

MEASURES AND MEDIATIONS OF CONNECTIVITY

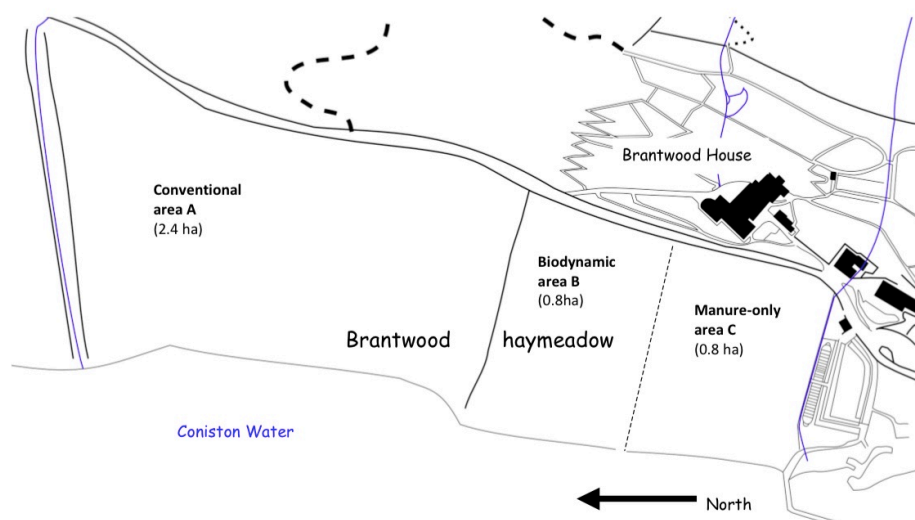
Brantwood Soil Life Project (2007-14)

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*Earth becomes the companion of Man - his friend and his teacher.
(John Ruskin)*

John Ruskin offered us the option to see Nature through many different portals and to leave our observations perhaps by a very different route from where we began. He created, in his Brantwood land, a living laboratory of ideas and possibilities, of practical garden projects and aesthetic dreams. These are the inspirations that guided the inception of a research project in Brantwood's fields today. Art, science and practical husbandry have begun to reunite our understanding of the natural world in this pioneering piece of work.

Born of a recognition of the distancing of Nature from Humanity that runs as a common concern through the thoughts of Goethe, Ruskin and Steiner, Sally Beamish (Estate manager) attended a biodynamic forestry week-end at Ruskin Mill, Nailsworth in 2005, and was accompanied by her colleague, Ellie Sinclair, to the first Northern biodynamic week-end at Freeman College, Sheffield in 2007. These events inspired them to learn more about biodynamic land management and to explore how it might resonate with the Ruskinian principles that are – at the foundation of what informs the future of the Brantwood Estate. One fundamental truth is that soil health is key to the health of all living things - Ruskin reminds us that "*the soil can in no-wise dissemble*". This was chosen as the focus for an investigation into the values of biodynamic agriculture in upland areas. With the advice and sponsorship of Ruskin Mill Educational Trust, the Brantwood Soil Life Project was set up in Autumn 2007.



¹ The article was written in close collaboration with Sally Beamish and Louise Moss.

Situated in the Lake District, on the shores of Coniston Water, at the western edge of the 250 acre (100 hectare) Brantwood estate, the Brantwood Haymeadow is roughly rectangular in shape. 10 acres (4 hectares) in size, its long axis orientates north-south along part of the Estate's lake frontage. Carrying permanent pasture, the land slopes in an undulating manner down from the roadside wall to the lake. In order to study and compare the potential values of biodynamic pasture management, the northern field (A) continued to be managed using conventional modern agricultural methods with annual applications of artificial fertilizer. The southern field was divided in half, each area 2 acres (0.8 hectare) in size. Management of the southern half of this area (C) continued as before, with an annual dressing of farmyard manure. The rest of this field (B) having, in addition, the biodynamic preparations BD500-BD508 applied across it several times a year .

During the project, three different methods were used for recording changes within the soil life of the Meadow:

- A. Biochemical and physical analysis of soil samples
- B. Chromatographic analysis of soil samples (round paper chromatography)
- C. An observational technique derived from Goethe's 'spiritual science', involving close study and intuitive connection with meadow areas and turf samples, recorded through words and drawing exercises.

The project ran for the 7 years from November 2007-2014. My role has been to accompany the last phase of the project, in close collaboration with Sally Beamish and Louise Moss, who has undertaken the analysis of a large amount of complex data. This article gives a brief summary of key results. A full report will be published this summer and a public presentation will be made coming autumn.



KEY RESULTS

Material measures of connectivity (body)

In the *soil test data*, differences have been recorded between the three areas right from the start of the project. These differences, however, often seem to vary in a synchronised way. The *chromatography* recording gives in many ways a similar picture. Particularly with well established habitats such as old permanent pastures like this one, the plant roots are colonised by, and connected together by a vast web of fungal hyphae which enable carbon and other plant nutrients to be transported from areas with high concentrations of to those with low levels. Hyphae can extend several metres in length, and thus provide extensive pathways through the soil. Therefore some of the additional soil nutrients provided will be transported to other areas of the meadow, which will inevitably also affect the results. Such connectivity between separate areas may be suggested by the macro and micro-nutrient records. Variations appear to fluctuate through time in a largely synchronised way between all 3 meadow areas. For all trace element levels Area B (biodynamic) figures generally lie between those for areas A & C, and it is very rarely the highest level recorded. Possibly, this suggest a mediating role.

Although all three areas have broadly the same range of wildflower and grass species; the conventionally managed area (A) has the lowest number of species recorded and the lowest abundance of most wildflower species. Where grass growth is encouraged by the addition of artificial fertilisers, the abundance and range of wildflower species present declines. Different herb and grass species extract different amounts/combinations of nutrients from varying depths of the soil and also exude beneficial substances from their roots. This provides a wide range of trace elements for the benefit of the herbage and grazing stock. It has been found that

uptake of micro-nutrients is generally higher in more species-rich pastures and is particularly evident in comparison to a mono-culture rye-grass ley. This may be another reason why levels of trace element measured at Brantwood appear to be very favourable for both herbage quality and stock health.

The overall soil depth appears to have increased over time in the biodynamic area, and often shows the greatest depth of all three areas in the biodynamic area in the later years. As the plants roots were generally recorded as penetrating throughout the soil layer; as soil depth increased, so too did the length of the plant roots, which were often also recorded as being well branched. The average root health index for Area B (biodynamic) was 8.6; the highest of the three areas, although only slightly higher than that recorded for Area C (organic). Area C (conventional) had the lowest averal root health index.

Area	Root health: average first 9 records: Nov2007 – Aug 2010	Root health: average last 10 records: Apr '11 – Nov '14	Root health: increase or decrease between the two periods	Root health: overall average Nov 2007 – Nov 2014
A	8.8	7.0	1.8 decrease	7.8
B	8.9	8.3	0.6 decrease	8.6
C	7.8	8.1	0.3 increase	8.4

Figure 1: Root health index.

If we compare the soil test data to the round filter chromatography data, both give an overall impression of synchronicity or connectivity in timeline variations between the different areas on the whole.

Perceptual mediations of connectivity (soul)

In contrast, a systematic comparison of the drawings from the Goethean observations did reveal an impression of a permanent, striking difference between the three areas depicted. In a seminar with Frank Burdich and Inessa Guesava - who had been invited independantly to advise on interpretation of the observation image record - both were able to identify a quality they could recognize as belonging to the biodynamic part of the meadow. In analyzing these tryptics of images made together on each observation day, another very striking discovery was how diverse each individual expression is of the 'qualities of difference' that people perceive. Drawing their impressions of the meadows, each participant gives a depiction of the individual areas of the meadow (A, B, C), but also present to us a recording of the soul condition they are in themselves, when engaging in the experiment and exercise. This is a crucial epistemological point, since what is recorded on paper is a trace of a meeting: the observable meadow, as well as an observable imprint of the soul condition of the mediating participant. What they recorded, is strictly speaking no object but an 'event'.

Actually all science, no matter what instruments it uses to mediate, has such event character and depicts both poles; it will reveal an element of the world and an element of the position of a mediator. Goethe spoke of the experiment as the mediator between subject and object. It is the same principle we meet here; any result also reveals how one chooses to position oneself within a particular interaction. A field trial does not only reveal a reality, it sets up a relation.

Dialogic mediations of connectivity (spirit)

In the history of the Brantwood Soil Life project, something important happened during spring 2011. Sally Beamish asked her colleagues in the Project voluntary team to reposition themselves in relation to the meadow within the laboratory. What I mean by this is that having a suspicion that the effect of the biodynamic preparations was spreading beyond the dedicated area (B), a decision was made to engage the meadow as a 'Thou' and 'speaking partner' in the problem. The group engaged in a question directed to the meadow - 'Could help be given to contain the biodynamic effect to its area of application, thereby making any changes in the meadow more easily visible?' This was a very pragmatic question at one level, but also, ethically, quite a problematic one. It was not understood what this might actually mean for this part of the meadow to be asked not to share, not mediate, not perform connectivity within a space it shared with the rest of the meadow. What was clear, however, was that from the date of this question being posed – between April and August 2011 - a shift occurred: consciousness of the meadow was there as potential speaking partner.

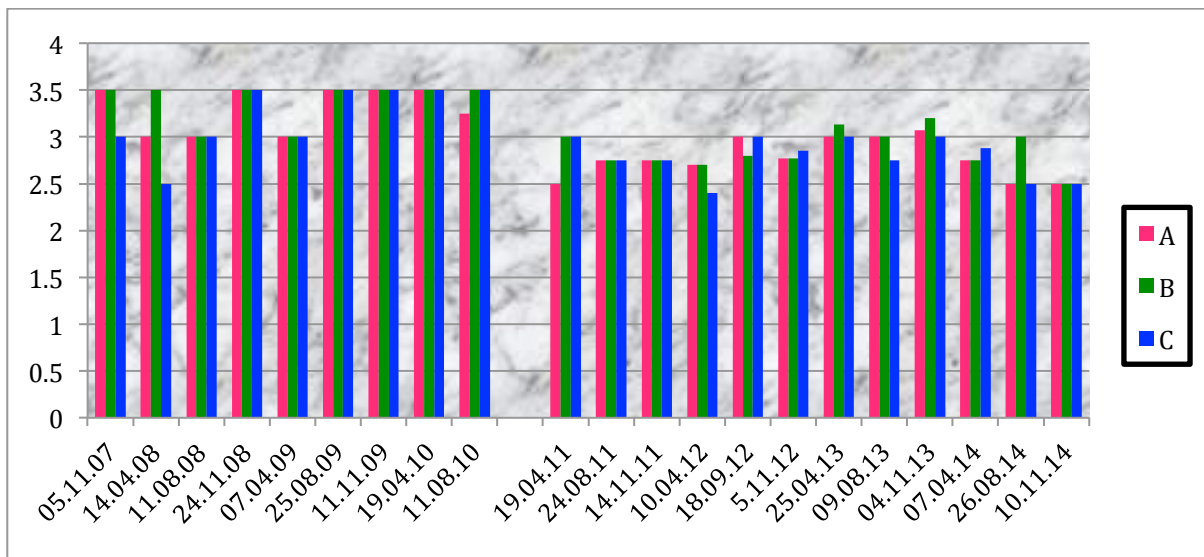


Figure 2: Hyphal diameter (um),

In 2011 there is a pronounced 'step change' in size of fungal hyphal diameter, recorded for all meadow areas. In interpreting such a "step" (figure), an open question arises, related to the potential influence the above event of 'spiritual connectivity' may have caused at a 'material connectivity level'. There is also a massive increase in the ratio of active:total fungal activity in area B (biodynamic) to an all time high of 6.1 mcg/g after a Meadow Celebration event in

August 2014. A significant variation in figures also occurs between November 2007 and April 2008, when the first biodynamic preparations were applied. This could be caused by trace element levels being unusually low in November 2007, or by something else, such as the introduction of biodynamic preparations.

DISCUSSION AND IMPLICATIONS

Regional implications for land management

The soil and plant surveys convey a pretty clear picture of how the interplay between soil and vegetation ecology builds dynamic reciprocity between 'diverse plantlife' and 'vital soil-life' in area B and C (biodynamic and manure-only). The soil structure records and overall root health indexes underpin these results. A balanced profile of micro-nutrients seem to keep more constant over time. This strengthens the image of a long term sustainable management system with micro-nutrient levels favourable for good herbage quality and stock health. The overall soil depth appears also to have increased over time in the biodynamic and manure-only areas. Since readings were taken from randomly placed soil profiles, these results need to be verified by further research.

Conventional area (A) has the lowest overall root health index. Interestingly, although area C was over-sown with timothy/rye-grass/white clover mix in August 2010, this conventional area showed the lowest percentage cover for clovers (often by a considerable margin) in every record after August 2009. These results may be used as a wake-up call for how delicate and dynamic a balance exists between plant-life and soil-life. They may also help to illustrate how farmers can learn to work in tandem with these fine dynamic forces to improve both soil fertility, fodder quality and ecological meadow diversity.

Methodological implications for biodynamic research

The Brantwood Soil Life Project may be viewed as a wake-up call also for those interested in the methodological questions of 'what constitutes a biodynamic field trial'. The question is how you position yourself as farmer and researcher in relation to the object of the study. If this positioning is not done consciously, it will easlily happen unconsciously along a given formula which simply says: 'the less subjective involvement, the more scientific'. One could argue this from different points of view. The pragmatic argument says that learning has a dialogical character, any good farmer stays in 'conversation' with his animals and fields, and lets the questions and answers grow along side the involvment with the matter at hand. In many ways, this is what has happened in the Brantwood Project – slipping out of the matrix of 'fixed field trial' – it has become a learning journey for all involved. A major discovery in this

journey has actually been the importance of *where* you position yourself in the dialogue with the living world. As Tim Ingold² clearly puts it, in his interpretation of Merleau-Ponty:

It is not possible, Merleau-Ponty implied, to be sentient in an *insentient* world – in a world, that is, which has turned its back on its inhabitants, exposing only its rigid, external surfaces to perceptual scrutiny. To be sentient, to the contrary, is to open up to a world, to yield to its embrace, and to resonate in one's inner being to its illuminations and reverberations.

This epistemological argument says that our experience sits in an embedded relation to nature, we participate bodily, but also with soul and spirit, when we engage in understanding nature. And as a reciprocal gesture, if we do this, Nature will echo back how we bodily (materially) soulwise (perceptually) or spiritwise (mindfully) situate ourselves in our interaction. The third argument to abandon the given formula, is therefore found in the ethical realm: In *the kind of relationship we chose to constitute* by contracting in 'this way or that way' we make an ethical statement towards the beings of nature that we encounter. The Brantwood Soil Life Project can thus become a door opener to an important discussion in biodynamic research – with the very general question (it is not a trivial one to answer): 'What is a biodynamic field trial?'

Educational implications for Brantwood

In his short introduction to the 'Biodynamic Studies at Brantwood' (Ingram 2013³), Brantwood's Director, Howard Hull, gives a fresh characterisation of 'what is under examination': "*In many ways, it is the perspectives and culture of the approach that is really under examination, a sort of parable seeking to open our eyes to the wider challenge of configuring our relationship to nature*". The question of the challenge of re-configuring our relationship to nature has been the red thread in the 'script' of the Brantwood Soil Life Project – as IT has unfolded itself. No better characterisation could be given today, as this phase of the project is brought to conclusion. There are multiple ways of human connections with the meadow; through land management and intent, through artistic processes, feelings and senses and spiritually through scientific and mindful engagement within nature. We are taken on a journey 'from observer to participant' in the natural world.

Within its educational space, the Hay Loft at Brantwood could provide an ideal entry point for such a renewal of the invitation the Meadow - as a piece of Nature - seem to be offering its hosts. In response, these hosts, the guardians of Brantwood today, can open the doors and windows of our being in nature again to their visitors, the region and the world.

² Tim Ingold (2011). *Being alive. Essays on Movement, knowledge and description*, Routledge, p. 12

³ David Ingram (2013). *The Gardens at Brantwood*, Pallas Athene, p. 86