceeded at a constant rate. Once the fermentation was complete (noted through a cessation in the production of gas and the sinking of the plant matter to the bottom of the vessel) I separated the liquids from the solid matter through a fine filter. The plant matter was set aside to dry. The plant 'wine' was then ready for distillation.

The 'wine' is subjected to repeated distillation in order to separate the alcohol (ethanol) from the dregs – mostly water.

I struggled with this process for some time. The indications to distil at 78ºC caused a lot of frustration as it would either proceed incredibly slowly or I would get overly concerned with watching the thermometer, and panicking a little every time the temperature went up into the 80's. In the end however, I realized that it is the *repeated* distillation that is crucial and that by

[42] Junius states that the addition of grape sugar "is permitted since Mercury is the same in the whole plant world". (Junius, 69) I will return to this designation of alcohol as 'Mercury' in subsequent sections. In brief, Mercury refers not to the grape sugar but to the alcohol obtained from the conversion of the grape sugar.

working initially with higher temperatures the gradual purification – *rectification* – of the wine could be achieved. After 5 repeated distillations the temperature never went much higher then 78ºC. The distilled wine was set aside.

The remaining plant matter - all that has been obtained from harvest – is incinerated to an ash and the ash *calcined.*

This process presented some challenges to me. It was difficult to get a good combustion of the plant matter and obtain the ash. Eventually I discovered that the wood-fired bread oven that my family and I built in our garden was the perfect incinerating oven. I fired the oven in such a way as to ensure that the fire – positioned at the back of the oven – produced abundant flame that licked out over the oven bed and then emerged out the oven door. Plants were incinerated separately (i.e. all the lavender incinerated and the ash collected prior to the incineration of the sage, or mint). Plant matter was placed on large baking tray and, when placed in the oven, produced copious amounts of grey smoke before bursting into flame (see Appendix V for images of this process). Plant matter was added until all of the leaves, stalks, stems etc. from each of the three plants was turned to ash. The ash was then left in the hot oven for several hours. It was a very dramatic process, and took several hours of tending the fire to ensure a complete combustion of the herbs. The reduction of plant matter to ash was also remarkable, as several large bagfuls of herb would reduce to a cupful of ash.

The ash is placed in a flask, covered in distilled water and gently heated to facilitate the dissolution of the water-soluble salts in the water. The solution is filtered and the filtrate containing the water-soluble salts obtained.

This process was largely straightforward, though there was much learned from doing it. The desired result of the process is "a white, strongly hygroscopic salt" (Junius, 91). When I took the salt solution off of the ash using a soxhlet extractor, the resulting liquid was an amber, tea-coloured solution. The salts that were left after evaporation of the water were also orange-brown in colour. This, according to Junius, is not pure enough and needed subsequent calcinations and purifying. These salts went back into the crucible, back into the oven and the

process of calcination, dissolution, filtering and evaporation repeated. This took some patience and commitment to repeating such a time intensive process, and asked for a greater amount of diligence in the next round to ensure a thorough calcination.

With the sage and lavender I made sure that the initial incineration and calcination were more thorough, undertaken in intense heat and sustained exposure to that heat in the bread oven. The salts of these plants, once obtained in the same method as described above, were white.

The above description constitutes the stage of **solve** *or separation from a technical/practical point of view. It can be encapsulated in an illustration to make clear that – though described above as a step-wise sequence of laboratory procedures – the process should be viewed in its entirety. This can be described as a separation from a primal unity (the plant as we encounter it in nature) into three 'essential' principles, the subsequent purification of these principles before their re-combination or* cohobation *in the process of* coagula*. Thus far only the* solve *has been described.*

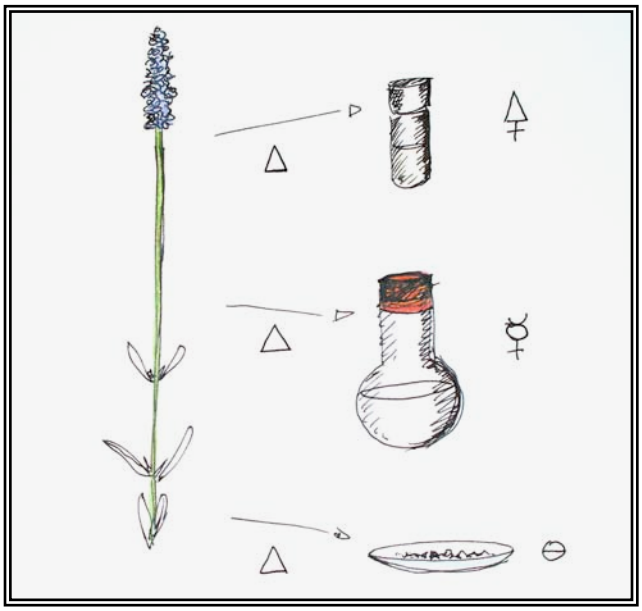


Fig.1: The Spagyric solve *process – separating out.*

Notably, the three substances that are obtained from the initial plant 'unity' have strikingly different characteristics. One can be amazed that such different substances derive from the same original plant 'body'.

The essential oil has a very distinctive scent, completely unique to each plant species, and even more so, to each group of plants[43]. This distinctive aroma encapsulated in the essential oil, or volatile oil, is immediately recognisable. The oil itself is flammable, will not mix with water (which allows for its separation from the plant body through steam distillation and simple separation methods) and dissipates readily in normal temperatures and conditions. Essential oils can be a variety of colours – from the deep blue of chamomile oil to the red of cedarwood oil, the golden yellow of several citrus oils to the clear and colourless oils of pine, rosemary, mint, etc.

The salt manifests polar opposite properties to those of the essential oils. It is obtained through the fact that it will dissolve in water, but will reappear out of solution once the water is evaporated off. The salts crystallize out into very distinctive, often geometric, forms. They are odourless, will not burn, melt only under very high heat (in the region of 900º C) and are strongly alkaline. The salts are, ideally, white or clear and highly hydroscopic once obtained.

Between these two quite polarized substances arises the alcohol. Whereas the essential oils are unique to every plant species, the alcohol is the same – ethanol – regardless from which plant it is obtained. This characteristic gains it the designation 'anonymous' from the spagyric perspective, in distinction to the 'specific' nature of the essential oils. Junius writes, "ethyl alcohol is an easily combustible, clear, colourless liquid, simultaneously fire, water and air" (2007, p. 55). The alcohol, positioned between the oily volatility of the essential oil pole, and the earthy, dissoluble nature of the salt pole, is the picture of the mediator. Where the oil won't mix with water, and the salt won't 'burn' or become 'volatile', they will both dissolve in the 'firewater' - alcohol – and 're-unite' as an essence or spagyric tincture – 3 in 1.

Considerations

The immersion in the process of making a spagyric herbal remedy came to a place of poignancy in the stage of obtaining the salts from the plant. The third stage in a heuristic research process has been described as "incubation…like tending to or sitting on an egg waiting for it to hatch" (Altman)

[43] In my experience of distilling oils the same lavender border has yielded different oil qualities depending on the climatic conditions of a given year, the time of harvesting/distilling etc.

Two aspects of my research into the making of a spagyric remedy emerged as being particularly significant. The first regards the nature of 'heat' and the other the terminology used to name the three substances which are the products of the 'solve'. Both of these aspects took on new meaning through my immersion in the spagyric process and came to have direct relevance to my central question regarding the Biodynamic preparations and 'right synthesis'.

Qualities of heat

I have included in the diagram above (page 50) – between the plant and each of the three substances obtained through the process of 'solve' – the small symbol Δ.

On the one hand, this symbol represents 'fire' or 'heat', as it is through the application of heat in various forms that the processes of separation and purification take place (for instance distillation, fermentation, calcinations etc.). It is through my work with the spagyric process, however, that this seemingly obvious catalyst for all of the laboratory processes described above gained a new significance, which in turn 'opened' up my understanding of various other aspects of the work.

Δ

Having obtained the essential oil of mint, and completed the purification of the alcohol, I was presented with the task of obtaining the salts.

I gathered the mint leaves that had been through the fermentation process and gave these an initial drying in the sun in the garden.

I then lit the bread oven. I created a fire of seasoned oak-wood and, once the fire was burning intensely, pushed the coals and still-burning logs to the back of the oven.

There is no chimney on the oven – or rather the chimney has been blocked off – so the combustion process proceeds through a draw of air in through the open doorway of the oven at floor level and the flames lick up and over the inside of the oven in a slow mesmerising dance (images in Appendix V). Just before putting a tray of herbs in the entrance to the oven, I would add a good handful of smaller oak branches to the fire in order to ensure that the flames produced came fully over the oven bed and out the front of the oven.

I then inserted the tray into this inferno and waited, standing back to observe. The herbs began to smoke and crackle before bursting into flame and burning with an intense heat. The tray ensured that only the herb-ash would be obtained and that the process was separated from the primary combustion in the back of the bread oven.

This process continued until the entire herb was burned.

Working with this intensity of heat was exhilarating and not without its risks. A singed eyebrow and the odd minor finger burn were part and parcel of the incineration process. Working with fire in this manner really gave me the strong impression of working with a force of nature requiring careful handling, almost as if it were an animal or being of some sort. Fire demands respect. 'Handling' fire means understanding its idiosyncrasies – it needs 'feeding' on the one hand, and 'tending' on the other. We must accommodate to fire's ways, understand how it will behave in a set of given conditions, and provide the right conditions if we are seeking to harness fires creative – and destructive – potentials.

After the initial burn a grey ash was left covering the bottom of the tray.

This I left in the oven for several hours, initially exposed to the heat of the fire and coals that lasted for an hour or so, and then in the residual heat in the oven.

The ash was then taken and cooled, placed in a glass beaker and I poured distilled water over the ash to fill two-thirds of the beaker.

After twenty-four hours this solution of ash and water was poured through a paper coffee filter and the clear salt solution obtained.

The trick then was to evaporate the water off. In this process my thoughts ran along a pretty pragmatic route – efficiency and speed would be the thing.

I put the solution in an evaporating flask and put the flask on top of a wood-burning stove.

Evaporation was rapid.

A crust of salt would form on the surface of the solution and create a skin over the top of the remaining solution slowing down the evaporation. Though I knew in my mind that I was

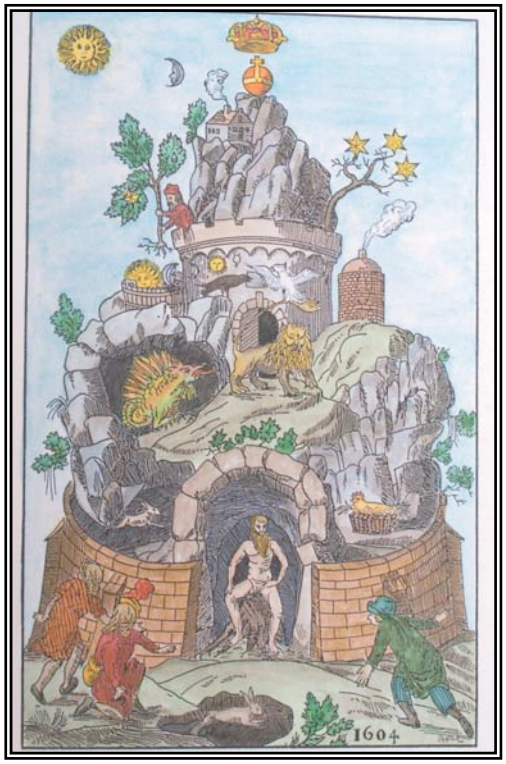
aiming for a ‘crystallisation’ I became quite fixated on obtaining a dry matter in the dish. The salts were so hygroscopic that if they were not exposed to heat there was always a wet solution in the dish. I grew impatient and on the next firing of the bread oven, put the evaporating dish in the entrance to the oven once the firing had settled down. In this way I was able to get a dry salt – but it was a crust, not crystallized out but baked onto the evaporating dish.

For days I struggled with the process of evaporation – seeking for the formation of good, distinct crystals out of the salt solution. I oscillated between heat sources that were too gentle, too intense or too intermittent.

As in many cases, the solution (!) to such problems is not complex but what needs to be overcome is the way in which the problem is being approached. In retrospect, it is easy for me to see that what I needed was a shift – a shift in how I was approaching the task, of how I was trying to ‘problem solve’. What followed (I realized, in retrospect) was a shift from one mode of consciousness (analytical) to a more holistic mode, through ‘pondering’ rather than ‘forcing’. This shift was facilitated by a trip away for a few days, and some distance from the process.

As I was returning from this trip abroad, standing in the customs cue in Gatwick airport I had the following experience. Having ample time to get either frustrated or impatient (three hundred people were being served by a handful of immigration officers). I chose instead to reflect on the process I had been working with. I had recently described the process to a colleague and that I was looking for a certain type of heat – not temperature but more of a quality and specific *condition* of heat…

Standing in the cue I was running the process through my mind as a series of inner pictures, when the image of the tray of herbs lying in the bread oven came to mind…herbs engulfed in flames from the intense heat...a plume of flames from the burning oak logs at the back of the oven licking out the door of the oven…



Into my mind the image on the right arose and instantaneously the insight as to the meaning of two particular figures in the image, the exactness of the figures in terms of *qualitative* meaning as well as insight into the process required to obtain the crystallization I was seeking.

To be specific, what came to mind was the image of the dragon on the left side of the emblem and the hen sitting in a basket on a clutch of eggs, lower down and to the right.

I first came across the image several years ago in a book titled *The Seer's Handbook* by Dennis Klocek and though I had not studied this image for some time, it arose in my mind while standing in the cue in Gatwick and the following insight accompanied the arising of the image.

Dragon and hen were here depicting two different qualities of heat. By qualities I mean not just temperature, degrees Centigrade or Fahrenheit, but the *conditions of heat*. Furthermore these spoke not only of 'external' qualities of heat but they crossed the boundaries of the 'outer' phenomena – measurable in degrees – to the 'inner' nature of heat that I had encountered in the process of obtaining the salts. I have above referred to these as 'exhilaration', 'impatience', and 'enthusiasm'.

The dragon instantly spoke to me of the intensity of the combustion process, the smell of singed hair and choking carbon-rich smoke, of the ferocity of the flames as they consumed the dried herbs, of the sweat and determination it took to tend the fire with poker and glove. Dragon heat – I realized – is indiscriminate, used to 'incinerate' and leave nothing in its wake. It is a fierce heat and requires determination inwardly to work to these temperatures. It is only barely contained and unfolds in a tricky balance between encouraging it to be its hottest and most destructive (not unlike 'goading' the dragon out of its cave) and nonetheless contained in order to consume only what is offered up to it.

Hen heat, on the other hand, is the picture of a constant, unchanging heat, 'brooding' warmth that knows that the process can't be rushed. The hen is the picture of patience, self-sacrifice even – an exact image and foil to my own impatience in wanting to rush the crystallisation process, a process that – after all – requires in nature the conditions of constancy and extended time. The image was not just – in the moment of its arising – a picture depicting an external process but was at one and the same time an admonition for me to be 'hen-like' in allowing the crystallisation to take its course. I realized that I had not yet found the means to adequately produce this type of heat and this in itself was an intensification of my realization of the significance given to *qualities* of heat in the alchemical texts. Heat expanded as a concept to include elements of time, intensity, exposure, duration (direct flames, residual heat from heated stone, gas flame, electric element…) and came to include and embrace the inner nature of my own 'heat' (impatience, intensity, concentration) *as well as* the outer nature of heat (constant, enveloping, radiant) in a unified experience.

At the same time as realizing a greater depth to the phenomena of 'heat' in the processes I had been undertaking in the lab, the sense – or understanding – also shifted profoundly for me of the beings themselves, in their embodied reality. Dragons are hard to come by, but hens – on the other hand – are seen daily outside my window. Hen as a 'bird' became for me an embodiment of a particular relationship to heat, to warmth – it was first and foremost a warmth-being, and its intrinsic warmth-nature became more significant then the feather and squawk creature present to my senses. The hen – positioned between the reptile and the early mammal in evolutionary terms – is a creature that has not yet internalised the warmth process completely, at least not in its reproductive cycle. The hen, having an externalised reproduction cycle in the stage of the egg, needs to 'brood' and incubate the egg with its own bodily warmth. Without the warmth of the mother, the insulation of the feathers and down and the bodily 'cavity' of the nest, the young will not mature and hatch. My perception/conception of the familiar physical phenomena of a hen changed and has remained altered since my encounter with the alchemical nature of 'heat'.

A similar shift in understanding arose for me regarding the nature of 'salt'. Prior to my experience with the spagyric process I am aware that I had a very static conception of the

substance ‘salt’. It was, I could say, a very concrete, material conception of a physical substance that – if not mechanically broken down and presented in the saltshaker for culinary use –was a building block, itself made of building blocks (Na, K, C etc.) Through the struggle to obtain the salts as described above, my conception of salt shifted and whereas before it was ‘stuff’ it subsequently has become more of an activity, a *dynamic.* Salt – in my mind – is a concept that encapsulates the *coming into being,* or *becoming* of the salt crystal – it includes the burning, dissolving, evaporating, crystallizing… salt is not just the ‘stuff’ it is more-than-manifest which includes and encompasses its time in solution, the evaporation and slow accretion of form in stillness. Salt becomes ‘stuff’, an abstract ‘that’ only when we undertake a ‘solve’ conceptually – when we separate out its becoming and only cognize its manifestation[44].

Through the coalescence of experience (practical lab work), theory, living with a problem and the encounter with the imaginal in the form of the alchemical image, I realized that the alchemist was not just using ambiguous images where words and numbers would suffice but that they rather used images from the natural world in an exact manner, derived from a ‘seeing the phenomena in depth’ (Bortoft, 1996).

I was left with, and am still left with, a *dynamic* sense of heat, salt, the alchemical image, the ‘essence’ of the process and *myself* as collaborator in that process. This experience was one of touching the transformational potential of working with the different elements of the spagyric process – the substances, the practical procedures, the contemplative activity, the alchemical image...’the making of the medicine is the medicine’.

All of the above description belies the pains it takes to describe in words that which – standing in the cue in Gatwick – was a split second insight, revealing a correspondence of inner experience, image and un-resolved questioning. Bortoft describes this (page 37 above) in terms of the holistic mode of consciousness; “This mode is nonlinear, simultaneous, intuitive instead of verbal-intellectual, and concerned more with relationships than with the discrete elements that are related”. In the briefest of terms, I was woken up to the fact that I

[44] That this is a *way of seeing* and not ‘just the way it is’ in a positivist sense is explored at some length by Bortoft in *The Wholeness of Nature* (1996). Salt perceived through the *quantitative way of seeing* is what I have described in this sentence. A new way of seeing, and a new perception of salt, opened up for me through the experiences described in the preceding section.

was – in pursuing a crystallisation of the salts – using dragon heat where I should have been using hen heat. To achieve my aim I had to find a 'hen', and some patience[45].

The *Dynamics* in Biodynamics

How has the above experience contributed to my understanding of the Biodynamic preparations? On the one hand, through the work with the spagyric process I have developed a tangible 'felt-sense' for the qualitative nature of heat, for the *dynamic* nature of salt – which previously I conceived of in a purely material, static way – and even for the significance of time. This is salt as a *verb*, not merely a noun.

Now, salt and heat do not have an apparent connection to the biodynamic preparations, and in particular not the Oak Bark prep used as an example in this text. How has my research into spagyrics contributed to an understanding for the bringing together of plant material (oak bark), animal organs (skull) and specific indications for burying these combinations in the earth for designated lengths of time (over the winter)?

I discovered that a significant contribution emerged from the way in which the Spagyric practitioner viewed the products of the *solve,* analysis or separation of the plant into its *essentials.*

Separating out

To begin, a brief review. The spagyric process, as I have described above, consists of the separation of three substances or 'Essentials' from a plant. These three substances are referred to in a number of ways. They have terms that are familiar from a modern perspective of analytical chemistry – essential (or volatile) oil, alcohol (ethanol) and salt (potassium carbonate). They also have designations that originate in an alchemical perspective, where they are referred to as the Tria Principia (Fritz Julius, p.18) or Three Philosophical Principles (Junius, p.29). It is evident from the following that the Three Principles were – for the

[45] I am not, in the above, suggesting that the 'meaning' of the dragon and hen that I gleaned from the image of the alchemical mountain is necessarily the meaning that the author intended. Images have many meanings, but for me the insight arose in such a way as to profoundly influence my sense of how warmth processes unfold in the phenomena of nature, and in the 'soul'.

alchemist – far more then the material substances named above, with their clear chemical classification.

> According to the alchemistic conception, the entire manifestation of matter is maintained through the cooperation of three Philosophical Principles, which are also called the Three Essentials or Three Substances.
>
> The different proportion of the three substances in the countless forms of manifestation of matter accounts for their multiplicity. For this reason, the various materially existing things are sometimes also called Mixta (mixtures). A metal, for instance, is a Mixtum, likewise a plant. In this way specific proportions of the Three Substances...form the basis to every chemical (or alchemical) element. The three Philosophical Principles form a unity in the triad, though they are different from one another. (Junius, 2007 p. 29)

The alchemical terms are now added to the right of the drawing re-produced below:

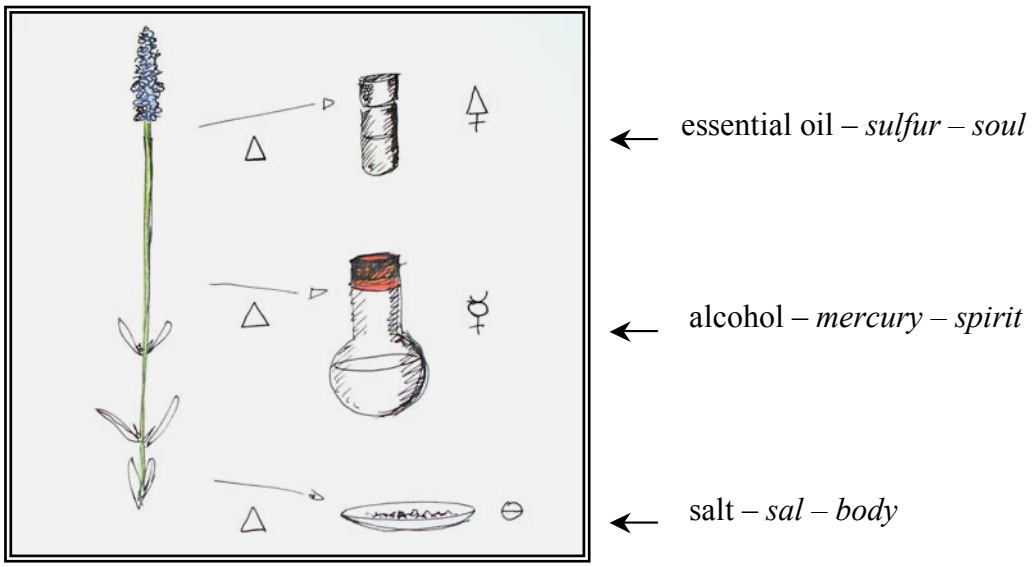


Fig. 2 The Spagyric *solve* process. The alchemical terms for the Tria Principia are in italics.

In the spagyric work, the essential oil is referred to as the *sulf or sulphur* principle and also *soul.* The alcohol is referred to as the *mercury* principle or *spirit.* The salt principle is referred to as *sal* and *body.* How are these terms to be understood?

Three-in-One

In the course of my research I came across the use of these terms in the rather un-expected context of a study of physiology from a very well known contemporary anatomist. This led me to the question as to whether other studies made reference to these terms. The following

survey of literature or research, where a range of authors describe the Tria Principia and develop their work with some reference to them, arises from this path of enquiry. I will follow this survey with a section on how I have come to understand the *bio* of biodynamics in light of both the alchemical Tria Principia and the contemporary scientific studies that are arising from a renewed engagement with these archetypal *principles*.

Tria Principia: Perspectives

A survey of the literature wherein reference to the Tria Principia is made and, more to the point, where these three Principles are placed as the root for "another way of looking at nature" reveals a quite remarkable field of research. Though still represented by a relatively small number of individuals, it is noteworthy that a re-engagement with *sal, mercur* and *sulfur* has been found to be significant in disciplines as diverse as human physiology and chemistry, biology and social studies. The following examples are taken from this small, but growing, field of research that seeks to develop qualitative and holistic understanding in the natural and social sciences.

Physiology

The anatomist Johannes W. Rohen is well known for his *Color Atlas of Anatomy*, a reference book used by medical students all over the world. It is an example par excellence of an analytical study of the human body in order to facilitate the identification of the visible structures that make up the complexity of the physical body. However, in 2007, this world-renowned anatomist published a book of a different kind. In this book, *Functional Morphology: The Dynamic Wholeness of the Human Organism* Rohen refers to the Tria Principia in the following passage:

> As early as the Middle Ages, the alchemists and Paracelsus (among others) were already aware of the significance of these three basic physiological systems, which they called Sal, Sulfur, and Mercury processes. They understood Sal as the tendency toward hardening, salt formation, and structural definition – the formative, informational element as it were. Sulfur was understood as chemical conversion, which is always linked to the transformation of matter and the release of energy. Sulfur encompassed not only actual combustion but also the transformation of matter, metabolic processes as such. Mercury,

> quicksilver-like and mobile, constituted the middle, rhythmic element in this trinity, inserted between the polar opposites of Sal and Sulfur as a balancing and linking element. (2007, p.19)

Rohen's comprehensive study of human physiology takes these three processes as its basis and applies them in a *functional* study of the human being from the cellular level to the level of the whole body. He provides the following illustration (redrawn by myself from Rohen, p. 20) to illustrate this understanding of the basic functional processes of the human organism.

sal processes

mercur processes

sulfur processes

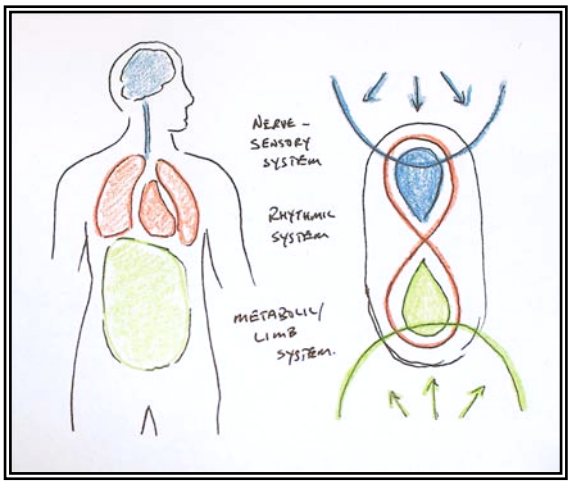


Fig. 3 The functional threefoldness of the human body. The two polar functional systems – the information system (brain and sensory organs) and metabolic/limb system (abdominal organs and extremities) – are connected, harmonized and balanced by the organs with rhythmic functions (respiratory system, cardiovascular system). (Rohen, p. 20)

Rohen uses throughout his book the terminology he establishes in the caption above and table below (where the terms *sal, mercur* and *sulfur* have been added by myself for reference). The correspondence between the terminologies he uses and the Tria Principia is exact. Rohen furthermore makes a distinction between functional processes in the body (pictured above) and functional processes in the soul as informed by the Tria Principia. He provides the following table to illustrate the manner in which the processes are viewed in his study of the body and soul:

Information exchange	*Structural and informational processes*	*Nervous system*	*Thinking (Sal)*
Rhythm, transport, balance	*Rhythmical processes*	*Circulatory system* *Respiratory system*	*Feeling (Mercur)*
Metabolism	*Substance processes, exchanges of matter and energy*	*Metabolic system*	*Willing (Sulfur)*

Fig. 4 Basic functional processes of the human body and their relationships to soul functions (Rohen, p. 25)

As a physiologist Rohen has found significance for the three processes in providing a study of the human organism in terms of its *life process* where anatomical and analytical studies lead to an understanding of its lifeless structure and mechanical activities. Rohen writes the following succinct passage about his sense of the contribution of a study based on *qualitative processes* to science and human understanding:

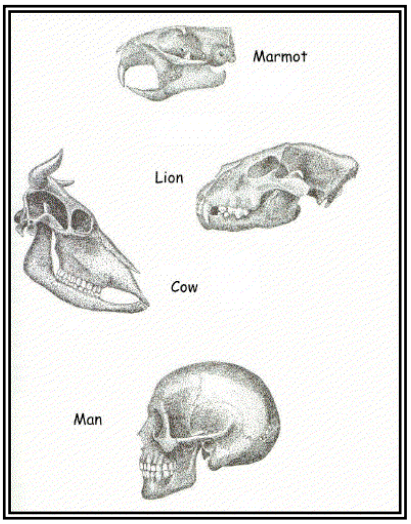
> If I have succeeded in engaging unbiased readers in a more 'living' way of thinking, perhaps I will also have contributed one small building block to the edifice of a new and accurately expanded science of the human being that will serve as a foundation not only for many specialized fields such as education and medicine but also for the development of human culture in general. (Rohen, xvi)

Rohen is clear, in the above, that the human being viewed in terms of the *functional threefoldness* of the *processes* underlying the human body and soul contribute to very practical fields of social life and their development. His conviction in this regard is made ever more evident in his most recent publication *Functional Threefoldness in the Human Organism and Human Society* (2011) wherein he proposes that many of the 'flawed concepts' being applied in the economic realm, the political realm and the social realm generally can be ameliorated through an understanding of the triad of functional principles detailed in his previous work.

Biology

The biologist Wolfgang Schad takes as his departure point for a study of the mammals the three systems mentioned by Rohen – the nervous, respiratory or rhythmic and the metabolic – though his work precedes that of Rohen's by several decades. Though not explicitly alluding to the processes of *sal, mercur* and *sulfur*, Schad's study is exemplary of the potentials for the basic tri-unity of the three *processes* to inform a wide range of disciplines. Schad attributes Rudolf Steiner's insights into the three-fold human being as the basis for his study. I am here placing Schad in this context as the triad of processes articulated in the alchemical world view and those defined by Steiner and Schad have – I propose – the same root in a *process* oriented view founded on the polarity of hardening, crystallizing processes with the expansive, dissolving processes and the mediating third maintaining the two poles in dynamic interplay.

> (Steiner) proposed that the proper way to understand animal forms is by first comprehending the human form, for to his intuitive perception the nature of man showed itself to be a kind of compendium or summary, on a higher level, of the entire animal kingdom; and for him this truth came to expression in the harmonious, omnipotential form of man's body. So understood, man is the central and balanced configuration of which each mammalian animal species appears as a partial, one-sided development. (Schad, p.2)



Schad in his study is able to offer a very convincing and informative study of the mammals and sheds light on features of individual organisms as well as on various aspects of behaviour, nutrition, life cycle and habitat. I will not go in to Schad's study at great length as I leave that to the interested reader to pursue further, however, I will briefly touch on the aspect of the threefold nature of the mammals through an illustration provided by Schad as it will have specific bearing to my research into the biodynamic preparations in subsequent sections of this thesis.

Schad illustrates, initially through images of skulls (right), the dynamic threefoldness embodied by the different main mammal groups he identifies.

The marmot is given as a representative of the rodent group, the lion of the carnivore group, and the cow of the ungulate group. The human skull illustrates that, wherein the three mammal groups manifest a dominance of either the nerve sense (rodents), rhythmic (carnivores) or metabolic (ungulates) systems, the human being has developed its organism on the basis of a functional harmony or balance between these systems.

Through a study of the *functional processes* and the tendency for each of the three mammal groups to be dominantly informed by one of these processes, new insights arise into their physiology, life cycle, behaviour, diet, colouring etc. - insights into 'parts' that have often been explained through an abstraction of their specific contribution to the animals adaptive behaviour rather than seen as intrinsically related to the whole animal as revealed through an understanding of the group of mammals as a whole – and their synthesis in the human form.

Schad's book holds a wealth of insight and detail that is not reproducible in this context, but reveals the significance of the threefold functional view of processes in 'making sense' of the mammals.

Geology

In the introduction to the book *Silica, Calcium and Clay* by Drs Benesch and Wilde, Ross Rentea M.D. present the following description of the way in which the Tria Principia inform an understanding of geology and processes in the development of the mineral kingdom. The authors contribute an in-depth study of the three principles through a study of the role of silica, calcium and clay in the mineral, plant, animal and human realms, describing them as "gates to all further understanding of 'natura'" (1995, x). Dr. Rentea writes:

> On a more spiritual level these three substances (silica, calcium and clay) perform activities known throughout the Middle Ages as the principles of sal, mercury (or mercurial), and sulfur. During the Middle Ages these three principles were considered profound activities rather than substances. The sal quality was seen wherever earth-like substances connected with a watery substance; the mercurial wherever the watery, fluid elements connected with the airy (where, for instance, foamy substances appear in the more crystallic world or the creation of leaves appears in the plant world); and the sulphuric as the connection between the airy and the fiery. The authors describe how the silica substances are more involved in man's thinking/sense perceptions, calcium is connected with the metabolic system, and how clay, the mercurial substance par excellence, connects the digestive processes governed by calcium with the nerve-sense processes governed by silica. (Benesch and Wilde, 1995 p. x)

What is made clear throughout the book, and where an initial reference to the Tria Principia is significant, is that the authors are not referring to silica, calcium and clay in a solely material sense but that these substance-activities are present in a very wide range of natural processes. In order to make this distinction clearer the authors adopt the terms *silicic, calcic and clayish* when the process is the focus and silica, calcium and clay when the more familiar mineral substances are being considered.

This study is a very significant contribution to the question I have raised at the outset of this thesis and illustrates that there is a significant and fundamental shift in the type of thinking needed to be able to understand the minerals from a *dynamic* point of view. This study, written as it is by two very highly qualified authorities on their subjects, makes it apparent that in order to work creatively and accurately with the silicic, calcic and clayish in either agriculture or medicine requires an in-depth familiarity with the three processes, a 'knowing' that goes further than what is usually taken on with the verbal-intellectual mind[46].

Chemistry

In his book *Fundamentals for A Phenomenological Study of Chemistry* (2000), Fritz Julius begins with introducing the Tria Principia in much the same way as the authors quoted above. A very similar picture emerges, using very similar language.

> Salt signifies crystallization processes, as well as everything that involves condensation and hardening of substance, and especially points to the transition between the liquid and solid state.
>
> Mercury symbolizes everything that is mobile interaction, in transformative activity, and especially the manifold matter cycles with their play of condensation and evaporation, as represented especially by water.
>
> Sulfur exemplifies the process of burning, and also processes in which warmth arises and matter disappears.
>
> If a person earnestly contemplates such thoughts, they will experience that thoughts like these can contribute a great deal towards forming a grand, imaginative picture of the whole of nature. (p. 18).

In the last part of the quote above Julius adds an essential aspect to previous contributions to the subject of the Tria Principia. He explicitly states that an engagement with these three

[46] This term - the verbal-intellectual mind and the *ways of knowing* derived from its activity - are described in Chapter 4, Part A this thesis.

processes and their contribution to a deepened understanding of nature and the human being lies in the 'imaginative contemplation' of their *activities* as manifest in such phenomena as crystallization of salts, the dissolution of salts, the combustion process (p.19). Julius places this *imaginative contemplation* - discussed previously in Chapter 4, Part A (The Art of Knowing) - of the three processes at the root of their proper understanding and potential for providing a "deeply grounded-world view" (p. 19). Julius makes the very significant statement that " it will be difficult to find the connection between the human being and nature if we don't know this Principle, since we are an actual ordered expression of the Three Principles" (p. 19).

Julius is positing a view of chemistry that can (as the alchemical world view did in its way) establish a relationship of chemistry to *life* and the human being and he illustrates the *dynamic* view of chemistry that he seeks to establish in the following passage headed 'Chemistry as an Intermediary between an Organic and Inorganic Science':

> If we say: a chemical element can participate in a sequence of metamorphoses, then that is not correct. The element itself is a metamorphoses of the substance-type[47]. Thus we must distinguish between sulphur, which we can hold in our hands as a piece of matter, and the sulphur-principle, which is hidden therein. Perhaps we could speak of archetypal sulphur (or primal sulfur). The term 'archetypal sulphur' points to a dynamic which is hidden in the substance, and which expresses itself both in the properties of sulphur in elemental form just as much in those of its compounds. The world of substance is comparable to a tapestry, woven using the substance types…(Julius, p. 305)

Compare this articulation of sulphur in its various meanings to the descriptions of the Tria Principia given previously. Also striking is to compare the formulation that Julius is setting forth from a perspective of chemist with that of the spagyric (alchemical) view of matter as described by Manfred Junius:

> According to the alchemistic conception, the entire manifestation of matter is maintained through the cooperation of three Philosophical Principles, which are also called the Three Essentials or the Three Substances. The different proportion of the three substances in the countless forms of manifestation of matter accounts for their multiplicity. For this reason, the various materially existing things are sometimes called the Mixta (mixtures). A metal, for instance, is a Mixtum, likewise a plant… the Three Philosophical Principles form a unity in the triad, although they are different from one another. (Junius, 2007, p. 29)

[47] see the discussion in this same chapter of Julius' book regarding 'archetype' and 'type' with regards the chemical elements.

Julius, a scientist as well as a teacher, makes a connection between the imaginative contemplation of the Tria Principia in the study of chemistry and the moral implications that this gives rise to. In a similar vein as that expressed by Lehrs (above) he writes, “it is not possible to explain the processes in living organisms out of an interaction with matter. But, we can very well trace back the characteristics of the substances to their specific connections with life. Life is primary: our view of nature must be life-centred.” (Julius, 2000 p.15) It is significant that a chemist seeking to re-enliven his science, and to make it relevant to the realms of life, has placed at the outset of his articulation of a positive direction for chemistry the three Philosophical Principles of the alchemists!

Medicine

Fritz Julius, whom I have referenced above, makes the statement that “ it will be difficult to find the connection between the human being and nature if we don’t know this Principle, since we are an actual ordered expression of the Three Principles” (2000, p. 19).

In the realm of medicine this connection between the human being and nature has developed in fruitful directions where the key of the Three Principles has been grasped. An initial indication for this connection was given above where Wolfgang Schad illustrated functional relationships between the human being and the mammals based on the same triad of physiological functions articulated by Johannes Rohen. With regards to the world of plants, and plant medicines, the Alchemical Tria Principia can also provide significant insight regarding the relation of plant to human. This key, however, manifests in a surprising manner, as illustrated below.

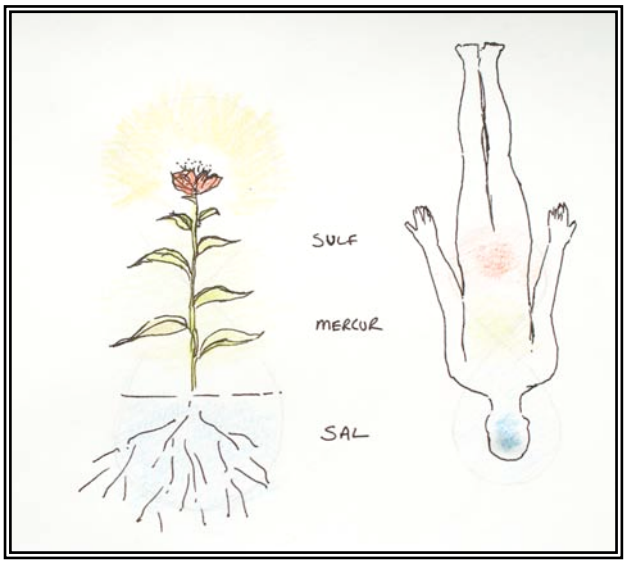


Fig. 6 The functional relationship between the three Principles in the human being and the plant.

In Figure 6 the functional relationship of human being to plant is – at least in spatial orientation – reversed. Ralph Twentyman in his book *The Science and Art of Healing* (1992) describes this relationship with particular reference to the medicinal action of the lilies:

> In the old alchemical tradition the root process was called Sal or salt and the blossom process Sulphur, whilst the middle realm of stem and leaf was called Mercury…It is clear, using this way of looking at the living processes of nature, that in the lilies the Sulphur and Mercury processes predominate, the Salt processes are weak. The lilies have not come strongly to earth. We would anticipate that their chief actions within the human organization will be in the metabolic and genital realms, the sphere paramountly of the Sulphur processes, and in the rhythmic systems of the circulations and breathing which is the realm of the Mercury processes. And this is what we have found in the drug pictures. (Twentyman, p. 188)

Wilhelm Pelikan illustrates the relationship between human being and plant in terms of the functional relationship of the middle system – the rhythmic system.

> The leaf takes carbon dioxide from the air. This goes through a process of carbon condensation and carbohydrate metamorphosis that essentially provides the material for the plant body. Oxygen is exhaled in the process. The human rhythmic system takes up oxygen in the chest organization and disassembles the 'carbon-ness' of the body, combating its dense nature and ejecting the carbon dioxide from it. Both processes proceed rhythmically between the fluid and airy spheres, but they go in opposite directions. (Pelikan, p. 2)

On the basis of these, and many other examples of the functional relationships between processes in the plant and their corresponding "polar opposite" (Pelikan, p. 5) activity in the human, Pelikan gives a very cogent basis for understanding the medicinal properties of plants which does not rely solely on the analysis of chemical actions and isolated mechanisms. The whole human being, and the whole plant, are kept in mind throughout – the one informing the other. Furthermore, Pelikan makes it evident that through the three-fold manner of viewing the plant the whole question of disease and pathology take on new meaning.

> The nerves and senses are indispensable to the human being as a whole, but life is suppressed in them in a way that signifies *disease* for other parts of the organism; consciousness and the ability to think are developed at a cost; they rest on the catabolism, hardening, a weakening of vital functions. Conversely the metabolic system acting on its own signifies *disease* because its extreme vitality can only develop in a state of suppressed consciousness, with the soul asleep.
>
> A third, middles system is a vital necessity if those opposites are to be united and held in balance. It combines the opposites to make a whole. (Pelikan, p. 10)

From the above it can be seen that Pelikan's view of disease is rooted in the displacement of what is otherwise a healthy functional process active in the bounds of its appropriate domain.

With regards for the potential for plants to be healing for human pathology, Pelikan writes the following:

> Plant life also has contrasting elements of dissolution and hardening, the latter in its root functions, the former in its flowering processes. A rhythmic relation is established between them through the middle principle of leaf activity. However, in plants the dominance of either extreme does not lead to disease. Instead a creative principle produces variety of form.
>
> Some plants are almost entirely root, with leaf and flower development reduced to a minimum. Others produce enormous flowers but hardly any root or leaf. (Pelikan, p. 11)

With insights such as these regarding the human being, on the one hand, and the plants tendency to produce forms which exaggerate one or other of the plant organ processes, Pelikan establishes a "rational medical botany" (Pelikan, p. 12) with the diagram of correspondence above as its basis. Thus in the realm of medicine – homeopathy in the case of Ralph Twentyman and herbal medicine in that of Wilhelm Pelikan – the contribution of an understanding of the three principles to developments in science and human development is made evident once again.

~

I would like to conclude this survey with one further instance of where the Tria Principia have informed an individual's work and research. It engages the question of the quality of *time.* This is significant, I feel, for in the Biodynamic preparations as a whole, specific indications are given for undertaking certain procedures at specific times of year. This is a notable departure for our modern world-view, which is largely unaccustomed to thinking in terms of the qualitative influences of time. In the following example it is again the principles *sal, sulf* and *mercur* that provide the lens. I will end this chapter with a discussion on the contribution of all of the above perspectives to the question of *understanding* the biodynamic preparations.

~

Qualities of Time

In a study of the seasons of the year and the qualities that each season encapsulates, Rudolf Steiner presents the following picture. I quote it at length because in many respects it touches on several themes outlined above.

> If we now turn towards the inner part of the earth we come to the acid formation process and especially to the salt process, for the salts derive from the acids; and this is what the earth really wants to be. Hence when we look up into the cosmos we are really looking at the sulphur process. When we consider the tendency of the earth to form itself into a cosmic water drop we are really looking at the mercurial process. And if we turn our gaze to the solid earth underfoot, which in spring gives rise to all that we see as growing, sprouting life, we are looking at the salt process.
>
> The salt process is all-important for springtime life and growth. For the roots of plants in forming themselves out of the seeds, depend for their whole growth on their relation to the salt formation of the soil. It is these salt formations – in the widest sense of the term – the deposit formations within the crust of the earth, which give substance to the roots and enable them to act as the earthly foundation of plant life. (Steiner, 1996, pp17-18)

In these passages Steiner now considers the *sal, mercur* and *sulf* processes in relation to the whole Earth and it environs. Also, he makes the very significant statement that the seasons and their qualitative influences can also be understood in these terms:

> Thus in turning back to the earth we encounter the salt process. This is what the earth makes of itself in the depths of winter, whereas in summer there is much more intermingling. For in summer the air is shot through with sulphurizing processes, which indeed occur also in lightning and thunder; they penetrate far down, so that the whole course of the season is sulphurized…during the summer too the salt process mingles with the atmosphere, for the growing plants carry the salts up through their leaves and blossoms right up into the seeds. Naturally we find the salt widely distributed in the plant. They etherealize themselves in the essential oils, and so on; they approach the sulphurizing process. The salts are carried up through the plants; they stream out and become part of the being of the atmosphere.
>
> In high summer, accordingly, we have a mingling of the mercurial element, always present in the earth, with the sulphurizing and salt forming elements. If at this season we stand here on earth our head actually projects into a mixture of sulphur, mercury and salt; while the arrival of midwinter means that each of these three principles reverts to its own inner condition. The salts are drawn back into the inner part of the earth, and the tendency for the hydrosphere to assume a spherical shape reasserts itself – imaged in winter by the snow mantle that covers parts of the earth. The sulphur process withdraws, so that here is no particular occasion to observe it. In place of it something else comes to the fore during midwinter season. (Steiner, 1996, p. 18)

Steiner here describes the processes in terms that are strongly analogous with those that I encountered in the spagyric process. There is a condition, Steiner indicates, where the three functional processes are more intermingled and 'mixed' – in and through the summer months – and a time of *solve* when they separate out into three distinct realms – in the winter months.

During this time (winter) the *sal* process is most influential in the earth "If therefore we observe the earth in the depths of winter, we have first the internal tendency to salt formation".

This indication that the three principles are active in the different regions of the Earth as well as in the seasons of the year brought me yet a step closer to understanding the Biodynamic preparations which – in light of all of the examples above – clearly arise out of a *dynamic* understanding of substances and processes and not out of physico-chemical or mechanical relationships.

The *Bio* in Biodynamics

To recapitulate briefly, I state the following in the introduction of this thesis (page 9):

> The Enviropig and preparation 505 (or what is often referred to as the Oak Bark prep) come into the agricultural domain through, it would appear, a synthetic thinking process that is attempting to create, out of this new synthesis, a beneficial solution to specific farming issues. Out of 'parts' – genetic information from mice, ecoli bacteria, skulls, oak bark – a new synthesis or 'whole' is created.

Whereas it was possible in the instance of the Enviropig to follow a causal connection between the parts and to see how they are being brought together in a mechanistic relationship (page 9), this same type of cause and effect relationship was not so apparent in the Oak Bark prep. Through my research into Spagyrics it became apparent to me that a different type of thinking, or way of seeing, informed the combination of the parts chosen in the creation of the Biodynamic preparation than in the genetically modified pig. This way of seeing is evident, on the one hand, in the fact that the 'parts' of the Oak Bark prep reveal a synergy in terms of their *dynamic* or alchemical properties as seen from the perspective of the Tria Principia. I came to understand this synergistic composition of the parts of the prep as follows;

Oak Bark is the product of the deposition (*sal)* process in the life activity of the growing tree. It is also very high in calcium (Steiner, 1993, p. 101). Calcium and the *calcic* are related to *sal* in the tri-unity of silica, calcium and clay (see page 64). The skull, and in particular the brain case wherein oak bark is placed, is the region of the body most closely associated with *sal* processes (page 63) as it is where the nerve-sense system and its organs are most concentrated in their activity. Considering the skull and it's cranial cavity leads to the awareness that within the whole organism it is in the brain case where a certain 'stillness' or immobility arises due to the enclosing 'cave' of bone and suspension in the cerebro-spinal fluid. This stillness provides the conditions for *sal* processes – in the animal these are processes of consciousness

- to take place. This is taken to a particular height of expression in the human physiology wherein processes of consciousness and reflective self-awareness reach a significant level of development in the relative stillness of the cranium and its concentration of sense organs and nerve tissue (Rohen).

The winter months are the time in which the *sal* processes are dominant in the life cycles of nature (page 69). What emerges through the above is that the Oak Bark prep appears to be derived from a synergy, a bringing together of substances or rather *functional processes* from the mineral (calcium), plant (oak bark), animal (skull) and the seasonal qualities of time (winter) in order to enhance this very *process – sal* or the *calcic* - in the organic realm.

The Turning Point

Now, at this point it is necessary to pause and 'take stock'. The need for this pause arises (and arose for me in the course of my research) due to a pivotal point that is reached in the spagyric process, and in the analogous processes in consciousness. This point was foreshadowed by Bortoft in terms of *modes of consciousness* and his distinction between *two* complementary ways of knowing. This shift was highlighted for myself in the course of a dialogue with a colleague about the spagyric process.

I had explained the process of *solve* – whereby the plant is separated into the three principles referred to as 'body' (salt), 'soul' (essential oil) and 'spirit' (alcohol). I had also described the process of *coagula* to my colleague on more than one occasion, i.e. the practical process in spagyric terms. On a visit to my workshop[48] my colleague, however, said to me "I still don't understand the *coagula*". Withholding a momentary feeling of frustration (as we had discussed this many times) I realized that this was actually an absolutely essential question that was being asked. It was a 'kernel' at the core of my question 'What way of knowing stands behind the Biodynamic impulse; how can this be understood, learned and experienced

[48] in November 2011. My colleague Valborg Kløve-Graue contributed to many dialogues about alchemy throughout this research process.

by myself in order that I might also effectively contribute to Biodynamic teaching, learning and research?'

The danger brought into focus by my colleague's query lay at what I have referred to as 'a pivotal point' of the spagyric process. This danger is to see the *coagula* as a simple 'mixing' or a 're-combination' of the parts derived from the process of *solve* in order to create a new 'whole' or synthesis. This would amount to a mere 're-assembly' of parts separated out or analyzed from the initial unity of the plant. This is a danger, I realized, not only for understanding the practical outcome in the Spagyric flask, but for consciousness, for my consciousness, engaged in the pursuit of *understanding* the Biodynamic preparations. In the context of the Oak Bark prep I realized this danger when reflecting on the new level of understanding arrived at through a study of the Tria Principia. Though this new perspective led me to a perception of the synergistic relationships underlying the choice of 'parts' due to their *sal* nature, this did not yet amount to a cognizing or knowing that could claim to 'stand within' the creative source of the prep. The new insight regarding the 'parts' of the Oak Bark prep were, and are, only that – 'parts', distinct and discreet, as *long as they are grasped only by the verbal intellectual consciousness*. They are the residue of a *way of* knowing and not the way of knowing itself. Rudolf Steiner highlights this dilemma in his book *A Theory of Knowledge Implicit in Goethe's World Conception* wherein he clearly articulates the analytical, *solve* function of the intellect. He writes;

> Making distinctions…is the task of the intellect (Verstandes). It has only to separate concepts and maintain them in this separation. This is a necessary preliminary stage of any higher scientific work. Above all, in fact, we need firmly established, clearly delineated concepts before we can seek their harmony. But we must not remain in this separation. For the intellect, things are separated that humanity has an essential need to see in a harmonious unity. Remaining separate for the intellect are: cause and effect, mechanism and organism, freedom and necessity, idea and reality, spirit and nature, and so on. All these distinctions are introduced by the intellect. (Steiner, 1979)

Steiner goes further and really sums up the conundrum faced by the mind at the point where a clear distinction, classification or separation has been achieved when he states very succinctly "The intellect itself is in no position to go beyond this separation. It holds firmly to the separated parts." (Steiner, 1979)

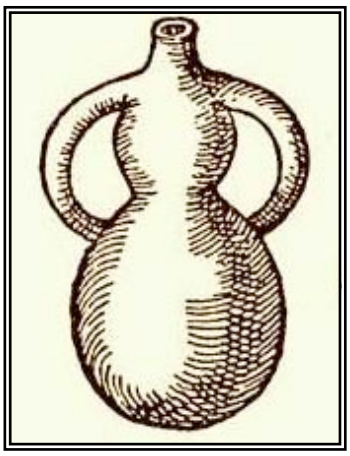
Herein lies the danger. It is at this point that something needs to change otherwise the intellect carries on beyond its rightful activity of distinction (*solve*) to attempt the re-synthesis. "If the

(intellectual view) is regarded as an end in itself instead of as a necessary intermediary stage, then it does not yield reality but rather a distorted image of it" (Steiner, 1979)[49].

The intermediary stage alluded to by Steiner is what I have called 'the pivotal point'. The pivot or turning point is hinged on the shift from *solve* to *coagula*. For Steiner this shift is described as a shift from the exercise of the intellect to that of reason (Steiner, 1979). For Bortoft it is the shift from the verbal-intellectual mode to the holistic mode. These perspectives were all clear to me from a theoretical perspective (through my researches which resulted in The Art of Knowing) but what I faced when presented with the question: 'So, what really is the process of *coagula*?' was the challenge of not stopping in the 'turning point', not taking an initial sense of having 'understood' the Oak Bark prep on the basis of its synergies as an understanding of the principles and creative place out of which it was conceived. I needed to do more work on understanding the process of *coagula*. This was the gift my colleague brought to me with her question.

Starting with practice I went back to the spagyric process wherein I had found a 'grounding' previously. This time it was to research the missing part of the process I had undertaken thus far.

The three principles *sal* (salts), *mercur* (alcohol) and *sulf* (essential oil), having been separated and purified, are taken up once again.



The salts are ground, placed in a flask and the essential oil poured over the salts and allowed to "imbibe until saturation"[50]. The alcohol is then added and the flask is corked and a circulation is established. This process was classically undertaken in a vessel called a 'pelican' (pictured right).

The circulation came about through warming the flask and the

[49] See Henri Bortoft's article *Authentic and Counterfeit Wholes* for a further, and thorough, exploration of the potential dangers explored in this section.

[50] The source of this formulation arises from a personal correspondence with a practitioner familiar with this process with whom I consulted in August 2011.

liquid in the lower chamber to the point where the liquid would begin to evaporate and rise through the narrow neck into the top chamber. The vapours would expand in the top section of the flask and, through cooling, condense at the top of the flask and run down the 'arms' into the bottom of the flask again. Significant with regards the whole process was that it was undertaken for a specified period of time – forty days[51] – and would have been undertaken with particular attention to the declination of sun and moon. Junius writes of this process "circulation is an improvement of liquid substances" (2007, p.164). Alchemists refer to the process as an "Exaltation" (2007, p.164). Paracelsus says that one part of a medicine 'exalted' in this manner "has the same effect as the two-hundredthfold quantity of corresponding dry plants"[52] (Junius, 2007, p. 161). Clearly the *coagula* undertaken through a circulation is not a mere mixing in the sense of combining one substance with another through a mechanical process. The key term that encapsulates the whole process, and intention, being the 'exaltation' of the three principles, whereby they are re-combined or re-synthesized but to 'new heights'. Through a rhythmic process (repeated circulation) in time, and a movement between the polarities of condensation (sal) and evaporation (sulf) the medicine is imbued with attributes that go beyond the chemical properties of the substances themselves.

The description of the practical process of the *coagula* in the context of the Spagyric process struck me as being analogous to the process in consciousness whereby I had come to see the significance of the images of the hen and dragon, the qualities of heat that I needed to pay attention to and my inner state in terms of finding patience in the process (page 50). The vessel in this instance was my own attention and the substances in the vessel the sense impressions, the questions, feelings, remembered snippets of conversation... etc. The circulation was my pondering – an imaginative contemplation - which could unfold in a degree of relaxed quiescence due to the circumstances and environment of the immigration hallway. I was both passive or 'open' and active at the same time. As the images and questions were warmed through my attention they were opened, and receptive to the meaning

[51] the Philosophical month, see Junius page 160 for a description of the source of this time period

[52] "Until today science has been unable to explain why circulation, especially rhythmic circulation, causes an exaltation of the product. It is similar with homeopathic potencies. Experience proves their validity again and again, but an explanation is beyond the present state of official science." Junius , p 157

encoded in the imaginal nature of the alchemical emblem that came to meet them in a flash of insight. I understand this to be – in Kühlewind's terms – a touching into the superconscious, in Bortoft's terms an experience of the "nonlinear, simultaneous, intuitive"(1996, p. 63) nature of the holistic mode of consciousness.

Though the 'exaltation' of my work with salts and heat strikes me as an analogous process in consciousness to the events unfolding in the alchemical flask, it was an experience that was *given* to me within the rather random and unplanned events of the Gatwick immigration line. It was upon reflection, however, a direct experience of the type of 'knowing' that I explored in The Art of Knowing – brought about through the imaginative contemplation of the substances engaged with in the 'laboratory' and the uniting element of the image. Theory and experience combined with this new understanding of *coagula* and pointed to a way of navigating the 'turning point'. The grace of Gatwick could be repeated as a consciously directed process of imaginative contemplation of the products of the *solve*. I will discuss this process further in terms of the *stages of learning* in chapter 5.

With regards the Oak Bark prep, I realized that the new insights derived from seeing it in light of the three principles *sal, sulf* and *mercur* (page 71), were now the raw material for imaginative 'circulation'. I will take also take up the thread of this process in the following.

SUMMARY

I began my researches into Spagyrics with the question: what is the contribution of alchemical thinking to Steiner's proposals for re-enlivening of the agricultural domain?

The following insights arose through that path of enquiry:

- A direct experience of the possibility of developing *qualitative* experience and a qualitative depth of understanding of both substances and processes through working with the Spagyric method of preparing a plant remedy (i.e. in the example above, experiencing/understanding salt as a *verb* through its Spagyric preparation)

- A realization of the potential for the alchemical Tria Principia to inform a wide range of disciplines based on its attention to archetypal *processes* (*sal, mercur, sulf*) and thus

its wide applicability to those realms included in Chapter 4, B of this thesis as well as to areas not yet specified.

- A realization of the *synthetic* activity of the imaginative mode of cognition whereby "the experience of relationship as such" arises "through a transformation from a piecemeal way of thought to a simultaneous perception of the whole"[53]. (Bortoft)

- A recognition of a key point in the process of cognition, one that I have named the 'turning point', in which a significant transition between two modes of consciousness lies – a turning point that is either overstepped by an adherence to an intellectual mode of consciousness, or bridged by the cultivation of imaginative cognition and the holistic mode of consciousness.

From Self-education to Teaching Biodynamics

Now, my immersion in the practical aspects of Spagyrics was undertaken as 'self-education'. This self-education was crucial in order to inform my work with the Biodynamic method as a gardener but also, as stated in my aims[54] as a teacher. Through this self-education process I came to identify certain principles that I identified as contributing to the deepening of my own understanding and articulation of Biodynamics. However, alongside my researches of both part A and part B of Chapter 4 (undertaken between 2009 and 2011) I was active in designing and teaching a variety of workshops for students of Biodynamics. These became research laboratories of another sort where I took aspects of my theoretical and practical findings and placed them in the 'vessel' of the learning environment to enquire into their contribution to my overall question regarding teaching and learning in Biodynamics.

[53] I refer to the 'pieces' in the third stage of the Spagyric process – salts, types of heat, the images in the alchemical emblem, my own inner state or mood in undertaking the process – which synthesized into a meaningful perception of wholeness while standing in the cue in Gatwick, going through the process in my imagination.

[54] 'As a teacher in the field of Biodynamics a further aim of my research is to contribute to the quite specific field of education in the discipline of Biodynamics by identifying possible methods and principles of course design that can contribute to the work of educators in this field.'

C) Teaching and Learning

"It is useful for adult educators to try and get out of the role of being authority figures with answers. If they don't, then they are laming the growth of the very organ they are trying to create"

Dennis Klocek, *Knowledge, Teaching and the Death of the Mysterious*

As stated above, this section addresses the second research aim listed in Chapter 1 (page 9), 'to contribute to the quite specific field of education in the discipline of Biodynamics by identifying possible methods and principles of course design that can contribute to the work of educators in this field.' With this aim in view I designed workshops and seminars in Biodynamics, each informed with a particular aspect of my research that I was exploring at that time. Thus the first Case Study sheds light on the learner's experience arising from a meeting with Biodynamics in a very introductory, and thus general, way. This Case Study revealed a framework in which I could better understand the capacities that I, as an educator, was seeking to foster in students in my courses. The second Case Study arises out of an exploration of teaching *methods* informed by alchemical theory (from Chapter 4 part A and B), and the Self-Determination Theory (from Case Study 1) and the third Case Study focuses on the elements of *course design* (also informed by Chapter 4 part A and B and the previous two Case Studies).

Case Study 1: The Dynamics of 3-in-1 in Education

Practical Skills Therapeutic Education (PSTE)

I am currently the Head of Programme team for the Hiram Education and Research Department of the Crossfields Institute[55].

Part of my work with the Hiram Education and Research Department (HERD) has involved the design, development and delivery of a course for Ruskin Mill Trust staff called *Practical Skills Therapeutic Education* (referred to in the following as PSTE). The PSTE course has been designed to fulfil a particular set of outcomes (see Appendix IX for course overview). From an organizational perspective the course has been designed to engage the staff explicitly and concretely in a study of the Trust's Vision and Values with the aim of developing and deepening competence in the delivery of the PSTE curriculum to students at RMT educational sites. From my perspective as an adult educator I have also approached the course with the inclusion of other – complementary – set of objectives appropriate for the context of adult education. I will say more about these below.

Context

Ruskin Mill Trust started as a small craft and land-based educational initiative at Ruskin Mill in Nailsworth, Gloucestershire and has grown to its present status, comprising three independent specialist colleges and several subsidiaries on sites in England and Wales. The Trust's charitable objects are:

> To advance the education of young people with learning difficulties and/or behavioural problems or special educational needs through training in the areas of arts, crafts, **agriculture and environmental sciences**, with particular reference being given to the indications and insights of Rudolf Steiner in these areas.
>
> To promote research into the practice and development of those areas of education provided that all research findings will be widely disseminated.

[55] Crossfields Institute is an educational charity providing bespoke accreditation, quality assurance, programme development and adult education for more than 60 affiliated education centres internationally. Crossfields Institute is licensed and accredited by Edexcel.

Understanding the Principles of Biodynamic Agriculture

The study of Biodynamics is an integral aspect of the PSTE course. It is important to note that the staff at Ruskin Mill have little or no affiliation with Biodynamics when they take up employment with Ruskin Mill Trust (unless they are employed specifically in horticulture or agricultural roles). In the development of the PSTE course I was therefore presented with the challenge of creating a learning process that would introduce Biodynamics to members of RMT staff who had very varying degrees of understanding of either anthroposophy or Biodynamics. The fact that the course is also a component of a professional development pathway within the Trust staff development plan is also significant – staff learners have a very different attitude to the course then either Biodynamic apprentices (see Case Study 2) or students of the BD course at Emerson (Case study 3). Staff often start on the course out of an employment-related incentive – progression and remuneration - and are not necessarily engaging with subject matter that they would have studied of their own accord in a different setting. Embedded as it is within the whole PSTE course, I have been running the process (as course coordinator and primary teacher/mentor) with three key points of reference – or coordinates - in mind.

These are as follows;

1. RMET Vision and Values

The first point of reference is that the course is created to concretely engage, research, and understand the Vision and Values of RMT as articulated in the Trust's Objects (above) and Strategic Plan. The Trust's Vision and Values are inspired by Aonghus Gordon "using the insights of Rudolf Steiner, John Ruskin and William Morris"[56]. The PSTE course is a fully accredited course, validated through the Crossfields Institute and Edexcel[57], with clearly stated learning outcomes and assessment criteria cross referenced to the Strategic Plan:

Learning Outcomes for PSTE Stage 2: Understanding the Principles of Biodynamics

1. Know basic principles of Biodynamic agriculture.
2. Understand how Biodynamic agriculture informs the PSTE method and

[56] quoted from page 36 of the Hiram education and Research department Prospectus 2011-12

[57] http://www.edexcel.com/Pages/Home.aspx

curriculum.
3. Understand how Biodynamic agriculture informs the RMET food policy.
4. Be able to critically evaluate own learning process.

This provides an objective and concrete point of reference for the course and articulates evidencing required for satisfactory completion of the course.

Inside this coordinate of the Vision and Values is reference material that the staff learner is expected to read and incorporate in their research process. These include *Recovering Gifts* written by RMT's founder Aonghus Gordon, the RMT Food Policy, papers by biodynamic practitioners and links to websites connected to the Biodynamic movement. Engagement with Biodynamic literature and Recovering Gifts provides reference material that ensures that the research process engages the theory that informs Biodynamic methods.

2. First Hand Experience

The second essential coordinate in the PSTE course is that it is designed to give the learner *first hand experience* of the activities that comprise the PSTE curriculum. As I found in my own self-education process through an immersion in the study of Spagyrics, an experiential approach to learning has proven to be very effective in engaging new practices and ideas. This approach also includes the invitation to staff to undertake a self-generated learning process, instigated by the question 'what aspect of Biodynamics *do you* wish to research in the second stage of the PSTE course?' This is a very important aspect of the course as it ensures the essential element of 'personal choice' for the adult learner, and gives them a sense of ownership and voice in the process. It is also, I have found, a significant motivating factor. Dennis Klocek, in his book *Knowledge, Teaching and the Death of the Mysterious*, clearly alludes to this essential element to be respected in the context of adult education:

> Anthroposophy is just as effective with adults as the lower school curriculum is for the souls of children. It is just that, with an adult, there needs to be a kind of reversal of the processes, and the work needs to be given to the adult in complete freedom. There cannot be any bottom line or any expectation that this work is going to yield anything, or else the work is seen as coercive and this reduces its potential for soul hygiene. The work has to come out of that unique individual soul on its own moral initiative to unfold towards

> something that is higher than one's own self. No one can teach that, especially to an adult. It is impossible to teach profound truths. That is an alchemical saying. All we can do is provide an opportunity for people to explore the possibility that maybe someday they would like to move in a certain direction morally, to turn their soul. (Klocek, p.81)

This articulation of the ethos behind adult education has profound implications for methodology:

> That is the difference between the high school and adult education. In the lower school you are building a fire. In the high school you are more or less setting backfires. In adult education you are trying to teach adults how to gather kindling for another higher kind of fire. As a teacher, you must simply know when it is the proper time to strike the spark. (81)

In the PSTE course I have designed the process in such a way as to meet – as far as possible – the approach to adult education articulated so succinctly by Klocek in the passage above. This is the second coordinate that informs the design of the PSTE course.

3. Implications for RMT Student's and the Curriculum

The third coordinate is to understand the significance of the Biodynamic impulse and farm organism in the curriculum for students with learning difficulties. An engagement only with the Vision and Values and Biodynamic theory does not 'touch the ground'. It remains only 'head' knowledge but does not inform the primary work of the Trust, which is education for young adults with learning and behavioural challenges. A research process that is too deeply rooted in the individual member of staff's experience is also one-sided, as this then does not allow for the research to inform the *praxis* of education and the deepening of both practical work with Biodynamics or the deepening of awareness of its place in the Trust's Vision and Values.

This third coordinate is hinged on the staff learner engaging directly with Biodynamic land based activities or nutrition (food preparation, preservation etc.) and RMT students engaged in these processes.

At the root of the PSTE course I have designed the course of study to engage with the same pedagogical approach taken by the Trust as a whole in its approach to working with the young people who attend the Trust's colleges, namely: "to address the whole human being through engaging the hand, the heart and the head". (RMT Strategic Plan)

Course Structure

In terms of the structure of the Biodynamic stage of the PSTE course the stage is 'launched' with a whole day at Vale Head Farm, near Stourbridge (a part of RMT's Glasshouse College).

This day has (to date) been co-taught with Ed Berger and Berni Courts, two of RMT's Biodynamic farmers and farm tutors.

The day consists of the following:

- A walk of the farm to introduce the concept of the 'whole farm organism' or 'farm individuality'. This is done through observation, discussion and draws attention to the unique elements of Vale Head Farm in terms of mineral/geological aspects, plant-life, animals (domestic primarily) and human influences.
- An introduction to the farm and to Biodynamics in the form of a slide presentation and talk.
- A group activity – often compost building
- A shared meal
- Introduction to the Biodynamic preparations and addition of these to the compost pile
- Discussion and articulation of the course aims, objectives and assignment briefs (being the second stage of the course learners are familiar with the accredited units though these are looked at again in the context of stage 2).

Learners then go back to their place of work and choose a Biodynamic activity to study by participating in the session or activity, interviewing students about their experience of the session, interviewing tutors about their work with Biodynamics.

The learners then do a short presentation of 20 minutes to their colleagues and submit written assignments recording their experience, research findings etc.

Findings

I designed a feedback sheet and circulated it to those members of staff who (at the time of writing) had completed this second stage of the PSTE course. However I found that informal feedback in the form of comments and statements made in assignments, through email exchanges and through dialogue with learners gave me the most relevant feedback about the course. To reiterate, the significant difference between the PSTE course and the other two

teaching contexts described in the Case Studies to follow is that the learners on the PSTE course have not come to the study of Biodynamics out of an intention to become practitioners or even teachers in this discipline. It is a part of their professional development, and for *some*, it is taken up on a deeper level - as personal development. Many staff members who take the course will have very little to do with Biodynamics, in practical terms, in their role within RMT or in their personal lives. Due to these unique circumstances for engaging with Biodynamic education, the feedback revealed less about practical methods or competencies developed and reveals more about the shift in world-view, with a concurrent shift in 'ways of seeing', that it asked of the individual staff member. In light of Aksel Hugo's reference to a need for a 'healing' between the human being and nature, the PSTE course feedback made evident that this was emerging as an outcome of the course. Although there was an increased awareness of Biodynamics theory and its holistic, practical approach to land stewardship – what emerged through the voice of the learners was an expansion of their awareness – an awareness of self, of the landscape, of the role of the Biodynamic 'farm organism' in healing the split between culture and nature, self and other.

The Learner's Voice

The first example articulates in writing from one individual feedback that I have had verbally from a variety of learners, though using different specific wording of course:

> Sent: 04 January 2012 21:53
>
> To: Jonathan Code (CFI)
>
> Attachments:
>
> Thanks Jonathan for your speedy response. I will have a look at Aonghus' book 'Recovering Gifts' tonight…to be perfectly honest I didn't really expect to get anything out of the training but found so much out about myself. I am feeling a lot more confident in myself now again, which was something that had faded. I have noticed as well that I'm not afraid to voice myself as much in front of others. The lost little soul returns! Ha ha
>
> See you next week
>
> Thanks (author's anonymity protected).

I have included this piece of feedback and place it at the outset of this review as it articulates clearly one of my key intentions for the course that – even though it is strongly embedded in an organizational context, with clear expectations regarding the deepening of organizational ethos, values and practices – it must be 'learner-centred' (the learner being the adult) and

meet the objectives stated in Coordinate 1 above by myself and Klocek. The email quoted above speaks to this objective and the potential that emerges once the learner is 'fired up' to learn. I will return to this theme below in the Discussion.

Another learner writes the following, this time in an assignment:

> Project: the designing and making of an apple press with a group of adults and students (16-18 year old) at Ruskin mill College.
>
> The needs of the farm generated the design brief. Working with our biodynamic apprentices and a group of RM students we decided to design and make an apple press for use on the farm. As a team we collaborated to research current designs and agreed on an initial design. This took several sessions over a two-week period. The overall project took 8 weeks to completion and testing. The majority of this time was spent in the workshop developing the design, our craft skills and supporting each other to complete the project as a team. (RMT) Students were **given autonomy** to experiment and pull in other crafts from all over the college to complete the project. This included horticulture, fabrication, greenwood work and forge work. The finished item was functional and a source of pride for the team. We tested it on a community apple-pressing day.
>
> New skills developed naturally as the need arose. It is the values of this needs-driven project which made it work on many levels for a group of diverse students. The farm as an organism became the container in which we were driven and this education process could take place. We also met some external criteria for the student's qualifications, but more importantly we experienced something of the spirit of the needs of the farm and its community.
>
> The biodynamic farm is often spoken of as an organism. An independent entity with needs and requirements. There is something in the spirit of this other being, the farm, that provides a vessel in which community, crafts, design, education, production and aesthetics can not only co-exist but are driven by necessity.

Another learner described the experience of the course and her research in the following:

> …redemption being offered from hindrance, separation and incapacity, through the pursuit of a particular path – that of the acquisition of **a holistic competence** through involving the whole person in the real history, and material substance of the earth on which we live, and skills which further contribute to the well-being of others as well as of the self – intensifying relationship, beauty, joy and usefulness.

Key themes began to emerge for me while reading the above assignments. Some of these include the words or phrases 'collaboration', 'supporting each other', 'given autonomy', 'source of pride for the team', 'the spirit of the needs of the farm and its community', 'competence', 'in the spirit of this other being, the farm'.

These themes, I realized, had appeared in previous assignments as well – some from Stage One of the course, but others from the Biodynamic stage.

MB - Nature of Material - wood /metal

The most important similarity between working with the two materials is the therapeutic nature of working with hand, heart, and head in order to manipulate a raw material into a useable product/artefact, which in turn changes the participant through his/her experiences and interactions with the material and environment **to build autonomy**.

Each material dictates its own set of unique rules and boundaries within which the participant must .... work with. This provides the student with the opportunity to encounter real physical and mental boundaries in order to manipulate the raw material into a useful/beautiful artefact.

OD - Stage 2

an involvement in these preparations, and with the plants which grow from the soil which receive these preparations, involves learners (if unconsciously) in developing relationships with the universe and cosmic processes. ...**connecting with plants** is a reflection of **connecting to the earth**.

AD

By engaging with the biodynamic curriculum the students can learn how much thought and effort goes into producing the food (and clothing and other goods) that they take for granted. Simple gestures like bringing everyone together to say a blessing at the start of the meal can start to teach our students self restraint and respect for the food, which the earth and much human labour has provided.

RMC student. " yes there was this one time when we were using the horses to plough up potatoes. We just went along and then just thousands of potatoes came up out of the ground!. I was wondering how we were going to pick them up but then loads of people came and we all worked together to pick them up. It was an amazing feeling – **everyone working together** to get something done. "

The seed to table diagram clearly shows the integrated nature of the farm organism, the **interconnectedness** of all the activities on the farm and how they expand outwards into the community. By engaging with the activities, which arise from the desire to achieve this self-sufficient objective, the students will begin to recognize their place within this process and to appreciate the value of the food that they eat. The students start to experience **the connections between themselves, the earth and each other**.

3-in-1: Autonomy, Competence, Connectedness

In the spring of 2011, while I was delivering the PSTE course, Dennis Klocek visited Ruskin Mill and in his lectures discussed the Self Determination Theory and the work of psychologist Harry T Reis. I realized, while reading assignments from the PSTE course through academic year 2011/12, that comments and reflections made by staff learners (such as those quoted above) started to resonate deeply with the three main themes discussed in the Self Determination Theory – autonomy, competence and connectedness. These three terms were emerging again and again from staff learners on the PSTE course, though usually not in a triad, such as that presented by Klocek. I realized that the PSTE learner's voices, seen in light of the Self-Determination Theory, were reflecting numerous threads that I had been pursuing in my research to that point.

A brief description of the Self-Determination Theory follows, which will then be explored in terms of its contribution to my research into principles of teaching and learning in Biodynamics.

Self-Determination Theory

From a psychological perspective the three terms autonomy, competence and connectedness (or relatedness) are described as follows:

> • Relatedness refers to feeling connected to others, to caring for and being cared for by those others, to having a sense of belongingness both with other individuals and with one's community.
>
> • Competence refers to feeling effective in one's ongoing interactions with the social environment… The need for competence leads people to seek challenges that are optimal for their capacities.
>
> • Autonomy refers to being the perceived origin or source of one's own behavior. Autonomy concerns acting from interest . . . One can quite autonomously enact values and behaviors that others have requested or forwarded, provided that one congruently endorses them. (Ryan and Deci, 2002, pp. 7-8)

From an educational perspective, these three areas of psychological function have been studied at some length in the article *Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice* by Christopher P. Niemiec and Richard M. Ryan. These authors give the following definition for the three terms in the context of education:

- The need for autonomy refers to the experience of behavior as volitional and reflectively self-endorsed. For example, students are autonomous when they willingly devote time and energy to their studies.
- The need for competence refers to the experience of behavior as effectively enacted. Students' competence can be supported by educators' introducing learning activities that are optimally challenging, thereby allowing students to test and to expand their…capabilities.

The authors of the above do not give a single succinct definition of relatedness.

Klocek talked about the three in terms of different qualities of *will*.
From his perspective our sense of *autonomy* is rooted in the instinctual will that is part of the 'giveness' of our body and bodily existence. Our sense of connectedness, on the other hand, derives from our spiritual being (Klocek, 2011), in Kühlewind's terms from the superconscious. Our sense of competence mediates these two in placing our autonomous will in service of the wider, community. Conversely we develop our sense of autonomy when the community receives and recognizes our individual skills and capacities and provides them with the social context in which they can unfold.

Implications:

Practical Skills Therapeutic Education: Understanding the Principles of Biodynamics

In their feedback, assignments and reflections learners articulate that the PSTE course contributes to their sense of autonomy, competence and connectedness in the following ways:

Autonomy: Through being encouraged to pursue their own particular interest and question with regards to Biodynamics, learners gain a strong sense of ownership in the process. This enhances their engagement and commitment to the course. In Klocek's articulation of the aims of adult education, this is a process of enabling the staff learner to 'light their own fire' and to keep it burning. It is, for the adult, a parallel to that which RMT fosters in its students, articulated above in several excerpts from assignments.

When given ownership with regards to the research theme, there is a greater openness to exploring the challenges that Biodynamics presents for many RMT learners who are new to it. Through mentoring this gesture of 'giving autonomy' is enhanced and supported while

guiding the learner to also keep their individual path of learning related to the overall objective of 'understanding the principles of Biodynamics'.

Connectedness: Through the engagement practically in the landscape of the Colleges, the work with colleagues in land based and nutrition projects, a study of the Vision and Values of the Trust and Recovering Gifts, and work with the students, the staff learner builds a strong sense of connectedness. RMT names these different levels of relation as 'universe, earth and people' and the PSTE course develops connectedness to these realms, both for staff and students (again, this is evidenced in the excerpts above and through verbal feedback from staff learners). My sense for the potency of the activity of making a compost pile as a group on the first day of the Biodynamic course is to foster this sense of 'contributing to the whole'. Many learners' explicitly refer back to this task as an activity that builds a sense of common purpose and that working together builds a bridge between each other, the land and the future potential embodied materially and symbolically in the compost.

In considering the course design as a whole I am looking for activities that can integrate the individual initiative of the staff learners into a group process that will lead the participants involved in that process to a deeper experiential understanding of the Biodynamic principles. Making a compost pile and adding the Biodynamic preparations to the pile is a perfect activity that time and again has proved to be a powerful experience on all levels – practical, social and as a way of connecting to the farm organism.

Competence: This third member of the triad is very significant. Several levels of competence are articulated in the findings quoted above. One is a renewed sense of self and one's contribution to the college community (see email of January 4th, above). Another is the realization of new skills and practical abilities – either learned or 'kindled' as an aspiration. There is, in the excerpt from the work of SC above, a clear sense of the development of problem solving skills and the ability to work to bring skills together collectively to realize a task.

These are just some - a distilled picture - of the various ways in which the Biodynamic stage of the PSTE programme enhances all three elements of autonomy, competence and connectedness in adult learners.

Implications for learning, teaching and practicing Biodynamics

In Chapter 4, part B I say that "I undertook my research in spagyrics not purely to verse myself in or study practical procedures and work with plants, but to study the way in which my inner life of thoughts, feelings, reactions, was engaged and influenced by undertaking the more 'outer processes' of the lab. I was drawn to study Spagyrics because it seemed to be a process that offered a bridge between the study of matter and mind - 'knowing ' and 'doing'. (Page 45)

The Self Determination Theory, emerging both from PSTE learners' assignments and reflections, highlighted the crucial element in learning Biodynamics that it is *transformational learning.* Learning Biodynamics is not only a matter of learning new knowledge or new skills (though it is of course that) but it offers the potential for transformation of the learner/practitioner in quite fundamental ways. Initially it does this because the new concepts, methods and practices that we meet in Biodynamics give rise to what I might call the 'mirror' or 'shadow side' of the SDT – dependency, incompetence and isolation. The new ideas and practices presented to a group of PSTE learners new to Biodynamics has often been met with scepticism, rejection, ridicule or unquestioned acceptance. I have come to conclude that this is often due to the fact that these ideas and practices need to be bridged and that the role of the teacher is bridge building. In the context of adult education I found, through teaching the PSTE course, that this bridge is best built *with* the adult learner. It is not a bridge that the teacher or 'instructor' can build *for* adult learners. Klocek has succinctly touched on this point in the references above. This leads to a question of teaching *methods*, which I will take up through a second Case study.

Case Study 2: Researching Teaching Methods

Course: Weather and the Elements

Vale Head Farm, Stourbridge

Run over three days in the spring of 2010 and 2011 this course is designed for Biodynamic apprentices in their second year of a Biodynamic internship. As such there is, on my part, an

assumption that there is already quite a good grounding in the theory and practical aspects of Biodynamics. Where this has often proven to be the case, I have also found that the apprentices bring a wealth of practical experience and know-how but often ask about the preparations and how to understand the principles that inform their design and application.

Based on my research into the alchemical world-view and Spagyrics, I have brought elements of these two fields into my teaching and explored their relevance in the context of Biodynamic education. I have often found that the participants in the seminar have had no explicit engagement with alchemical thinking or alchemical principles and the course introduces these to the apprentices through a presentation (delivered over three mornings) and practical exercises.

This case study reviews a seminar which ran under the title 'Warmth, Light and Moisture' for several years but has recently changed to 'Weather and the Elements'. This change better reflects the decision (made by myself and Ed Berger, the farmer at Vale Head Farm) to engage more explicitly with the theory of the Four Elements and the alchemical world-view in the course of the workshop.

Context

When preparing a course or workshop and considering the design of the session and the methods I will use, I carry the questions: "What practical activity can I introduce which will provide the opportunity for a strong experience of substances and their transformation? Is the activity a good 'bridge' between theory and practice? Can the activity be a door into challenging theoretical ideas or unfamiliar practical processes?"

A central exercise that I have placed in the first day of the Weather and the Elements seminar is that of having the apprentices light a fire with a fire bow in groups of three. The decision to include the practical task of fire lighting in a seminar on Biodynamics arose for me out of realization that certain key practical tasks (as in the making of a Spagyric remedy) can, if approached in the right way, be a 'door' to a new way of seeing the substances and processes encountered in those activities. In the context of the seminar on Weather and the Elements the practical activity of Fire lighting is preceded by a brief introduction to the Theory of the Four Elements. It is essential to note, however, that in terms of teaching methodology, I place the

practical task as the entry point to the phenomenology of Fire during the seminar. Whereas there is a theoretical perspective that informs my choice of this particular task, when introducing the task to apprentices, I hold back at the beginning of the process in making this theoretical background explicit. I do so on the basis that I am seeking to create a foundation in the *first-hand experience* of the learner in order that the subsequent exploration of how the element Fire was conceived of by the alchemists, and the question as to the possible contribution of the Theory of the Four elements to understanding Biodynamics, can be drawn from that experience.

Theoretical considerations informing the task of fire lighting.

From an alchemical perspective, encapsulated in the mantra *ora, lege, lege, lege, relege, labora et invenies*[58] (Junius, 2007, p. 26) the theory informs the right practical activity but does not replace it!! I will therefore briefly describe this theoretical perspective, not to overshadow the task of fire lighting - which is the core methodological element I have placed at the centre of this case study – but in order to make explicit the way in which I have, as workshop leader, contextualized the choice of activity and its intention.

Fire – the fourth Element.

Ernst Lehrs engages with the question of the 'Elements' at some length in his book *Man or Matter* (1985), and he traces the transition from a period (lasting almost two millennia) when the theory of the Four Elements informed human consciousness in a multitude of ways, to the modern view of the chemical element as encountered in modern chemistry. With reference to Fire, Lehrs explores at length how the perception of this particular Element changed over time and the significance of this change for subsequent developments in our cognitive life. He proposes that;

> The picture of the process of combustion as conceived by man in different historical ages is indeed symptomatic of his experience of nature in general, including his particular conception of physical matter. (Lehrs, 1985, p.218)

[58] translated by Junius as " pray, read, read, read, read once again, work, and you will find it" (2007, p. 26)

From a historical perspective, the four-fold picture of the Elements as handed down from Aristotle gradually gave way to the three aggregate states of matter – solid, liquid and gas[59]. These latter were in effect all understood in terms of the ultimate 'part' or particle – the atom – the relative movements of which determined the manifest state of matter. The Four Elements, on the other hand, were understood to be different qualitative states or expressions of matter (or mind!). This conception is akin to what I found regarding *sal, sulf* and *mercur* and arises from a *dynamic* way of seeing rooted in a cultivation of imaginative cognition.

Where a theoretical case for a renewed engagement with the Theory of the Four Elements is clearly made by Lehrs, I have, through the inclusion of the fire-lighting process in several teaching contexts, sought for means of *facilitating an experience* of what such an engagement would reveal. I have previously described this as part of an attempt at building the bridge between 'knowing' and 'doing' (Hugo). The exercise is designed to engage the alchemical world-view through the practical and emotional experience of fire lighting deepened through the subsequent reflections and discussion. The result of which (it is hoped) is similar to my experience with the spagyric process – a new understanding of substance and process through a hands-on experience, and a deepened insight into the *dynamic principles* that inform our understanding of *substances*.

Lighting Fires

When I invite a group of three adults on one of my courses to light a fire with a fire bow I realize that I am quite consciously asking them to start in the flip-side (or what I have referred to above as the 'shadow side') of the three capacities identified in the Self Determination Theory. Very few people are familiar with the process and thus I invite them to start in *incompetence*. This places them in a *dependent* position (the flip-side of autonomy) – dependent on me as a teacher and skilled firelighter and on the other members of the group. They are usually awkward in the group to begin with as their *incompetence,* and *dependency* leads to a sense of *isolation.* Each person is thrown back upon themselves. This is a conscious design element on my part, for although it is possible to undertake the process alone, I

[59] Brady's contributions to the book *Being on Earth*, explored in The Art of Knowing pp , are relevant also to this shift in the history and philosophy of science and the shift in scientific consciousness that led to concurrent changes in how the term 'element' has been understood.

consciously have the learners do the process as a group of three as there is a tremendous opportunity for group building in the exercise. In the beginning, however, there is no 'group' only a gathering of individuals.

Once the group has become engaged, several developments can (and often do) take place. The group manages to organize themselves into roles – i.e. one person holding the vertical spindle so that it can rotate freely without being pulled side to side by the movement of the bow. This is already a call for autonomy (focussed on own task) within the process as a whole (paying attention to the downward pressure and working *with* the two group members on the bow). Other roles equally require focussed individual attention to a particular task while making their efforts serve the whole process.

I have noted again and again that only if this balance can be found between individual roles being performed in service to the whole will the process start to work. This is often indicated by the arising of smoke and may even lead to the creation of an ember.

There is usually a time where the process starts to work and the three individuals gain in competency with regards the practical technique required, their different roles and the process as a whole. This is not a linear development and there is oscillation when the group is tested to stay with the task while they seem to take two or three steps backwards having had some initial success. With determination and commitment the group can achieve what is in many respects a remarkable achievement – lighting a fire through friction. At this point the elation is palpable, the sense of achievement very pronounced and the three individuals have created a bond through their combined effort.

What is important from the point of view of teaching and learning is that I have come to see the method exemplified in the task of fire-lighting as a very profound example of how I can work with a group so that - beginning with new material or unfamiliar tasks – they can move to a place of autonomy – "I did this through my own intention and initiative, I am the active agent in this process" – connectedness "my efforts were in service to the whole and we each played parts in achieving an outcome that needed us all in order to succeed" - and competence – "I have realized new skills, new insights regarding the substances I have encountered and have a renewed sense of my self capability".

Feedback

The exercise of fire lighting was, for many apprentices, the highlight of the weekend and a most impressionable learning experience.

Some of the comments from participants when reflecting upon the fire lighting process:

"A must for the course".

"The experience was very strong. Top of the course".

"Fantastic experience. Something I have always wanted to do. I could definitely relate it to the weather process."

"Lets us learn something not from the head, but body, feeling, will."

"An amazingly thrilling experience, quite emotional."

At the end of the Weather and the Elements course that ran in the spring of 2010 I chose to hold an interview with the participants in order to obtain some reflections on the fire-lighting activity and its contribution to the course.

The transcript from that interview is reproduced in full in Appendix VIII.

From this interview, I found that the process of fire lighting contributed significantly to the course and created a strong experiential basis for understanding the Theory of the Four Elements. Comments from the participants that are significant and that speak of the quality of the experience and what they gained from it are descriptions such as: "an initiation", "mindfulness", "frustration", " joy", "nurturing of the ember", "feeling of warmth", "presence", "making that fire really brings you much much more in touch with the mystery", "primary experience", "hope", "nourishment", "Beingness of Fire".

What emerged from this way of working - from the method of working with practical tasks informed by an alchemical world view - was a deepening of the qualitative nature of the element Fire, an 'opening' or renewed wonder and sense for the nature of Fire both in the 'outer' world of nature and in the inner life. This activity contributed to a shift in the participant's way of seeing and revealed a dynamic quality to Fire that they had not had previously. It was, furthermore, a doorway into a true *understanding* of the Theory of the

Four Elements and provided insight into the potential for this alchemical perspective to illuminate a view of substance[60] that has informed Steiner's Agriculture Course.

That such a way of seeing can be brought to the *experience* of students of Biodynamics – and not remain a theoretical proposition – is evident through the participant's experiences of lighting fires with fire bows and the subsequent discussion, dialogue and presentations on the Theory of the Four Elements.

Case Study 3: Researching elements of Course Design

Course: Introduction to Plant Phenomenology

3/10/2011- 06/10/2011 – Biodynamic Agriculture College, Forest Row UK

The design of this workshop was informed by the question:

"What would the interweaving of science, art and contemplative methodologies or activities contribute to the overall learning of the principles of Biodynamics?"

This question is directly informed by theoretical considerations and proposals made in The Art of Knowing on pages 42 of this thesis.

Context

A four-day seminar held at the Biodynamic Agricultural College, Emerson Campus, Forest Row, UK for first year students on the Biodynamic Agriculture and Horticulture courses. This was a group of 18 students who were enrolled on the course full time and 3 learners who joined the group for this particular seminar. The course coordinator also joined the class.

[60] In his series of lectures titled *Therapeutic Insights, Earthly and Cosmic Laws* Steiner discusses in some depth the epistemological shift that comes about through seeing the Theory of the Four Elements in context. From this perspective he proposes that a further dimension to the Theory of the Four Elements is that each Element can be understood to be a *way of seeing* and, in Bortoft's terms, 'what is seen depends on the way of seeing'. This is made evident in the following passage: "What you call your seventy-two elements all belong to what we call Earth; it is very nice that you differentiate it and analyze it further, but for us the properties that you recognize in your seventy-two elements belong to the earth. Of Water, Air and Fire you understand nothing; of those you have no conception" (1984, p. 13) Case Study two is an example of my method for exploring this proposal, in the context of a wider exploration of the Theory of the Four Elements and the alchemical worldview.

The seminar was run over the four days with 3 sessions each day of between 1.5 and 2 hours in length. The seminar was described online on the Biodynamic Agriculture College website as follows:

> This four-day course is an introduction to plant phenomenology. We will work with plants from a variety of perspectives including Goethean phenomenology, spagyrics and an alchemical understanding of plant processes, evolutionary themes in plant morphology. Through a combination of presentation, collaborative research, simple experiments and group work we will enter this study of the remarkable world of plants. Through these collaborative study and research days we will come closer to an understanding of the potential for plants to contribute to health and well being – in ourselves, our gardens and farms, and in the wider community of nature.

In my teaching of this seminar I worked with both the explicit outcome of giving the learners a basic understanding of phenomenological methods and practice. On the other hand, what was not initially explicit to the learners, was that I was also doing so on the basis of my research into the structure of the course itself – considerations of course design. I wanted the learners to be able to experience the course, and then reflect upon it openly, without a possible distortion due to attention being placed on a research process or design intention.

I prepared the four-day Plant Phenomenology seminar ahead of time, drawing up a schedule (Schedule in Appendix VI) on the basis of the trichotomy of scientific, artistic and contemplative modes of enquiry. In practice this meant that I planned certain sessions to be informed more by a scientific perspective, some through artistic exercises and some with quiet, contemplative activities. I also planned the week so that certain sessions were 'hands on', practical and engaged physically, other sessions were more about the students feelings or reactions to phenomena, and still others were analytical and theoretical, brought with more of a didactic approach. These design decisions arose out of the theoretical stance that I stated in The Art of Knowing (page 35-6), namely that 'In Heinrich Khunrath's articulation of the hermetic path of knowledge there lay, it struck me, an indication for a way of knowing which may be adequate to understanding Nature and the Human Being. This way of knowing would engage and honor the disciplines of science, art and contemplative practice in their own right – in isolation as it were – while also recognizing the value, importance even, of finding a synthesis of insight arising from that prior engagement.'

The workshop in phenomenology was designed to explore the practical possibilities in the context of teaching Biodynamics for the theoretical stance taken above. In order to then get reflections from the learners who participated on this course on the style and format for the seminar I designed a feedback sheet (appendix VII), which the learners completed after the final session.

Feedback

22 participants completed feedback sheets.

Though I included a question on the feedback sheets regarding 'learning styles', and this was included so that I could address the fact that learners have preferences for different styles of learning (either hands-on - 'kinaesthetic', didactic – 'verbal, informational', or relational – 'through dialogue and social process') I will focus in the context of this case study on the questions regarding *course design*.

Course Design

In the course design (Appendix VI) the following sessions were designed with a 'scientific' approach in mind:

Phenomenology (of a plant chosen by the participant, and of the Four Elements through the mineral kingdom, phenomenology of water, air and fire)

Distillation of essential oils from lavender

Introduction to Spagyrics – theory

The following sessions were designed with more of an 'artistic' approach in mind:

Creative writing exercise based on 'it, you, I' perspectives of the plants chosen by the course participants

Drawing and sketching exercises

Essential oil portraits (pastel gesture drawings to depict qualities in plant scents).

The following sessions were designed with more of a contemplative approach in mind:

Sit spot (based on native American process of contemplative enquiry into place combined with a Goethean process of exact sensorial imagination).

Feedback for this design approach to the course was sought initially through the general question:

Did the week help you to understand more about Biodynamics?

2 participants didn't answer the question

16 answered with clear 'yes' answers and most followed these with longer explanations.

3 answered obliquely, stating that they had learned about phenomenology or 'how to look at a plant'.

1 answered with 'not sure' (followed by a longer explanation that makes evident that this individual is very new to Biodynamics).

With regards to the three aspects that informed the different activities of the workshop, the overall feedback was positive, though I became aware through the feedback that the week was too 'full' and there was more time needed to digest and consider what we had worked with in each session. Several participants explicitly reflected on the design of the week and the approach taken in the different sessions as follows;

"Yes – it has reinforced the idea that a different approach - or way of seeing/consciousness - is required in order to understand ("get") Biodynamics"

"It was a really good complement to the introductory course last week and the concepts and 'recipes' sit much easier now as I feel like I've understood the 'why' more."

"I wonder whether it would have been better to do (this course) BEFORE the work on the preparations[61]…some people I know found they need some foundation for that and I think this would have provided it."

"Excellent way of combining the knowledge of alchemy with the etherics/biodynamics in a free, home made rendition. Without quoting Steiner, I loved it!"

[61] This group had a week course on an introduction to the Biodynamic preparations the week prior to my course, which was delivered by another tutor.

In the spring of 2012 the following additional feedback came in the form of an email from the course coordinator. The email refers to a course review that the group had just undertaken of the whole year.

"March 12, 2012

Hi Jonathan, The students really enjoyed your classes - we are having the course review this week and your week came up again as one they enjoyed most!

AH"

Review and Summary

During my analysis of the feedback, I realized that my feedback sheet needed to be more focussed in order to provide a clearer sense of the *specific* contributions of a course design that weaves scientific, artistic and contemplative practices into a whole approach. Responses are general, very personal, and the participants were not able to respond directly to the different approaches due to the form of the questions posed. I realized that in future, I would need to be more explicit with these questions in order to come to a clearer sense of the specific elements of my course design.

This said, however, in response to my initial question;

"What would the interweaving of science, art and contemplative methodologies or activities contribute to the overall learning of the principles of Biodynamics?" the comments quoted above indicate that an interdisciplinary approach allows for an engagement with *principles* rather than purely didactic information or recipes.

I felt confident enough with the approach taken in the Plant Phenomenology course to work on this basis in further workshops and seminars, and to continue to refine the interweaving of scientific, artistic and contemplative approaches to the subject matter in question. I will return to this question of *course design* and the weaving of artistic, scientific and contemplative perspectives in the discussion that follows.

Chapter 5 ~ Discussion: Synthesis

We can't solve problems by using the same kind of thinking we used when we created them.

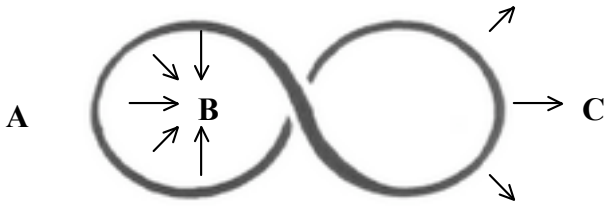
Einstein

As stated in Chapter 2, the aim of my research was to identify for myself some of the principles that inform the design and production of the biodynamic preparations with a view to then identifying competencies necessary, as a practitioner in Biodynamics, to work effectively and creatively in this discipline.

A second stated aim, as a teacher of Biodynamics, was to contribute to Biodynamic education by identifying possible methods and principles of course design that can contribute to the work of educators in this field.

Overview

Pictorially this has been a process with an initial 'inward' focus (first aim) which I have referred to as 'self-education' or 'self-guided apprenticeship', followed by research into the suitability and effectiveness of this learning applied outwardly in the context of workshops and seminars in Biodynamics (second aim). From this perspective the different sections of Chapter Four have evolved in the following dynamic.



Theory; establishing the 'field' → *Self-education; hands-on research* → *Teaching; social process*

This figure above is apt because I will state at the outset of the following discussion that it is an *ongoing* path of learning, research and development. It is not complete, or 'finished'. The

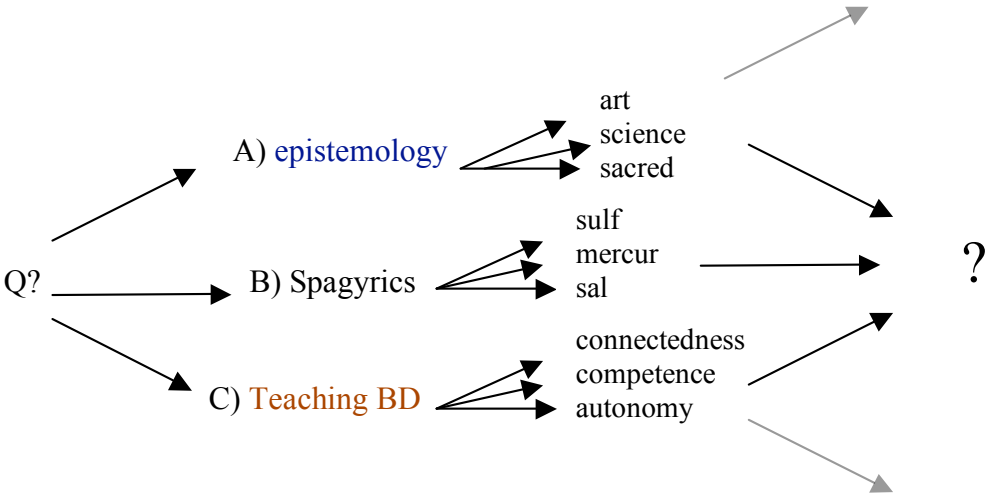
two halves of the lemniscate move into one another, inform one another. It is a weaving or circulating, ongoing dynamic with strong parallels in the process of the Spagyric preparation of a medicinal essence – forming, dissolving, distilling, refining, and reforming.

Three-in-one

The aims of my research (re-stated above) were pursued by engaging the question;

What way of knowing stands behind the Biodynamic impulse; how can this be understood, learned and experienced by myself in order that I might also effectively contribute to Biodynamic teaching, learning and research?

Through a process of separating out (illustrated on page 18 and reproduced below) three core themes in my research question revealed the following findings or insights;



Findings

To recapitulate, the 'essences' distilled out of the three different paths that I pursued are:

A) The Art of Knowing

- The distinction between two modes of consciousness – the verbal-intellectual and the holistic (Bortoft)
- The need to be conscious of which *way(s) of knowing* are being brought to bear on the enquiry into a phenomenon – "what is seen depends on the way it is seen" (Bortoft)

- The need to consider the *superconscious* in the act of cognition and to create situations in which knowledge or insight can arise from this superconscious realm (Kühlewind)
- The potential for knowing to be informed by the intertwined disciplines of artistic activity, contemplative practice and scientific enquiry (as evidenced in the work of J.W. Goethe, the alchemical method, Khunrath and Klocek).
- The importance of recognizing the imagination to be a way of knowing and that the development of imaginative cognition "amounts to a restructuring of consciousness itself" (Bortoft, 1996, p. 63)

B) Spagyrics

- A direct experience of the possibility of developing *qualitative* experience and a qualitative depth of understanding of both substances and processes through working with the Spagyric or alchemical method of preparing a plant remedy.
- A realization of the potential for the alchemical Tria Principia to inform a wide range of disciplines based on its attention to archetypal *processes* (*sal, mercur, sulf*) and thus its wide applicability to those realms included in Chapter 4, B of this thesis as well as to areas not yet specified.
- A realization of the *synthetic* activity of the imaginative mode of cognition whereby "the experience of relationship as such" arises "through a transformation from a piecemeal way of thought to a simultaneous perception of the whole". (Bortoft)
- Recognition of a key point in the process of cognition, one that I have named the 'turning point', in which a significant transition between two modes of consciousness lies.

C) Teaching Biodynamics

- The contribution of the Self-Determination Theory (SDT) to an understanding of adult education aims and objectives
- The potential of using the SDT in combination with practical activities to provide a basis for introducing and engaging new practices, theories and *ways of seeing*
- The benefits of interweaving artistic, scientific and contemplative activities in course design for Biodynamic teaching and learning

Retrospect

My research question has its root in my initial interest in Biodynamics and the conundrum presented by the Oak Bark preparation used by Biodynamics farmers and gardeners. Looking back over the path I have followed and the findings arising from that path (listed above) I can describe it in the following terms.

To begin with, the Oak Bark preparation is presented as a 'given' – an indication originally given by Rudolf Steiner in his Agriculture Course.

A first encounter with this preparation is often met (as evidenced for me in teaching the PSTE course) with scepticism or reactions that cast it off as 'witchcraft' or ritualistic nonsense. There is not always at this stage openness to exploring the prep further. For my part, I became interested in the preparations some time ago and began to use them in my garden and compost. However, I did this with little to no understanding of the *principles* out of which they were created.

This, I realized, was one 'level' of engagement with Biodynamics. At this level it is possible for someone open and interested in Biodynamics to purchase the preps and use them, following indications for timing, placement, storage etc. that are given by an increasing number of practitioners. This is fine and good, and even (as quoted on page 11) indicated to be a fruitful development of the preparations and their use.

However, there came a time – in my own work with Biodynamics as a gardener – that I wanted to understand the principles that lay behind the creation of the preparations on a deeper level. This same desire for *understanding* was increasingly being asked for by students and apprentices whom I encountered on my courses. In order to try and bridge the gap between 'knowing' and 'doing' I have researched the alchemical-world view and its contributions toward developing transformative education methods.

Stages of Learning

What became apparent to me through the journey re-capitulated above was that my research could be contextualized and synthesized in terms of different *stages of learning*. I will describe how I have come to understand these stages in the process of learning Biodynamics

by first discussing the concept of *learning stages* more generally, in order to build a context for the model I am proposing.

The Four-Stage Learning model

A very common model for stages of learning is that model attributed to Abraham Maslow[62], the 'Four Stages of Learning' or the 'Four Stages of Competence'. This model has clear crossovers with the Self Determination Theory, described in Chapter 4, C above. I will return to this cross over in due course.

The Four Stages of Learning are described as follows:

1. Unconscious incompetence

2. Conscious incompetence

3. Conscious competence

4. Unconscious competence

An example from the Process Coaching Website gives a succinct example of how these stages of learning are understood in the process of acquiring a new skill.

> Using the example of learning to drive a car, as a child I first thought that all I needed to do was sit behind the wheel and steer and use the pedals. This was the happy stage of unconscious incompetence.
>
> When I began learning to drive, I realized there was a whole lot more to it, and I became a little daunted. This was the stage of conscious incompetence. There were so many different things to do and think about, literally hundreds of new behaviors to learn.
>
> In this stage I made lots of mistakes, along with judgments against myself for not already knowing how to do it. Judgment release can be very helpful here in the second stage because mistakes are integral to the learning process. Information can be accumulated, but until it is practiced and used, it's only information. It's not learning, and certainly not a skill.
>
> As I practiced, I moved into the third stage of learning, conscious competence. This felt a lot better, but still I wasn't very smooth or fluid in my driving. I often had to think about

[62] The following quote from Wikipedia suggests a different origin " Initially described as 'Four Stages for Learning any New Skill', the theory was developed at the Gordon Training International by its employee Noel Burch in the 1970's. It has since been attributed to Abraham Maslow, although the model does not appear in his major works'. (retrieved April 2012).

> what to do next, and that felt awkward and uncomfortable.
>
> Finally, after enough practice, I got to the place where I didn't have to think about every little thing I was doing while driving. I thought about my driving only when something alerted me to it. I became unconsciously competent. Because of the ease and grace in unconscious competence, my driving became much safer. (Process Coaching Website).

Whereas the above example seems to illuminate clearly the process whereby a new competence is learned to the point where it becomes 'unconscious', the 'Four Stages of Learning (or Competence)' model has been critiqued for being primarily focused on the acquisition of new *skills*. It seems clear that the model requires elaboration when a learner is not only learning to acquire new skills but is faced with the challenge of developing new ways of seeing or thinking. Dr. Lorgene A. Mata writes "I find this model applicable mainly if not exclusively to the acquisition of physical skills or competencies and not to higher mental skills where conscious, non-repetitive, complex and creative mental operations are demanded" (Chapman, 2012).

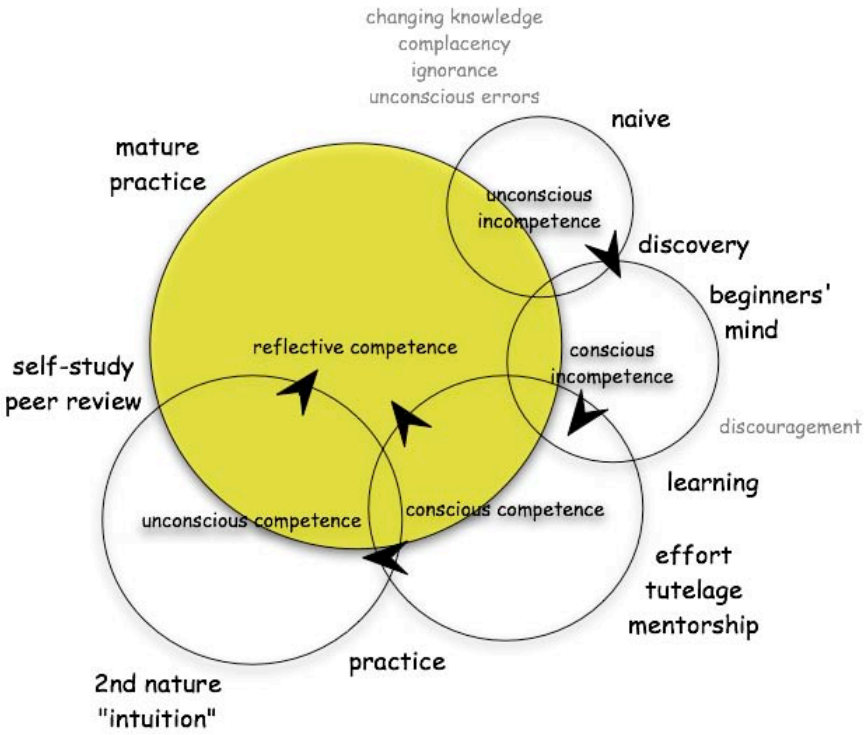
Critics of the Four Stages of learning model have often put forth proposals for its further elaboration. Dr Mata continues her critique (above) with the following:

> I believe the highest level of competence learning is not level 4, 'unconscious competence', but a higher 5th level which I call 'enlightened competence'. At this level, the person has not only mastered the physical skill to a highly efficient and accurate level which does not anymore require of him conscious, deliberate and careful execution of the skill but instead done instinctively and reflexively, requiring minimum efforts with maximum quality output, and is able to understand the very dynamics and scientific explanation of his own physical skills. In other words, he comprehends fully and accurately the what, when, how and why of his own skill and possibly those of others on the same skill he has. In addition to this, he is able to transcend and reflect on the physical skill itself and be able to improve on how it is acquired and learned at even greater efficiency with lower energy investment. Having fully understood all necessary steps and components of the skill to be learned and the manner how they are dynamically integrated to produce the desired level of overall competence, he is thereby able to teach the skill to others in a manner that is effective and expedient. (Chapman, 2012)

This elaboration of the four-step learning model is significant as it begins to identify a level of learning and understanding that becomes transferable, teachable. A further elaboration of the Four Stage, hierarchical model of learning has been proposed by Will Taylor[63]. Taylor elaborates on the previous model by introducing a fifth stage (reflective competence) and adds a cyclical orientation to the different stages.

[63] Chair, Department of Homeopathic Medicine, National College of Natural Medicine, Portland, Oregon, USA

A Five-Stage learning model



(Image courtesy of Will Taylor)

Taylor proposes the following with regards the learning stages:

> This is more of a spiral model than a hierarchical matrix. It would seem that mature practice involves a mature recognition that one is inevitably ignorant of many things one does not know (i.e., we revisit 'unconscious incompetence' repeatedly or continually; i.e., 'consciousness of unconscious incompetence'). Repeatedly, we are continuously rediscovering 'beginner's mind'. We revisit conscious incompetence, making discoveries in the holes in our knowledge and skills, becoming discouraged, which fuels incentive to proceed (when it does not defeat). We perpetually learn, inviting ongoing tutelage, mentoring and self-study (ongoing conscious competence). We continually challenge our 'unconscious competence' in the face of complacency, areas of ignorance, unconscious errors, and the changing world and knowledge base: We challenge our unconscious competence when we recognize that a return to unconscious incompetence would be inevitable. We do this in part by self-study and use of peer review - such that mature practice encompasses the entire 'conscious competence' model, rather than supersedes it as the hierarchical model might suggest. (Taylor, 2007)

Taylor's elaboration of the Four Stage model is another step in the right direction, I feel, as the fifth stage he proposes of 'reflective competence' is key for the context of teaching

wherein a teacher needs to be able to reflect upon their own competence in order to be able to teach it to others[64].

Learning Biodynamics

In light of my research into learning Biodynamics, I feel that a further elaboration of the stages of Learning is appropriate. Taylor's use of an illustration to approach the complexity of this process is helpful, and in seeking a way of encompassing the findings that have emerged through my studies (page 107-108 above) and to take a step toward a potential synthesis or *coagula* of those findings I will also use an illustration. In building up the following I will hang my reflections on a seven-step learning sequence and in the process pay tribute once again to alchemical thought where such a seven-step process was depicted in symbolic pictorial imagery[65].

The sketch on the following page will provide an initial picture of the process as a whole as I see it based on my current understanding. As is evident from both Taylor's recognition of the cyclical nature of the learning cycle and from my own experience of the learning process, the image could be developed as a circle. However, I have arranged it as an arch to make more visible the way in which I am interpreting Kühlewind, Bortoft and others in differentiating two modes of consciousness. This proposed layout for a way of considering the stages of learning that I have encountered in my research into 'learning Biodynamics' arises due to the challenge that already emerged in the four-stage model. When it is not merely a question of learning new skills, but a matter of developing new ways of thinking, perceiving, and doing, what would an appropriate image be that could bring to light some of the complexities of this learning journey?

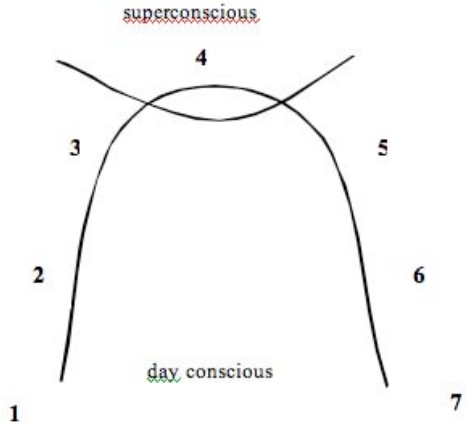
A seven stage learning process

The following image can be seen as representing a *movement of consciousness* in the learning process, as articulated by Kühlewind and Bortoft. Starting on the lower left (1) in what for Taylor was the place of 'unconscious incompetence' this is our 'everyday' experience of self

[64] Taylor's diagram was retrieved from http://www.businessballs.com/consciouscompetencelearningmodel.htm, which contains very interesting perspectives on both the Four Stage learning model and contributions toward articulating a fifth stage which many people feel is necessary to adequately represent the learning process.

[65] see the image in Appendix X – The Alchemical Tree from *John Daniel Mylius:Philosophia reformata.*

and world. Ernst Lehrs has referred to this mode of consciousness as that of the ‘onlooker’ (Lehrs, 1985).



Stage one

This first stage is where we encounter or perceive a phenomenon as ‘given’. Taylor (page 111) uses the term ‘naïve’ to describe this stage of the learner’s relationship to the object of knowledge. In my relationship to the Oak Bark preparation this is where I first used it out of a sympathetic sense that was in many respects unconscious, and un-questioning. The Oak Bark prep came to me as the product, or ‘corpse’ alchemically, of the creative activity of another person. Mylius depicts this stage with a raven perched on a skull on the ground (Appendix X). Habitual modes of thought are what dominate at this stage. There is a static relationship to the object of knowledge, it is experienced as a feature of a ‘finished’ world of objects. There is at this point a ‘taken for granted’ sense of one’s own autonomy, competence, and connectedness but this will be revealed in the next stage to have been a feature of the habitual thought and feeling life. At this stage I used the Oak Bark prep much as I would any soil improver that has come out of an analytical understanding of the essential nutrients required for growing healthy plants. There was not, at this stage, an embracing of the fact that the preparation arises from a very different epistemology, ontology and methodology (Lorand).

Stage Two

This stage is very strikingly illustrated alchemically by the bird on the ground that has become aware of the mirror image of itself as 'corpse' in the earth. The 'onlooker consciousness' wakes up to the fact that it *is* an onlooker, i.e. that what it sees is in some way a reflection of its own seeing. Taylor calls this stage 'beginner's mind' (page 111). I understand this to mean that a level of 'conscious incompetence' has been realized. It is now clear that what had been taken as 'understanding' or knowing reveals itself to be un-knowing. For myself, this is where I realized that I needed to reflect upon the epistemological foundations of *my own way* of thinking, a *way of knowing* that was congruent with the type of logic that informed the Enviropig but that would not give me access to an understanding of the Oak Bark preparation. It is possible at this stage – still using the activity of the verbal-intellectual mind - to reflect upon the way in which the new object of knowledge (or object of 'not-understanding) relates to previous knowledge. Lorand's paradigmatic analysis undertakes this comparison of four different agricultural methods in order to position Biodynamics in relation to those. This is a great step in identifying what is going to be required in order to move toward a deeper understanding of the preparations. I see the research and journey undertaken in The Art of Knowing (Chapter 4 part A) as being an example of this second step of the process. The previous 'unconscious' sense of autonomy, competence and connectedness begins to fragment in the process! A sense of 'I am not so sure that I know *what* I am doing with these preps, *why* I am doing it, or *who* they serve' arises. 'I am just following a recipe that I don't actually understand' is the seed realization that takes the process to the next stage.

Stage Three

This stage starts to shift the process in quite a dynamic way. Whereas in Stage 2, my research into the preparations included the making of several preparations with a more considered attention to the different aspects of place and timing (as in the Prelude), the preparations were still – for me – being used based on the indications of others and through a diligent following of the 'recipe' as to how to make them. In stage 3 I place my research into Spagyrics. Here some heat is needed - the agent of all transformation - a different kind of willed activity. I relate this phase to Taylor's description of the 'effort, tutelage, mentorship' stage of his model

(above). In stage 3 Mylius depicts two birds attempting to lift the corpse of the raven out of the ground. Through the process of preparing a spagyric remedy I sought to 'lift' my understanding to another level. I see this Stage as an intensification of activity and attention – one that I will refer to as 'my will be done'. It takes effort and repeated attempts to lift the leadenness of previous modes of thinking, habitual ways of doing and passive feelings into a place of openness to new insight. It takes the *desire* or intention *to lift*. For some learners this may not be important and they may wish to work with processes that are familiar and accepted. For others, however, there is a wish or need to go further.

A wide range of emotions accompanies this stage that I have experienced (and witnessed in others) when working to light a fire with a fire bow (Case study 2), or to make the spagyric essence, or to understand the Theory of the Four elements. At this stage the *solve* needs to be undertaken through the various types of will (heat) needed to distinguish, clarify, and refine the problem into its 'essentials'. It is a process accompanied by exhilaration, frustration, anticipation, disappointment…the bird may not get off the ground. The shadow elements of the SDT arise – a feeling of dependence (on the authoritative knowledge of others), deep incompetence, and isolation – alone in the work. The way forward is to persevere. The danger at this point is to 'push' the process through on the sheer force of one's own will… or on determination alone. Something else needs to come in! The realization can arise that it is not, in the end, 'my will' alone that will bring the new insight or understanding. We must first navigate 'the turning point'.

The Turning Point

Rather than being a stage in itself I would place the turning point discussed in Chapter 4 (page 76) between the third and fourth stage of the learning process I am describing. I do so because it is not at all a given that the turning point is navigated. I discussed this challenge in terms of the shift from the activity of the 'intellect' to that of 'reason' as described by Rudolf Steiner (page 77). In Bortoft's terms this is the shift from the verbal-intellectual mode of consciousness to the holistic mode of consciousness. Georg Kühlewind has placed great emphasis on this point in the process by identifying two types of will. The one will – the will to lift the 'corpses' of our thinking and our perception out of the grave of our reflective consciousness – is the hard will (*my* will…). But, (and it is a big but) this type of will needs to

be turned, or in Kühlewind's terms "reversed", to become the 'gentle will' which is *receptive* where the hard will was not (Kühlewind, 2011). This is the crux of the turning point.

In my own experience this is not at all an easy point to navigate, and the tendency to 'hold on' to previous modes and habits is very strong. Resistance arises, the inner resistance to change. The turning point is a 'letting go', a 'give away' but not a 'given'. From a certain perspective this is a death process, but a different kind of dying than that which led to the lifeless thoughts and habits of stage 1. In the turning point we have to 'die to ourselves to awaken in the other' and we may experience all kinds of inner schemes and ways of avoiding this experience! The training here is that we take *ourselves* through this point and this takes practice – a practice in 'unknowing', in dissolving, in dis-*solve*-ing.

Stage Four

This stage is that of the 'exaltation'. The touching in to the superconscious is the 'crowning glory' of the process thus far. It is a moment of grace, '*thy* will be done'. It is a gift whose arising cannot be manipulated, forced or coerced. This is the 'Eureka!' moment of the scientist, the point in the artistic process wherein an artist encounters an "active absence" [66] that inspires their work and the moment of grace that can 'touch us' during contemplative activity. The symbol of the crown appears in Mylius' image at the crown of the tree. I experienced this process as the 'simultaneous, intuitive constellating' experience where previously discrete elements' (Bortoft) became understood in a meaningful whole (in my renewed experience of 'heat'). Whereas the earlier work was a question of *my will* engaged in order to lift images, thoughts and impressions toward this fourth stage – the fourth stage is the experience of being 'touched'. In my experience this stage is opened through the *imaginative* contemplation of an image, concept or percept where there is poignant balance between the activity of 'my will' and a receptivity and openness that is empty of preconceptions. This takes dedicated and repeated practice and refining. Play, improvisation and experimentation are all pathways to this point. It is my proposal that the Oak Bark preparation is a product of

[66] This term is used by Henri Bortoft to describe the experience of an actor performing in a play. Bortoft writes, regarding the activity of performing, "the actor no longer imposes himself or herself on the play as if it were an object to be mastered, but he or she listens to the play and allows himself or herself to be moved by it." (1996, p. 15)

this kind of movement of consciousness and not the causal logic of the verbal intellectual mind. I will elaborate on this proposal further below.

Stage Five

In Stage 5 the 'at-one-with' experience that constitutes the "simultaneous perception of the whole" (Bortoft, 1996. p 63) releases the knower to assimilate this new insight. From the point of view of Spagyrics, this is the 'exalted' essence in a newly 'married' state. Mylius depicts two birds resting on the limbs of a budding tree. Learners who have managed to light a fire with a fire bow embody this stage as openhearted appreciation and companionship, a sense of having been 'touched' by a numinous experience (Case Study 2, Chapter 4 C). One of the PSTE learners describes this stage in terms of encountering the "spirit of the being of the farm" and an experience of the "the spirit of the needs of the farm and its community".

This however is not yet a time of action and new initiative, it is more of a process of waiting patiently as the new impulse gestates. There is a sense of profound knowing but that it is inappropriate at this point to speak this knowing. Feelings of renewed autonomy, competence and connectedness accompany this stage. "I know!... and know that I know through *my will* (autonomy) and now I am confident that I can act with this knowledge when the time is right (competence) but I also know that my knowing has come from a source greater than myself and that I have touched this space and it has touched me (connectedness)".

Stage Six

Mylius presents the very striking image of a unicorn resting at the base of a tree. The tree is in full bloom. How is this image to be understood? Out of the 'ah ha' moment in stage 5, and the 'gestating' period of stage 6, those elements of the study or research which were previously fragmented, disjointed or lacking in meaningful connection (*solve)* are now, in what Kühlewind calls a 'feeling of knowing', *felt* to be connected. This experience is accompanied by a sense of wonder. Far from being a vague or naïve experience, wonder is an essential mood to arise in these learning stages. Rudolf Steiner repeatedly speaks of the need for wonder and reverence to be cultivated as *essential* moods in a path of knowledge and he places great emphasis on these moods as the first steps towards an understanding of the

physical-spiritual matrix of nature. In Mylius' image we find depicted a remarkable *being*, a mythical being, a unicorn. At this point in the learning process what was once foreign, cast away as magical or mythical and misunderstood is experienced as a new possibility. Alchemically, the *coagula* appears which is not just an assembly of the parts that were separated and purified during the *solve* phase, but is a new exalted creation. It is a healing essence.

I have found throughout my research that engaging with the spagyric process, the alchemical images, the themes and movements of my ideas etc. with *imaginative* contemplation has again and again brought me to this stage of wonder that I think Mylius' has depicted in this image. The images, pictures, perceptions engaged with through *imaginative* contemplation are 'lifted' from their lifeless, abstract nature to being energized and filled with potency. Previously unrelated phenomena – hens, fires, salts crystallizing – are revealed to have deep and meaningful connections. Such an experience of connectedness is experienced and felt as a 'magical blossoming'.

Stage Seven

The process yields new forces.

In striking contrast to where the process began – with a raven perched upon a skull – there is in Mylius' depiction of this stage a young woman arising from the grave – a resurrection.

At the seventh stage new insight, new methods, new being arises out of the journey undertaken in the previous stages.

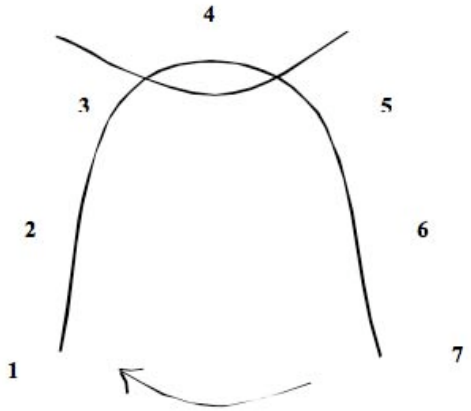
If the principles that stand behind the preparations have been deeply understood, there is now the possibility for the preparation to be used with a new level of understanding and for a practitioner to become a co-creator in this realm of creating healing, vitalizing substances to aid in the life processes of plants and animals.

Second dying

I have added below one further element, however. The arrow placed at the bottom of the diagram (below) indicates the potential movement of these new insights into the habitual and eventually into the realm of the 'taken for granted'. This is a tendency for the once living

elements of consciousness to become ‘corpses’, and the cycle returns – ‘our consciousness is a consciousness of the past, conscious of its own past’ (Bortoft). Taylor succinctly describes this element in the learning process when he writes “It would seem that mature practice involves a mature recognition that one is inevitably ignorant of many things one does not know (i.e., we revisit 'unconscious incompetence' repeatedly or continually; i.e., 'consciousness of unconscious incompetence'). Repeatedly, we are continuously rediscovering 'beginner's mind'“(from above). In the context of teaching, Aksel Hugo gives a picture of a very similar dynamic unfolding in the *act* (activity) of teaching, a description that has deep echoes with the seven stages of learning explored above:

> ‘I do’ implies activity, at a pedagogical stage it translates to conscious performance in and out of the stage of *aporia*, of ‘no way out’. And exactly through and into this sustained tension, something new may appear. To act within the sensitivity to what lives and develops in a pedagogical space, is precisely what a genuine teacher is able to do – and again fails to do, and recognizes and learns through ‘eating’ this failure to enter again. A never ending story – very much actually like being the artist on stage. If you think you have it, you can be sure you have lost it. (Hugo, 2011)



Biodynamics: Bridging Art, Science and the Sacred

Alchemists saw the path of knowledge as encompassing the disciplines of art, science and contemplative practice (Khunrath). Rudolf Steiner makes reference to an alchemical way of thinking in his Agriculture course that led me to research this *way of seeing* through both theory and practice. This path of research has led me to see the Biodynamic preparations as a

fruit of the Art of a contemporary alchemical way of knowing, a braiding of science, art and contemplative practice – in an ever deepening path of learning.

I will conclude this Discussion with a look *back* at the inter-weaving of the three elements of the Art as I experienced them in the making of a Spagyric essence while also *looking forward* to how I see my future work as student, practitioner and teacher of Biodynamics working with these in my own ongoing work of self-education, practice and teaching.

Separate…

Spagyrics: The *solve* phase in the process involved the activities in the laboratory – both the laboratory of nature where the plants were harvested and the laboratory of the workshop with its various forms of heat and the vessels for the practical procedures. The task here is to distinguish – the right plant, the right type of heat, the correct methods for separating, distilling, incinerating etc. In Heinrich Khunrath's image (Appendix III) these activities are depicted in the right hand side of the emblem. I have, in the Art of Knowing, attributed this area of the emblem to the realm of *science.* In the image of the seven-stage process of learning this phase of the work finds its echo primarily in steps 2 and 3[67].

Biodynamics: The elements of the preparations – plant organs, animal organs, particular times of year for making, for applying etc. – are identified and selected based on an ontology that recognizes a spiritual-physical matrix[68] (Lorand) standing behind their manifestation. For the practitioner and student of Biodynamics this is a call for a deep study of the mineral, plant and animal realms and *their morphological principles*. The authors studied in Chapter 4 B

[67] I am aware of the danger of an artificial or too categorical separation of the three activities in the following discussion but indicate, nonetheless, gestures that emphasize one of the three disciplines in the seven-stage learning image.

[68] The view of nature that the founder of Biodynamics put forth was – akin to the processes encountered in Spagyrics – a matter of the *separating out* of the various kingdoms of nature from a former unified condition. From this perspective the process of *separating out* gave rise – in time – to a being (a Human) that encompassed within it's own psycho-spiritual and physical make-up aspects of all of the kingdoms of nature which preceded its own *physical* development and maturation as an embodied human Being. Steiner is not alone in proposing this picture as the origin of the current condition of life on the planet Earth. The view that the "existing genera and species had come into being through processes of *devolution*" – that they had "precipitated" (Watson, 1992,p.25) is older than the more modern view that said genera and species have *evolved* from primordial origins in inorganic matter.

(pages 60 – 69) have contributed greatly to this study. Scientists such as Dankmar Bosse[69], Rohen and Klocek have undertaken the tremendous task of bridging the insights from contemporary, analytical science with those insights gained through the phenomenological methods developed by Goethe and Steiner. The view of nature and her kingdoms that arises through studies such as those of Bosse, Klocek, Rohen, Junius and others provides the *materia* for the preparations. Understood in terms of their *dynamic principles* they are the *essentials* that the Biodynamic Practitioner uses in their Art.

Purify…

Spagyrics: This phase was followed by the contemplation, imaginative pondering of the images and impressions that were particularly related to the problems I was facing in obtaining a clear, crystalline salt from the ashes. This contemplation phase wherein inner images of the process were formed and released through imaginative pondering relates to the transition between stages 3 and 4 in the learning process. In Khunrath's image this area appears on the left-hand side of the image and I have attributed this area to the realm of *spiritual* or *contemplative* practice.

Biodynamics: Out of my research I feel that the steps towards developing competencies in Biodynamics include the cultivation of *imaginative cognition* as articulated by Steiner, Klocek, Bortoft and others. This is a schooling of consciousness that in Goethe's terms develops new organs of cognition.

Exercises in Goethean phenomenology, active perception (Podolinsky), and contemplative exercises develop new perceptive faculties. For teachers the inclusion of contemplative exercises in Biodynamic seminars is – in my experience –a significant contribution to a learning process that can otherwise become polarized between 'knowing' and 'doing' (Hugo). Building this bridge through our inner schooling opens the possibility for the realization that we are not working merely to serve our own needs for either economic or material return but are working as *stewards* who have taken on the task of 'tending' the Earth and her creatures.

[69] Bosse's book *Die Gemeinsame Evolution Von Erde Und Mensch* is available in German only. An English translation is currently underway. Bosse provides a very thorough study of the relationship between the idea of *devolution* (note 68 above) and the more prevalent view of *evolution* derived from the fossil record.

...and Re-combine

Spagyrics: Out of the imaginative recreation and releasing of images (forming and dissolving) insight arose for me into the nature of heat, into the dynamic of *salt*. This insight arose in part due to the artistic rendering of the alchemical work in the form of an emblem that I had encountered prior to my work with Spagyrics. This artistic rendering, encountered initially as an ambiguous image, held within it the picture of a hen and the picture of a dragon that served to bring me new insight into the problem that I was facing in the laboratory. In the central area of Khunrath's image lies a table covered with musical instruments. The role of the *artist* is here depicted as that of sounding the harmonies that resound throughout the 'creation', the Harmonies of the Spheres.

This artistic process denotes the 5^{th}, 6^{th}, and possibly 7^{th} steps of the learning process as the fruits of both the rigorous research on the 'ascending path' of the learning process and the insights received in the touching in with the "'night-side' of knowing" (Hugo, 2011) become manifest through the Art of the alchemist as a situated, performed event bringing new inspiration and forces of vitality into the world.

Biodynamics: What is the Art of Biodynamics? The *poetics* of Biodynamics? The preparations are, I propose, a poetics of substance and process whereby 'parts' constellate into new relationships out of an intuitive perception of their intrinsic connection despite their apparent un-relatedness from the perspective of the analytical mind. The preparation arises through a *coagula* or *exaltation* of the previously cognized *dynamic* nature of the plant and animal organs and their relationship to each other in light of their *common* source in the spiritual-matrix out of which they precipitated. When used, their inclusion in a compost pile or application as a spray on the land is a *performed event* that brings time, place, and intention together in a moment of communication between human and nature.

Essence

Spagyric: Out of the original plant 'body' the essentials are separated out from the non-essentials. The greater mass of plant substance yields a small vial of essential oil, a few hundred millilitres of pure alcohol and a thimble full of salts. The alchemist identifies these as the 'soul', 'spirit' and 'body' of the plant or rather the *seat of the soul*, *spirit*...etc. Substance

is understood by the alchemist as the carrier or vehicle for these forces, activities or aspects of the *being* that stands behind the physical, sense-perceptible plant body acting in and through them. Mint "lives in the cosmos and dies in the meadow" (Klocek). The *solve* of mint is from the alchemical perspective a freeing up of the *being* of mint from its matter-bound *corpus*. Through repeated distillation, incineration, calcination and condensation the three *essentials* are purified and in the process dynamized. Brought into a rhythmic circulation in the process of *coagula,* the three substances are re-married – exalted. It is the *being* of mint that heals through the action of its refined vehicle, but not its vehicle per se." The 'exalted' medicine "has the same effect as the two-hundredthfold quantity of corresponding dry plants"[70] (Junius, 2007, p. 161). In its exalted form a few drops of the rhythmicized essence works its healing forces.

Biodynamics: And what of the Oak Bark preparation? The *solve* has taken place on the one hand through the great 'separating out' of the kingdoms of nature. Mineral/plant/animal has become mineral - plant - animal (Bosse). "Form is movement come to rest". Throughout this great *solve* beings take hold of substance to build bodies. Substance serves beings in the shaping and clothing of bodies[71].

If we place our attention on the manifest, the matter is primary, the building block, the unchanging (what is seen depends on the way it is seen). Calcium is calcium is calcium - whether in shell or stone, cell or bone.

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[70] "Until today science has been unable to explain why circulation, especially rhythmic circulation, causes an exaltation of the product. It is similar with homeopathic potencies. Experience proves their validity again and again, but an explanation is beyond the present state of official science." Junius , p 157

[71] "The substance you are potentizing was originally formed from the cosmic periphery inward, by an individually rhythmic, not to say musical, relation between the cosmic periphery and the earthly centre. True, it has come to rest in the earthly place where it abides – in root or leaf of plant, in metal or crystal, mineral, or even in the bottle on the apothecar's shelves. But this is only its last resting place. In the precise earthly locality where it was first precipitated, it came into being through a specific and individual relation between the earth-planet and the vast spheres of the cosmos. In this relation lies the secret of its chemical individuality qua substance, and its vital nature if still embedded in the living realm. The formative rhythm is still latent in it, and when the careful hand of the pharmacist…subjects it to the rhythmic process of expansion, mingling it by trituration or succussion with the spatial medium which is to receive it, an opportunity is given for the formative rhythm of its origin to be re-born and for its latent connection with the healing essences of the cosmos to be restored…Is not the picture I have been giving in harmony with Hanemann's own words quoted above, when he speaks of the spirit-like individuality of the substance which in the crude material lies latent and concealed?" (Adams, 1961, p6)

From another perspective, calcium is dynamically different depending on how it is 'hosted'. "For the calcium to have a healing effect, however, it has to be calcium from something living, we cannot evade the organic realm. It won't help at all to add ordinary lime or any other calcium compound that has fallen out of the organic realm" (Steiner, 1993, p.101). Calcium *serves,* places itself in service and it is the *activity of calcium – the calcic* - that the Biodynamic practitioner is inviting, rhythmicizing and radiating into the pile of compost as a dynamic *essence* in the compost pile. The essence of calcium is *sal* through and through – substance that bridges Earth and Water. When Fire chases the water away, a parched dryness awakens – a thirst and a hunger. Taker of shapes, a *builder* of bridges, from fluid to fixed, the holder of form. Rind of oak, shell of egg, scaffold of bone, life bearer and barrier, both in one.

As in the spagyric remedy, the Oak Bark preparation comes about through an enhancement ('two-hundredthfold') of the *calcic principle* in plant and animal through the process of *coagula*. A *coagula* in the vessel of the earth, circulated through the rhythms of the winter sun, moon and stars – an exalted substance to serve in the great transformation work of the gardener and grower, to serve in the transformation *of the* gardener and grower, the learner and researcher.

The essence that emerges from the alchemical perspective explored above – for the learner, teacher and researcher of Biodynamics - is that in this new direction for land stewardship a radical re-orientation of knowing, responding and doing emerges. These three faculties, distinct yet intrinsically related, require a conscious repositioning by the practitioner, teacher or researcher such that human activity finds a place once again *within* a meaningful field of reciprocal relations. Rather then unfolding our interactions with the substances and beings of the nature as 'commands' or 'demands' we can *participate* in a mutually enhancing *dialogue.* This realization completes the circle: "Every way of knowing becomes a way of living, every epistemology becomes an ethic."

The Stones

...I broke them where they slugged in their dark
cells, and lifted them up in pieces.
As I piled them in the light
I began their music. I heard their old lime
rouse in breath of song that has not left me…

Wendell Berry

Chapter 7 ~ Conclusion

We live in a world of meanings *though we are convinced that we live in a world of* things.

G. Kühlewind

I have come to the conclusion that a vast potential is presented in the Biodynamic approach that will, however, only be fully realized through a process that addresses the transformation of the learner along with the development of new methods and practices. Viewed from this perspective the Biodynamic preparations are both functional agents for transforming the soil, the earth and the plants *as well as being seeds for the transformation of consciousness itself*.

For the modern 'onlooker' consciousness that has come to see the earth as an agglomeration of resources to be extracted and exploited, Steiner's proposals for a renewal of agriculture represents a radical departure from the 'what's-in-it-for-me' stance of our contemporary consumer culture. This consciousness, having unwittingly undertaken the great *solve* and awakened to itself as an abstract product of its own process of abstraction, faces a crucial turning point. Instances abound of imbalances that arise when this hard won 'onlooker' consciousness engages the dynamic, living world of *Natura*. All too often we see reflected in her mirror our own deathly gaze, a consciousness that sees corpses, the *Mater* reduced to matter - what is seen depends on the way of seeing.

Faced with this turning point I have explored one possible direction for the resurrection of my own seeing and thinking through an engagement with the alchemical worldview. I experienced the essence of this engagement as the touching in to a way of seeing that is, I propose, not merely a relic of pre-Enlightenment science but a fruitful path toward the redemption of thinking and the founding of a *new* relationship to *Natura.* A way forward is sketched that is based soundly on the crystalline clarity won through several hundred years of analytical science but that is *also* based on the recognition that a schooling of the capacities for exact imaginative cognition is essential in order to lift the products of the scientific *solve* out of the grave of abstraction.

In the biodynamic impulse we are invited to re-establish a field of relations between the seemingly distinct realms of plant and planet, season and substance, self and other. This amounts to a *poiesis*, a poeticizing of our stance in the world, a shift from mere management to sensitive stewardship. It is to build a bridge between the *sal* of science and the *sulf* or soul of the *beings* who populate our farms and gardens with the *mercur* of heartfelt-knowing. It is a very precise activity that is asked of us but "precise in the way a poem is precise not in the way a formula is precise." (Klocek 2009). This, in my experience as gardener and teacher, is not an easy task as it is a very far-reaching *poiesis* that is proposed. As a contribution to this task, however, I have found that a renewed attention to the Art of separating and re-combining – the three-in-one – has shown itself to be an effective *way of knowing* for these initial steps towards understanding, learning and teaching Biodynamics.

Epilogue

Dug up silica horn at Vale Head.
A very similar day to when it was buried..
hot, bright sun…dry!
also gathered flint stones, and
some sandstone.

September 27th , 2011 - 2 PM
Vale Head Farm, Kinver, West Midlands, UK

I find the spot again without any trouble. There is the gorse bush… there the chunk of sandstone just below the surface of the turf. Digging down I am struck by how much deeper the horn lies than I remember having placed it. A pile of loose sandy earth builds around the edges of the hole until, finally, my spade hits the hard layer of quartz river pebbles that I placed over the horn so many months ago. Out of its entombment in the earth I pull out this buried treasure (there are no sheep to watch me this time). Steeped in the earth over the long days of summer, this unlikely marriage between mineral and mammal returns to the angled light of autumn. I take it back to my car for the drive south, pondering its potential to quicken the light in my own garden. With their feet in lime and leaves overshadowed by the tall limbs of beech, I am hoping this little dose of light will nourish the plants whose life I tend.

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Appendices

Appendix I: Andrew Lorand's Knowledge Map of the Paradigm of Biodynamic Agriculture

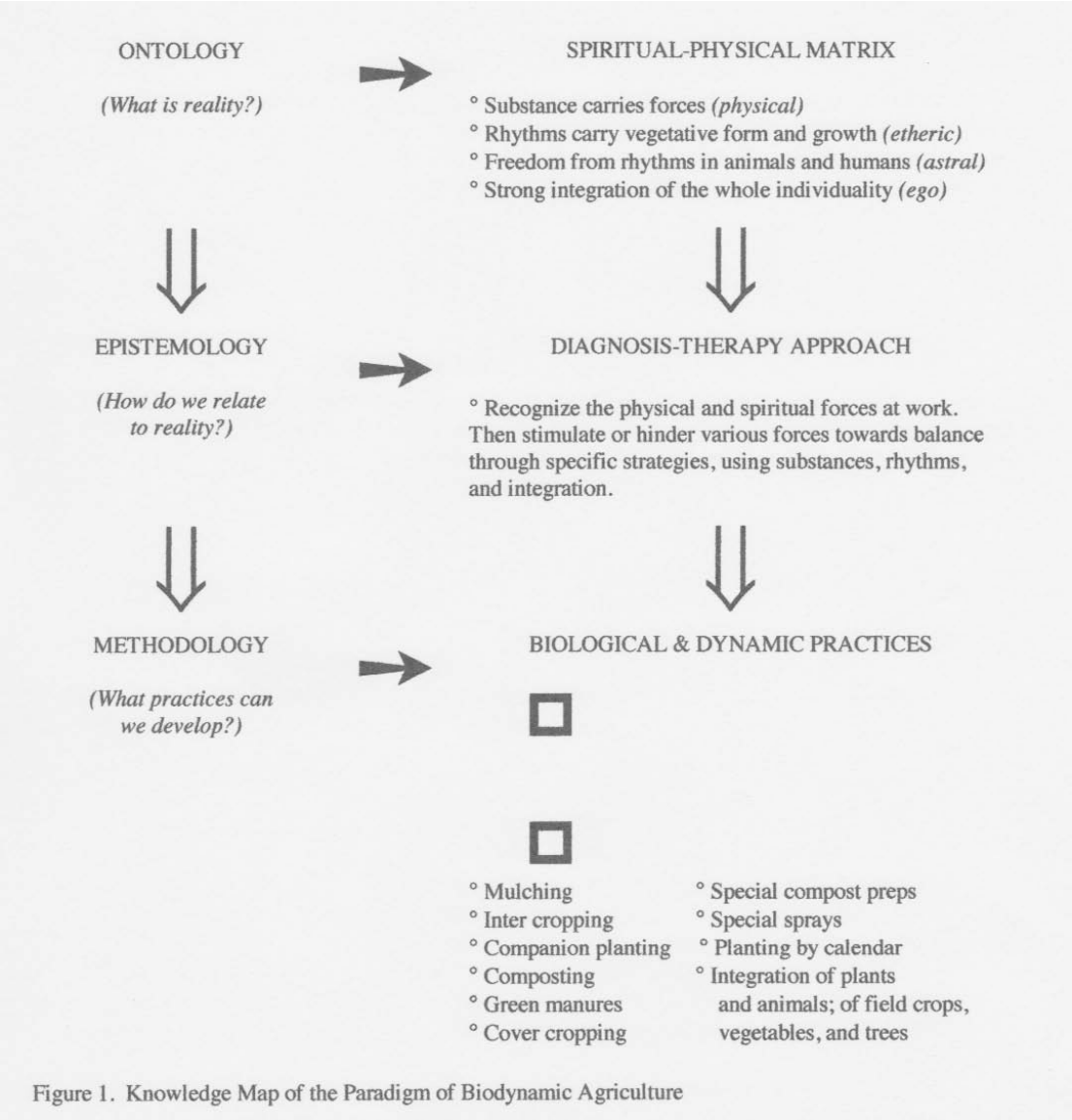

Figure 1. Knowledge Map of the Paradigm of Biodynamic Agriculture

From **BIODYNAMIC AGRICULTURE: A PARADIGMATIC ANALYSIS**

By Andrew C. Lorand, Ph.D.

Appendix II: Interview with Dennis Klocek

(Interview : Stroud, UK – 20/4/2012)

Jonathan Code (JC): Can you tell me what, in your view, are the 'essentials' when thinking about education in Biodynamics…Biodynamic education…as a teacher or lecturer…gardener.

Dennis Klocek (DK) : well, you know, fundamentally you have to be a good organic…you have to understand organic principles of agriculture or gardening or whatever level you are involved in and those organic principles will change the way you approach soil science and things like that , but as you become adept at that a second level is to then start buying and using the preps… and when you buy and use the preps you start to see things happening in the plants that may seem interesting to you and… pretty much everybody, if they are in BD, they kind of get there. So if they are committed to organic methods, composting, mulching, no NPK… basic organic processes of composting, crop rotation, mulching, fertilizing with amendments that are all organic. You try and stay away as much as you can from urea -in fish emulsion for instance - and things like that, that's what I mean by organic. And once you get there, then…say, compost, you say well, how can I make my compost better? Then you get the preps and you start putting the preps in the compost and then you get interested in sprays and herbal teas, and things like that and now you are on an alchemical track, but some people who have large acreages, they just buy the stuff and stir it and just spray it out, and that's ok too, but if you want to go to the next level you ask yourself, well…what is this that I am doing, is this just convenient fable or is this some reality to this? Then you have to start understanding the Four Elements and alchemical principles and Three Processes and that's one level, you are just going into substance, and then a really high level is when you start understanding planetary influences, not just…and then you have to read about it, in the beginning you read about it and it is just a metaphor, until it actually becomes an experience, and then when it actually becomes an experience, you start to see into the organic method, you start to see into the BD preps, you start to see into those things that you started to use just as a product.

JC If you were to describe your method as a teacher now, or lecturer in Biodynamics how would you describe your method as a teacher.

DK As a teacher I think it is important for young people coming in who had maybe a biology background or a soil science background or something, to have the experience that you can speak that language…um, I gave a chemistry course to wine growers up in Portland a couple of months ago, and there was a young woman who was a graduate of Davis who was the manager for a winery and she majored in first soil science, she had a very strong background in soil science and then she moved to viticulture and she was in the front row and she came to me afterwards and she said 'Boy, I wish I had heard you speak before I went to University'…she said the struggle to integrate so much information at University that is linear and abstract, she said that 'the diagrams you brought showed me that they are not linear they are reciprocal' she said 'all the things you were saying I already knew, but the way you were saying them and putting them brought new insights to me that I wish I had had when I started studying, it would have made is so much easier'.

JC and that is the…

DK the mandala..

JC the mandala, polarities…

DK polarities, and processes, difference between a substance and a process, rhythmic structures, using the solar rhythm as a kind of archetype for everything else. declination of the solar rhythm. and that's what I did there and she said 'oh, this makes so much sense to me'…and she had a Master's degree in soil science.

JC so how is your lecturing different from her lecturers (at Uni)

DK Because they were just giving factoids of…you know…calcium is in this place in the periodic table and silica is this place and the cationic exchange capacity of the soil has to do with free-ionic exchange and blah, blah, blah…but when we put calcium at one pole and silica at another pole suddenly it is like 'oh I see, the silicates are weathering into potassium

feldspars and they are on the acid side and…you know it just makes sense to her, then the things she knew were in polarities rather than in a linear… the periodic table actually *is* that..

JC …and that is a stepping point toward introducing a different cosmology?

DK (agrees) that's a stepping off point into saying this is the invisible relationship that chemistry has thrown out the window in order to be able to analyse substances in terms of molecular weight…and a part of the presentation I gave had to do with the experiments that threw that out the window, from Lavoisier and people like that..and then his reason for throwing the phlogiston theory out…and then…contemporary science…it's actually a funny little riff I do, about how contemporary science is talking about these forces of light that are coming in from the periphery and rays that actually instigate chemical changes and stuff but they are saying, you know, 'they go through glass and they can't actually be measured' and so on…which is exactly what the phlogiston theory was but when Lavoisier found out that oxygen has weight because of forming a metal calx in a vacuum they concluded that there was nothing of a spiritual nature in matter… because they sealed it off in a bell jar. but, now…my role as a teacher is to find those little places where science goes 'we don't know what the hell is going on'and then see if there is a place in Steiner and alchemical thought that we can place in there and say this is what they are talking about. So it means you have to know your organic stuff and then some.

JC Then you are also bringing something quite different to the…, or also to complement the practical learning that people are doing in apprenticeships…?

DK well, that's what this lady said, she said she wished she had had this piece of the puzzle – with the *dynamics* of the way things work in terms of their polarities when she went to university because then she would have had a *dynamic* picture, that was presented to her just as separate elements and then she had to try and figure it out herself through soil science and then there is all this math and everything like cation potentials of different soils and potassium, phosphorous unavailability …that when you read it you just get a headache reading it…but if you have alchemy it makes it easier to read it. so, I'm not a trained chemist

but, because of my alchemical studies I can read these things and say ‘oh, that sounds like a sulphur process’ and sure enough when you get down into it deep enough you find that that is what it is. It’s an archetype.
And we see all those things as separate things, and then you have to piece them together, with the kind of stitching the science uses to make things happen which is just basically molecules and atoms and then where we can’t explain that we go into quantum and …

JC but because it is alchemical it lends itself to taking into the ‘lab’ to work with…

DK yes sure, so, I can then go and talk to wine makers who are really adept at lab and the principles I bring to them out of alchemy they can recognize, I don’t have the total expertise that they do in depths as to what is happening in the must with all the enzymes and chemistry interactions, but when I speak to them they understand that I understand the principles so they are willing to forgive some mistakes I make in the tighter, little details of things because they understand that I have the language of the bigger picture. And so, I can go into their labs, I can ask them intelligent questions, they can give me intelligent answers and if I don’t understand their language I just ask them ‘can you explain that to me’ and then I can say ‘oh, yes, that’s a sulphur’ and they will say ‘but there is no sulphur in it’…ok, but dat, dat, dat, dat…’oh yes, there is sulphur there, that’s part of the Kreb’s cycle, ok’. and then I learned from their expertise and they tolerate me because the alchemy gives me a way of visualizing…and if they get to know me well they actually appreciate that, and they can teach me their stuff and I say ‘Is that like this kind of process?’ ‘yes that kind of process’ and then I file that away alchemically in my head as *pictures*.

JC where do you see that there are gaps in Biodynamic trainings these days or gaps in Biodynamic education?

DK Oh yes, the gap in Biodynamic trainings is this whole compliance gap, anyway…if you want to get a grant to study from the Federal government for BD training you have to have so many units of ‘power take-off repair’ and ‘tractor driving management’ and stuff like that that the government feels like you should have if your on a farm…so for the apprenticeship for a

farm you really need that, you really need that kind of stuff…and you need a kind of basis in soil science…but I haven't seen a lot of training that the apprentices get that actually grounds them in this other side of things (alchemical perspective)…I haven't seen it, it may be, in places…I don't really travel a lot with the BD work, but for BD certification you don't have to know any of the (alchemical) work, you just have to be compliant with certain guidelines that are Federally oriented and then there's a group of farmers in the BD association that builds their own guidelines for Demeter certification…they're good people and they know what they're doing as farmers and I think that's great, I just don't know if the theoretical side is valued because the practical side…you know, equipment management, fundamental agronomy, plant identification, things like that … and then a large part of it you just go to work on a farm and the class work is not what it could be. The farm work is what it is depending on the farmer, and that's a little bit catch as catch can. If you happen to luck out and have a really good farmer who really understands things and is willing to share then you get a lot, if you have someone who's not willing to share you have to try and make sense out of what is happening and if they're not willing to share then you end up just working a lot. I've seen that.

So the farmers that are really good…I met a pig farmer from North Carolina who was deeply into the analysis of the pig manure, and the relationship of nutrient flow through his soil, into his crops, into his pigs and back onto the land, and he really knew that. When he took the course I gave…the first day he was asking these really technical questions and then when we finally got into it he just kind of stepped back and he looked at me and kind of smiled, pulled his John Deere hat back on his head…he sat back there… and then he came up to me and said 'why is potassium on the 'sulf' - sulphur side'…and it was a *beautiful* question. and when I explained to him the sulphur side is just *mobility* he just went – 'got it'. This is a guy who raises 3000 head of pigs.

JC Do you think it changed his practice at all?

DK It gave him insight into his practice. It gave him insight into what he was doing. And then we would sit together at lunch and talk about rotation of elements within the soils and soil weathering, and …if he wanted to go buy a new piece of land…and about vat composting,

what he could add to big, big – you know – I mean you got 3000 pigs, you got a lot of pig shit. and how to ferment that so that it doesn't kill the neighbours. So he is a very experienced, very adept farmer, very smart and when he heard the alchemy he had very good questions and when he got it he said 'oh yes, wow, I get this.' he said 'this is really great'. So, yes, it's not in a vacuum.

I've been meeting a lot of interesting people with this (alchemical) work . I gave a workshop on Sacred Agriculture in Wisconsin and 75 people came. And when they did an exit poll on why the people came people said it was the title. They wanted to know how the work they were doing on the land was sacred. I gave a history of agriculture in America…changing products to commodities…and how that changed the role of the farmer…and machinery…one of the images in it was – I said 'the latest John Deere is a 500 horse power tractor. And if you had 500 horses – a horse is eight feet long, plus two feet for the traces…500 horses times ten that's 5000 feet - that's a mile of horses…now you put them four abreast so that you can manage them and you still have a quarter mile of horses, now say 'gee up!'… I said ' that's what your dealing with'. and they all just laughed – it was like 'oh wow'. All at the turn of a key. so what kind of operation would you need just to handle the horse shit from 5000 horses, and get them to turn, and…'hello'...it was one of those, so when you can bring metaphors like that to people it is like smelling salts, it is 'oh my god, yes,…'.

JC Perspective

DK Yes! that's really what BD is. It's a perspective on what it is that your doing there with the land and the power that you have to change it

Appendix III: Colored plate from Heinrich Khunrath"s *Amphitheatrum sapientiae aeternae*

"We can awake […] through constant prayer in the oratorium (left), and through unstinting work in the laboratorium (right), which rests on the two pillars of experience and reason. The oven in the foreground admonishes us to patience, and the gifts on the table remind us that sacred music and harmony are supposed to accompany and define the Work." (Roob, 2001, p. 331)

Appendix IV: Distillation of essential oils

Appendix V: Incineration

Appendix VI: Plant Phenomenology Workshop

Monday	Tuesday	Wednesday	Thursday
Intros – METHODS - Research Berry poem or Stafford poem Phenomenology – via a study of the **four elements** – Earth , Water, Air,	Fire - fire lighting Stafford poem **Seeds/sprouts – becoming** Polarity – earthly and cosmic, Root and leaf What is changing?	Distillation – essence Dragon and Hen	What is the whole? Medicinal – plant – human Spagyrics Examples – butterbur, ??? Separating out…..
Finding our plant and sit spot – going for a walk, coming in first impressions. Drawn or sketched Sharing	Becomings – pitcher plant metamorphosis dandelion CONTEXT	Oil portraits 3 oils Essence	Evolution of the plant Research time
Earth – descriptions of details Shared with a partner What is different? Sit spot Sketching Exact imaginative contemplation	Plant as process - what is changing? Gesture drawing – life gesture Sit spot Sketching Exact imaginative contemplation	Introduce diamond poem in whole group. any word to start Introduction to plant in situ – partners.? it, you , I – diamond poem form (you), prose (it) sit spot	Presentations Feedback time - design feedback sheet from cal. template

Sessions in green are informed by a *scientific impulse – for the most part phenomenological*
" in orange are in formed by an *artistic impulse – i.e. sketching, creative writing*
" in purple are informed by a *contemplative approach*

8:30-10:00 1st session
10:00-10:30 coffee break
10:30-12:30 2nd session
12:30-14:00 Lunch
14:00-15:30 or 16:00 3rd session

Appendix VII: Reflections from Plant Phenomenology Course

Plant Phenomenology w/ Jonathan Code Oct. 3-6 2011

TEACHING METHOD

Please give some reflections on your experience of this course.

1. Are you ok if your reflections are included (anonymously) in a research document?

(please circle one) Yes No

2. How would you describe your learning style?

kinaesthetic relational cognitive

Did you feel that at some time (or times) during the week you were met with regards your learning style?

In which sessions/activities?

3. Did the week help you to understand more about;

Phenomenology

(If so, please say briefly in what way:

If no, please say what was not so helpful:)

Biodynamics

(If so, please say briefly in what way:

If no, please say what was not so helpful: continue on other side of paper if necessary)

CONTENT

Can you comment on the *content* of the week – either in general…

or if you would like to comment on specific aspects of the course please do so:

Four elements (E,W,A,F) through phenomenology, activities (i.e. fire lighting) and discussion:

Finding and working with your own plant:

Distillation of oil:

Essential oil 'portraits': three oils (rosewood, mint, lavender 'special')

Creative writing : (Diamond poems – It, you, I)

any other comments: (Use other side of page)

Appendix VIII Interview from Vale Head Farm

Transcript of reflections from Warmth, Moisture, Light seminar for Biodynamic apprentices at Vale Head Farm, Stourbridge 16 – 18 April 2010.

JC: The first question is: how did the experience of fire-lighting (with fire bows) contribute to the theme of the weekend. It can be as open as what did this whole experience give to you in terms of new understanding?

Matt: I think it was the best bit of the weekend by far.

JC : Why?

Matt: Because I think it is a genuine initiation experience for a western… for young western men. Scrap most of school just get them to do that.

JC: It changed the way you think about fire?

Matt: Yes.

Lucy: I think that so often we talk about mindfulness, and we mean by that an opening of the heart but through lighting the fire with sticks and bow, this really brings mindfulness.

We talked about lighting a match and there is no mindfulness there but now, after lighting a fire like we did there is real mindfulness. I was in Romania and we had to gather three different kinds of water for different purposes and to walk a kilometre for the good, good water… well you don't spill any of that on the way home that was real mindfulness for that water. With the fire it is the same experience.

Matt: It's learning with the whole body as well.

Ed: there's also something about the inner experience that goes along with it. When you think about fire you think about something 'firey' you think of all this exuberance or rage or very very extreme experience, but the actual experience of making the fire was….yes there's the real heated activity of the fire bow, but its still very focussed, and actually the encouraging of the ember is actually a very soft, kind of gentle bit, I relate it to the other side of fire which is when we sat around the soft embers of the fire last night, I was watching the embers. It's really probably much closer to the qualities – the beingness of fire.

JC That came up a few times. You picked up on that quite strongly, didn't you Lucy, about being relaxed and letting things come in their own way.

Matt: It's also a very good magic trick, it's the archetypal magic trick.

Hannah: Didn't do very much, I assisted but found that quite frustrating…I found myself getting quite angry, I don't feel that very often. But it was such a nice thing to do as a group, and it needed to be a group activity, we needed to work together as a group. Like last night when we did it as a group, and that was a bigger group. That was a strong experience.

It reminds me of what you said in the beginning Lucy that when we loose the fire element or when the Fire is taken out we loose the 'Mother'.

Charlie: I just want to echo what has already been said. I also notice that I wasn't just aware of my own process but other peoples as well. I really felt like I felt other people's feeling frustrated. We arrived and all felt 'yeah, we're going to do it!'. And then we went through this whole frustration and then really nurturing of the ember and then a feeling of warmth when the fire was lit and I really felt that presence myself and very strongly felt it in other people. I felt other peoples frustration and also their joy and I felt part of the group, which helped me think very differently about fire.

JC: So, not just an 'outer' Fire…

Ed: I would say as well, just in relation to the theme of the weekend. we have done before, we have looked at the elements before and you always think that you've got it but in that you actually loose the mystery…making that fire really brings you much much more in touch with the mystery. It's like the Zen master who comes and slaps you on the back when you start nodding off. It's as if we have been sleeping with these concepts, that actually I don't *really* know what warmth and what fire is. We had a very primary experience of it.

JC : Did the practice of lighting the fire inform the theory. Did it help bring clarity. We started to talk about the four elements…

Matt: The reality of the fire lighting made you realize that everything different that fire can be...how it can now be something quite gentle, and then quite violent. With the elements it is the same…it's not just gas, it's so much bigger. Fire!

Lucy : Now I regret not drawing up the water from the well. Some people pulled the water up, and some people didn't, they just watched. It would have been more interesting to draw the water because it was such a polarity to the lighting of the fire. (*participants took part in drawing water from a newly re-opened well 150 ft deep into the bed rock).* Now we are all really full of this fire and it would have been great to have the experience of drawing the water. Or collecting the dew.

JC That is very interesting observation because what I often find comes out of this process is that you often understand one of the elements, not in isolation, but by touching all the others. You actually have to work the wholeness, on some level. That's a very interesting point. Anybody else want to say anything – did lighting the fire inform the theoretical engagement with the elements?

Linda: I think that such an intense experience of *process* – not just the fire, but the whole process of warming up, getting to know the materials, and practicing and nurturing and then becoming more competent. That whole process aspect of that element of Fire, and though we didn't go into it in depth into Earth, and Water and Air are similar. We've been speaking about air processes and water processes and earth it's an in-depth experience of the one element (fire), of the one *process* aspect of the element.

Charlie: I really like that we spoke about how easy it is to light a match. And how separated we are from the elements. You spoke about how the language of the elements is so misunderstood, how the original meaning is lost - the basic idea of Earth, Air, Fire and Water but that example (of the match) of how easy it is to have something now, with technology to have something without any skill but you are really separated then, you don't have this strong connection. From that experience of lighting fire I have a much stronger connection to the

meaning of the element Fire , in the same way with spreading of the water, I had a much stronger connection because you showed us around the farm. If you hadn't shown us around the farm we would have gone off and thought 'well this seems like a good place to spread' that really informs the material, when you start to experience the landscape through the sit spot, lighting a fire, going through the history of where we are and how we express and explain it, experience it through our limbs and spraying… creating fire – it felt very balanced.

Matt; What strikes me is that fire actually came out of an Earth element, you know, sticks… that's not fire is it …sticks, out of that , with nothing added apart from movement, which we provided, somehow Fire appears out of the Earth element. It's already there, the conditions are there… we have to bring them together. Fire was 'hiding', that's how Tich Nat Han says it, he does it with a match - fire was always there it's just hiding. He strikes a match and says ' here, it's made itself manifest'. we really went through that process in a way that's …suddenly fire appears out of wood….that's what it feels like.

JC That's what it feels like, and as you speak I also have this (image come to mind) you know this picture that Goethe gives about the eye - if the eye were not sun-like or if the eye were not shaped by the light it couldn't see the sun light. There is another part of that…how do we know how to make the slight adjustments so that the fire actually comes , because we are constantly making little adjustments in tensions of the bow, or …so many little adjustments but there is a point where you think ' Yes, now we've got it…' isnt' there? The point where you think now everything is in place for Fire to come inWe must have a sense for fire in order to do this…otherwise…we could do trial and error until the cows came home. We could turn mushrooms instead of wood. Somewhere we have a sense for fire. It must be in us.

ED Just thinking about your question about how the fire-lighting processed informed the theory, I think the fact that we worked with so many things we have come to the place where fire is not just 'hot' and 'flames' but we have really started to live into the qualities of Fire, so that by the time you reach the third day and Aries over the UK you don't think, well Britains not very hot, because it is under a fire sign - I think that was really useful, to keep on building the qualitative relationship to Fire and doing the Fire (lighting) was fantastic for that because there is so much content in that. There is so much there to describe.

JC Great. When we started the first thing I said was, if I were to write, or when I write the word FIRE on the board put down your first impression – on Friday morning. And you wrote down impressions, has that impression changed?

Hannah: No. The first word that came to mind was Hope. It has become much stronger, I have a much stronger feeling about it…but it hasn't changed. This word that I thought of is the right one…(too much background noise)

Lucy: it became richer. Much more colourful

Ed: I wrote nourishment - last night standing around those hot embers I thought ' that's so nourishing'.

Matt: it really strongly has Being as well, more so then the other elements, perhaps because its moving, perhaps because it has a life span …. that experience of Being. I didn't write the word precious, now I would.

Ed move away from a fire to Fire. That's not 'a fire' we are just with Fire. It's that Beingness that you speak of.

JC you mentioned that – when two fires come together is it two fires? one fire? is fire divisible?

Matt – it doesn't sit still does it.

Appendix IX – Practical Skills Therapeutic Education (PSTE)

Practical Skills Therapeutic Education (level 4)
Choose this Programme
This course provides an experiential and theoretical introduction to the Practical Skills Therapeutic Education (PSTE) programme developed by Ruskin Mill Educational Trust. The PSTE programme is founded on the principle that education - and in the context of RMET *therapeutic* education - needs to address the whole human being through engaging the hand, the heart and the head. When this methodology is consciously situated through careful attention to the uniqueness of each place of learning, the student is able to integrate their own individual learning pathway with the wider social domain of which they are a part. The PSTE course offers a path of study linking practical craft experience, an introduction to Biodynamic approaches to farming and gardening and a foundational knowledge of human development from an Anthroposophical perspective.
What you will study
The course is delivered over a period of 18 months and is undertaken in three stages. The first stage places the focus on the descent into matter, the practical craft and its significance in an integrated curriculum through an action research placement in a craft session at one of RMET's colleges. Introduced with a day of instruction by experienced PSTE practitioners, the student will undertake a course of study supported by subject specialists, e-learning, a comprehensive reading list, and learning mentors. The guiding question for this stage of the course is: 'What does practical craft and hands-on learning contribute to an education that seeks to address the whole human being?' The second stage follows the same format as Stage One (above) though with an emphasis on Biodynamics and nutrition. It is more and more evident that good nutrition provides the basis for learning as well as general healthy cognitive and emotional development. Stage Two of the PSTE course introduces the student to the idea of the whole farm organism and the way in which Biodynamic farmers and gardeners attend to this 'farm individuality' in creating nutritious and vital food. The third stage of the PSTE introduces the subject of Human Development with an emphasis on how this process is understood from a spiritual scientific perspective. Drawing on a wide range of sources the phases of human development are investigated as well as ways in which development may be impeded. The understanding of the phasic

development of cognitive, sensory, emotional, and vital capacities provides the foundation for PSTE practitioners to be highly responsive and effective in their work as educators. A student study forms the core of the research in this Stage.	
Assessment	
Assessment methods will include written assignments, oral presentations, learning journals and records from mentoring sessions.	
Units	
• Craft and the Spirit of Place • Biodynamics • Human Development	
Special Features	
1. Ideal for experienced teachers or those just starting out in the profession, the PSTE course provides a well-rounded foundation for integrating learning through hand, heart and head. 2. The course combines contact time with self-directed study, allowing for a flexible approach for those who are working or are not able to attend a full-time course of study 3. You will work with experienced craft and land-based practitioners 4. You can work towards professional approved competencies. 5. You will also have the chance to meet and study with other learners from diverse professional backgrounds.	
Duration	Three stages of 14 weeks each undertaken over a period of 18 months.
Attendance	Occasional weekend days, min. 18 hrs placement (6hrs per stage) in a RMET craft or land-based activity (during term time). Mentored sessions (flexible timing).
Entry requirements	
Location	RMET Colleges
Contact	Course Administrator Name: Jane Tyler Number: 01453 837 _____ Email: jame.tyler@rmet.org.uk

Appendix X: The Alchemical Tree from *John Daniel Mylius: Philosophia reformata.*