The Permaculture Practitioner, Journal 6 – Biodynamics (Last updated October 2011)

This Journal series is a collection of notes and discoveries based on my own practical experience in Permaculture.

I have chosen to focus on a small number of design elements, practical techniques and sustainable practices that play a significant role in my own designs and could play a role in your own.

It is my humble opinion that these design aspects are of such high individual value to permaculture practitioners, and anyone interested in food production for that matter, that they warrant particular attention.

The order in which these journals are presented has no bearing on the design process itself. Rather they reflect significant discoveries of my own on the way to becoming a better practitioner of permaculture.

I've always been wary of preachers who have no dirt under their nails. So, unless I see good reason to, I only cover aspects that I have my own direct experiences to draw from. I hope you find these notes of some value...

About Permaculture

"The only ethical decision is to take responsibility for our own existence and that of our children" This is the prime directive of permaculture - (Mollison, *Permaculture A Designers Manual*, 1988)

From a values and ethics perspective permaculture practitioners believe in caring for the Earth, our People, in balance and fair share.

As a design system permaculture can be described as an interdisciplinary Earth practice that seeks to embrace and collaborate with nature to gain the outcomes we desire.

To me permaculture is very much a state of mind that reflects sound well thought out logic backed by a deep sense of wellbeing for all. It's entirely practical and can be implemented at a macro and a micro level, piecemeal and whole.

Pig in the Mud Forest …

Is a "one man" (that's me) orchard development on the slopes of the lower North Island of New Zealand.

Biodynamics

I've never seen a more content cow than a Biodynamic cow!

And it wasn't until I first saw my first biodynamic cow that I started to understand what one might actually look like and indeed how many cows I must have come across before that weren't content.

If you don't know what I mean visit a Biodynamic farm, look into the eyes of a biodynamic cow and I think you'll start to understand. It can be most enlightening.

I know this all sounds a bit odd. And why is this relevant? Well cows play a big role in biodynamics and to me their health and vitality serve as indicators of a production system in balance and in tune with nature. We'll talk about cows in a bit more detail later on in this journal entry.

But before we do that lets look at the basic concepts behind Biodynamic Agriculture...

Biodynamics is life and energy

In the previous journal entries we've talked about certain design elements and design practices that work to support the soil community.

With a healthy soil community humus continues to build and humus is the foundation, some say the pantry, on which the soil community and our trees can thrive.

Biodynamics, derived from the Greek words "bios" for life and "dynamos" for energy, is very much in tune with this philosophy and indeed soil health is of paramount importance to biodynamic practitioners.

Though biodynamic practitioners go beyond the soil and seek also to tune in to the cosmic elements, such as the sun, the moon, our planets and their relationship to the stars, to understand their rhythms and how those rhythms influence crop production.

Working with these two dimensions, biodynamic practitioners are said to be able to stimulate the organic processes and bring about a sensitivity within the soil and crops so that they can come to a full and balanced expression, their maximum potential so to speak.

The Cosmic Interplay

It all began with an Austrian man by the name of Dr Rudolph Steiner. Dr Steiner was a philosopher, a scientist and a mystic.

Responsible for the anthroposophical philosophy, Dr Steiner's appreciation of the natural world order was truly unique for his time.

In 1924, at the request of a group of organic farmers, who despite following organic practices were suffering diminishing crops, Dr Steiner delivered a series of lectures that have become the basis for modern biodynamics today.

In those lectures Dr Steiner described how our crops and trees not only grow through the soil, and soil nutrients, but also through the influence of the cosmos.

It's hard to imagine how cosmic bodies so far away in space can influence our crops on the land. But then again it only takes a trip to the beach, to watch the tide change, to see how one of those cosmic bodies, the Moon, can effect a force powerful enough to move oceans.

Biodynamics places great importance on the positions of the moon, sun and planets in relation to the zodiac constellations. And with an understanding of how these natural cosmic rhythms affect seed sowing, planting, applying certain manures or sprays, biodynamic practitioners leverage their knowledge of these influences to produce better crops.

As just one example take the Moon and Saturn for example. When they are on opposing sides of the earth their forces radiate into the earth from opposite directions. The moon's forces are said to bring in the calcium processes, which in our crops is related to propagation and growth. Saturn brings in the silica processes, which is related to the building up of substance in roots leaves and fruit. The balancing effect of these two forces is said to produce very strong plants from seed sown at this time.

So you can see it can be quite a complex topic though luckily most biodynamic associations publish a calendar every year for members that make the cosmic interplay and it's practical application on the farm much easier.

Dr Steiner also believed that in order to maximise the effect of the cosmic influences the soil must be alive. And over the generations our soils have become weaker and less receptive to the cosmic influences.

Where as modern conventional agriculture applies acid based fertilizers in what could be described as a reductionist view, where it's the substance that builds the plant, Dr Steiner devised natural amendments or preparations that enliven manures and in turn bring vitality, as apposed to substance, back to the soil and plants. We shall explore these preparations soon …

But this, I think, is a good time to revisit the humble cow.

The Humble Cow

The value cows have in the application of biodynamic principles cannot be overstated. They really are the backbone of the biodynamic practice.

Experienced biodynamic practitioners will reverently describe to you the cow as a regal beast well connected to both the earth and the cosmos through its horns. The horns and hooves, as concentrated skin, reflect back and hold within the cow's organism, the forces it uses in the process of digestion.

The cows dung is permeated with the astral and etheric forces that are vitally important in the process of plant growth.

The Biodynamic Preparations

Dr Steiner prescribed a number of preparations that leverage these unique properties from the cow…

The principal and often first amendment applied by biodynamic practitioners to a new plot of land is called preparation 500 or cow horn manure.

Biodynamic practitioners use preparation 500 to reinvigorate soil and support the humus building process.

It is made from the manure of a lactating cow that has been feed on good mature grass so that the dung is firm. The manure undergoes a special composting process, having been packed into the horn of a cow and buried upright or open end down, from early autumn over the winter months in compost enriched soil. It is then lifted in spring.

Twenty five grams of the resulting preparation, a dark brown earthy substance, is mixed into thirteen litres of pure water with a special stirring action, best described as a vortex action, with a stick or brush, for one hour.

The vortex action not only mixes the solution well but it is also said to enliven it such that it is more receptive and easily taken up by the life processes and by the earth.

Applied with the sweeping action of a brush or branch, preparation 500 is normally applied at dusk, in autumn and spring, ideally when the moon is in a descending phase, when the earth is said to be breathing in, and can be applied up to four times a year.

I don't think it would be a huge leap of faith to consider some of the properties of preparation 500 similar and complimentary to that of the Aerated Activated Compost Teas we explored in journal entry four.

Recent research comments cited by Peter Proctor in *"Biodynamic Agriculture in India"* shows preparation 500 to be `a most highly active material biologically'.

Knowing this and what we already know about the role soil microbes have in humus building, again from journal entry four, it would be fair to assume that preparation 500 applied as a soil drench introduces and promotes a wide range of soil microbes and it is the soil microbes and the life force they support that are responsible for accelerating humus development.

This, I believe, goes some way to explaining why biodynamic soils require 25-50% less irrigation than conventional soils.

To complement the humus developing preparation 500, Dr Steiner prescribed another preparation made from finely ground quartz crystals known as preparation 501.

Preparation 501 is employed to boost the photosynthesis process in the leaves of our trees and is often applied in the growing season at the beginning and end of a crops development stage.

Tree crops benefitting from a biodynamic regime that include the application of preparation 501, are believed to be stronger and more resistant to certain fungal attacks. The resulting crops they produce have a longer shelf life and demonstrate comparatively higher Brix counts than those that don't.

Brix is a measure of the carbohydrate or sugar content and is an aspect of plant health and produce nutrition that we will go into some detail on in the next journal entry.

The higher Brix level lowers the freezing point of the plant, which can be quite useful if you're expecting heavy frosts and you want minimize the potential damage to your trees.

To prepare 501 a good clear and well-formed crystal of quartz silica is wrapped in hessian cloth and pounded with a hammer. The resulting pieces are refined with the grinding action of a mortar and pestle, and then further refined into a fine dust between two sheets of glass.

Mixed with water into thick slurry, the quartz is packed into a cow horn and left overnight to allow excess water to come to the top so it can be poured off before burying. In direct contrast to preparation 500, 501 is buried in spring and lifted in autumn.

One gram of the resulting preparation is mixed with the same vortex action for one hour, with thirteen litres of water. It is applied as a foliar spray, on the one day every month when the moon opposes Saturn, at sunrise.

So you see how preparation 500 and 501 compliment each other, one working the soil humus and root zone, 500, and the other, 501, working to boost the photosynthesis factories of our crops for maximum health and yield.

The Compost Preparations

In addition to preparations 500 and 501 Dr Steiner prescribed a number of other preparations, called 502-507, which are derived from various medicinal herbs. When applied to new compost they support the task microbes have of humus building and of making certain key minerals available. So let's have a brief look at these preparations and the basic process their raw constituents undergo to become preparations...

The first of these, preparation 502, works on the potassium, sulphur and a number of trace element processes. Preparation 502 is made from flowers of the yarrow plant (*Achillea millifolium*) dried and stuffed into the bladder of a stag. The bladder is hung up in spring and summer, in the sunlight, and then buried in unglazed pots in autumn. It is then lifted the following spring.

Preparation 503 works on the calcium and nitrogen processes and is made from the flowers of the german chamomile plant (*Matricaria chamomilla).* The flowers are stuffed into the intestines of a bovine that are then buried in the soil in autumn to be lifted the following spring before any earthworms can get to them.

Preparation 504 works on the iron and magnesium processes and is made from the leaves and stalks of the perennial Stinging Nettle (*Urtica dioica).* The leaves, picked and dried in late spring and early summer, before they flower, are then buried in the soil in autumn for a period of twelve months.

Preparation 505 works on the calcium process and is made from the bark of the european oak (*Quercus robur or sometimes known as pedunculata)*, stuffed into the skull of a domestic animal and submerged in a barrel of water over spring and summer to be lifted out of the water in late autumn.

Preparation 506 works on the silica process and is made from the flowers of the dandelion plant (*Taraxicum officinalis*) wrapped in the mesentery of a cow and buried in autumn to be lifted in spring, at much the same time as preparation 500.

Preparation 507 works on the phosphorous process and is made from the flowers of the valerian plant (*Valeriana officinalis*) harvested in summer. The flowers undergo a grinding process with a mortar and pestle and are then stored in a jar, in the light, with four times their volume in pure water for seven days. The flowers are then filtered out with a coffee filter and the resulting tea stored in a bottle, to the brim such that no air is present, in a dark cupboard.

Some of you reading this maybe thinking "what an odd collection of ingredients?" Well they might be odd to you today but perhaps to the organic farmers in Germany, back in 1924, they may not have been that odd nor that hard to get hold of.

Indeed what they may reflect is a local implementation of concepts, only understood by Rudolph Steiner, into practical and achievable preparations for the given situation.

Luckily, for most of us, you need not worry about how you're going to get these ingredients as you can order the completed preparations, as sets, from your local biodynamic association.

The Biodynamic Compost Pile

In journal entry three we looked at what makes good quality compost. Here's what we discovered…

At a high level compost creation involves microorganisms breaking down raw organic materials and then synthesizing them into what is known as `humus'.

Humus, a partially decomposed, yet transformed and more stable form of the organic material we began with, is packed with microorganisms, primarily bacteria and fungi, and they provide us with good quantities of nitrogen, biologic carbon and other minerals present in a form that is both stable and available to the soil community.

These primary constituents of compost are vital to the health of our soil community. A good quality compost could well have a high humus content of around 30-40% organic matter.

Back in journal entry one we described fungi as living containers of fertilizer. Well bacteria can also be described in much the same way. They are second only to fungi as the primary decomposers of organic matter and form the very foundations on which the soil community thrives.

Both nitrogen and carbon, in the form we get from humus, are vital to healthy plant growth. Carbon plays a significant role in holding minerals in the soil, including nitrogen. The greater the carbon content then the greater the mineral holding capacity of our soil.

Carbon is also the primary moisture regulator in our soils and all biologic life for that matter. Carbon can hold up to four times its mass in water. So the more carbon present in our soils the better the water holding capacity.

At home, in New Zealand, many of our conventional farm soils lack biologic carbon as the soluble acid based fertilizers often employed essentially burn off any available biologic carbon. Water retention is impacted and the soil community is undermined.

In *A Home Gardeners Guide to Growing Nutrient Dense Food,* Kay Baxter tells us that in the Waikato, a region of New Zealand, carbon has been lost at a staggering rate of 30-40 tonnes per hectare over the last 30-40 years! (According to Waikato University and other figures)

As a result animal effluent and mineral amendments readily leach out of the soil and pollute the waterways that feed into our lakes and catchments.

So you can see organic matter and humus from compost is so vital to our soil health. Microbes only begin to "wake up" when soil organic matter content reaches 2%. They thrive at around 4-6% in temperate climates and around 3% in tropical climates.

The compost preparations, 502-507, are used in the preparation of biodynamic compost, and in fact to any processes which use fermentation.

In Biodynamics, the vitality of the compost is of prime importance and that the process of composting serves to retain and transform the original vitality of the materials that make up the compost, without loss.

Now making good biodynamic compost is quite an art. So look to the references and recommendations at the end of this journal and you'll find some great resources on the art of biodynamic compost making. See *Grasp the Nettle* and *Making Biodynamic Farming and Gardening Work* and *Biodynamic Agriculture in India* both by Peter Proctor

With biodynamic compost one set of the compost preparations, 502-507 are added at the time the compost pile is initially made. They are said to bring about an order and balance in the decomposition of the compost material. The final product has such a range of beneficial microbes that serve well, when applied, to combat soil born pathogens.

For orchards apply biodynamic compost at a rate of five to ten cubic metres per acre per year.

Cow Pat Pit (CPP)

The biodynamic compost preparations are also used with another soil inoculant known as Cow Pat Pit or CPP.

Devised by Maria Thun, a pre-eminent expert in biodynamics, CPP is said to stimulate the soil community and aid in the breakdown of organic and mineral matter.

Back in the 1980's, following the Chernobyl Nuclear disaster, authorities found that soils in the fallout zone regularly drenched with CPP were free of radioactivity.

From this I think we could draw some interesting connections …

You may remember back in journal entry one, on tagasaste, we learned that soils with high levels of microbial activity and humus are able to lock up toxins, and to a certain extent radioactive elements, through a complex biosequestration process.

So it appears CPP does a good job of promoting the soil community and humus building in our soils.

To support this in *Biodynamic Agriculture in India* Peter Proctor cites some recent research from Chennai India that shows CPP to have a wide range of useful fungi and bacteria colonies, as well as plant growth regulating hormones, subtilin a bacillus with anti fungal properties and the wood rotting fungus tricoderma and pseudodermus.

So it's good for our soils and it could help to lock up toxins and radioactive elements that might otherwise make their way into our produce. It's also quite versatile in that it can be applied in a number of different forms. Some of the more common forms that I have some experience with are:

As a soil drench, it can be applied with any compost application and when green manure is turned over as a way to get the effects of the compost preparations, 502-507, over the land. It can also be used in conjunction with preparation 500.

As a foliar spray, and as a component of a tree paste onto our orchard trees to reduce the risk of fungal and certain insect attacks that aren't so good for our trees.

As a component of tree paste, it also helps to repair and strengthen the bark. We'll go over a tree paste recipe we use at the orchard in a moment.

And it can be used to soak seeds and tubers, such as potatoes, to encourage root development and protect against blight.

With such a wide range of applications I prefer to make my own supply so that I have plenty on hand when I need it. It's really quite easy to make up …

Originally devised by Maria in wine barrels many now choose to make CPP in pits surrounded by bricks.

The basic process involves digging a pit 90cm by 60cm and 30cm deep. The sides are lined with bricks and the base left bare to the earth. The bricks are able to soak up water and help to keep the whole pit from drying up, which is not desirable.

60kgs of cow dung is mixed with 100 grams of powdered eggshells, to bring in the calcium processes, and 100 grams of powdered basalt dust, to bring in the silica processes. Mixed or dynamised for at least fifteen minutes, ideally for an hour, the final solution is deposited in the pit to a level no more than 15 cm's.

The top is then smoothed off and a row of six holes made to 3 cm. Preparations 502-506 are then each deposited in their own hole. The valerian preparation, 507, is mixed with water and half added to the final hole. The remainder is sprinkled over the dung, the bricks and over a damp hessian sack that is used to cover the pit.

After the first month the dung should be opened and turned with a fork to aerate it, and then every week after that. After two to four months, depending on where you are and the time of year, your CPP should be ready.

Finished CPP should smell a lot like finished compost, with a fresh earthy smell. It should also be high in humus so will feel silky if rubbed between your fingers.

You can use it straight away or store it in glass jars in a cool place, surrounded by peat, for up to two years.

At the Orchard

I have to be honest with you I don't consider myself as a model biodynamic practitioner, well at least not yet!

To be a good biodynamic practitioner I believe you must be a very good planner; with biodynamics the timing of your preparations and treatments is key. This, by the way, is also true of good permaculture practitioners.

And while I consider myself a good planner, for the most part, I struggle to adequately plan activities at the orchard as precisely as is required by biodynamics.

This is primarily due to the remote nature of my forest and orchard. Now, as a more seasoned practitioner of permaculture, I understand my original site selection for the orchard was fundamentally flawed. In permaculture we call this a type 1 error.

Maybe another way to describe a type 1 error is to have a shaky foundation for a house. It's very hard to fix and will always work against you.

With the Orchard being so remote my ability to understand the local patterns of nature, that should influence my application of the biodynamic practices, is also hindered.

That aside we do as best as we can at the Orchard.

At a minimum we apply one 500 drench, with CPP, in the autumn and one at spring just as our trees are coming out hibernation. It would be good to do two in autumn and two in spring but we haven't managed this yet. Hopefully this coming season we will.

We also apply a 501 foliar spray once in spring to help boost the photosynthesis process of the new leaves in formation. And when the time arrives for our seedlings to bear fruit we'll apply another just before harvest with an aim to enhance the Brix levels.

As 500 and 501 are complimentary in nature it's not a bad idea to apply the sprays quite close to together. Some folks practice what is known as sequential spraying, where 500 is applied in evening and the following morning 501 is applied. The timing should be such that the 501 is applied on the morning of the day before the Moon is opposite to Saturn.

In spring we apply biodynamic compost, put down the previous autumn, around the root line of our trees. We apply as much as we have available which is between one and two cubic metres over a quarter acre.

And whenever we can we apply CPP as a foliar spray. We do this at the end of the days activities. For me it seems to be a nice way of completing the day's work, to sit down and stir a CPP and then apply it with the backpack sprayer across the entire orchard.

During winter we apply a tree paste to the bark of our seedlings. The tree paste helps to seal away any wounds from fungal disease.

We experienced some nasty cicada damage in the first growing season and found the tree paste particularly useful in treating these wounds. The tree paste we use is also said to deter various boring insects from making our trees their breeding chambers.

The recipe I was given and use is four parts clay (bentonite clay is recommended if you can get it), two parts cow manure and one part diatomaceous earth.

Diatomaceous earth is a naturally occurring sedimentary rock that is full of the fossilized remains of diatoms. It acts as a mechanical insecticide. In other words it scratches the exoskeleton of insects and dehydrates them. So given the choice insects tend to go elsewhere.

Diatomaceous earth can be refined into a number of products for differing purposes. Be sure to use insecticide grade diatomaceous earth for your tree paste and not the more dangerous heat-treated diatomaceous earth used for swimming pool filters. I recommend you employ a dust mask whenever working with diatomaceous earth and wet the diatomaceous earth before you mix it in. It's quite a fine abrasive substance that you don't want in your lungs.

Mix these ingredients in with enough stirred preparation 500, with CPP added, to produce a paste that can be brushed on or smoothed onto your trees by hand.

A Natural Approach

There are just too many practical examples out there to dispute the effectiveness of biodynamics. It works!

As you've seen in this journal entry modern science is only just starting to catch up with biodynamics. I believe this is because we are only now just starting to truly understand the complex elements and dimensions of the natural world that effect soil, plant and human health.

Many of us see ways in which horticulture, using practices like biodynamics, can take the next evolutionary step. A great example of an industry that appears to be doing just that is Viticulture …

Vineyards are moving in droves to convert to biodynamics and from what I've heard from some of the people I know in this industry there are some very good reasons behind this.

Wine making is big business! And truly effective implementations of biodynamics can significantly lower the operational overheads associated with viticulture and it can boost production.

Though the successful marriage of viticulture and biodynamics extends beyond these operational aspects.

As we now know biodynamics works in a way that is intimately linked with the energy patterns of nature both terrestrially and cosmically. And of course these patterns are unique to every location.

These unique properties contribute to a concept well known in traditional wine making circles known as Terroir.

Terroir, derived from the word *terre* for "land", is a traditional French concept that a wine reflects every aspect of where it was made, such as the location and the climate, the air and the soil, the light and indeed the human influence that all influence the end product.

So you can see how compatible biodynamics and viticulture are …

Terroir touches on an important biodynamic concept that we, as humans, exert such an influence, or ego, on everything we do that we are placed in a unique position of responsibility.

Of course this concept compliments our own values and ethics from permaculture in that we believe in caring for the earth, our people, in balance and fair share.

In this journal I've covered only what I know about biodynamics, as a novice, and how I implement biodynamic practices for a small-scale non-commercial orchard. A one-man orchard!

There are many other aspects to biodynamics that I haven't covered nor have I had experience with.

Also please be aware that my description of the preparations and how they are concocted is rudimentary at best and should serve only as an introduction to the concepts and methods employed.

If you're contemplating practicing biodynamics you can read some of the books I've referenced or even better look to some training.

For those of us in New Zealand we are fortunate to have a world-class course in applied Organics and Biodynamics run by Taruna College in the Hawkes Bay. Seek out your local biodynamic association and they'll be able to recommend a course for you.

The Downside

I don't think there is a downside to Biodynamics.

If you explore Biodynamic's further you'll encounter aspects of theory that modern science is not yet in a position to explain. To be a Biodynamic practitioner certain elements of `Faith' are required and for some, including myself, this will come as a challenge.

I wouldn't call this a downside, rather I would call it an opportunity to grow and learn. Be open and accommodating of new concepts, even if you don't get them, otherwise you may struggle to embrace Biodynamics.

Other Journal Entries in the works

In the next journal entry we review our own design for soil remediation. Growing our own healthy produce can be one of the most empowering things we can do to support the health of our families and our legacy. But what is healthy produce? In this journal entry we examine that question and we begin to connect the dots between soil health, plant health and our own health.

Related topics covered include Soil Testing Techniques, Visual Soil Assessment, and Mineral Relationships.

Then in the last journal entry in this series we review the ethics base, principles and domains covered by permaculture design. We introduce some design strategies and tools used in permaculture design and we take a critical look at our own design at the orchard.

And thanks for the Help!

To Shar Packer, Kay Baxter, Rachel Pomeroy, Peter Proctor and John Ridout my sincere thanks for your contributions to this Journal entry.

- Tim Packer @ Pig in the Mud Permaculture (tim@piginthemud.com)

The Books I Always Have Nearby

The Koanga Gardening Guide by Kay Baxter

Design your own Orchard. Bringing Permaculture Design to the Ground in Aotearoa by Kay Baxter

A home gardeners guide to Growing Nutrient Dense Food by Kay Baxter

Teaming with Microbes: The Organic Gardeners Guide to the Soil Food Web, Revised Edition by Jeff Lowenfels & Wayne Lewis. A Timber Press Publication ISBN: 13: 978-1-60469-113-9

Permaculture: A Designers Manual by Bill Mollison. A Tagari Publication ISBN: O 908228 01 5.

The Man who Planted Hope and Grew Happiness by Jean Giono

Nourishment Home Grown by Dr A. F. Beddoe. A Whitman Publication ISBN 1-885653-20-4

How to Grow More Vegetables than you ever thought possible on less land than you ever imagined by John Jeavons. A Grow Bio Intensive Publication ISBN: 1-58008-233-5

The One Straw Revolution by Masanobu Fukuoka. An Other India Press Publication ISBN: 81 85569 31 2.

Grasp the Nettle. Making Biodynamic Farming and Gardening Work by Peter Proctor with Gillian Cole. A Random House New Zealand publication ISBN 1-86941-657-0

Other References and Resources related to this Journal

Biodynamic Agriculture in India by Peter Proctor

Biodynamic Perspectives. Farming and Gardening. A New Zealand Biodynamic Association publication.

Disclaimer

I offer this information to you in good faith on the understanding that the information I provide is at best an introduction. You should do your own research and/or training if a topic interests you and consult with experts if need be.

And while I have done my best to ensure the information is accurate I cannot take responsibility for errors or omissions, or for any consequences arising from reliance on the information I've provided. What you do with the information I provide in these journal entries is of your own accord and accountability.

Koha – A Value Exchange

I firmly believe, in a world facing such overwhelming challenges, that one of the most empowering things we can do for ourselves and for our legacy, the next generation, is to grow produce in our own back yards that is truly healthy. Healthy for us, for the Earth, and for the complex web of life we share the Earth with.

Using permaculture ethics and principles as a compass on a journey still in progress I've documented, in a number of journal entries, a number of practical experiences and important lessons picked up on the way to achieve this end. Every design situation and treatment must be unique, as will be your own journey in permaculture, though I do hope they can help you in some way.

You can download the journals from my website, <http://www.piginthemud.com/>, without charge. If these journals have been helpful to you, then please consider making a donation through my give a little page here - <https://givealittle.co.nz/cause/piginthemud> or by simply scanning this QR code…

Funds received will be used for research that will once again be shared freely, areas of focus include Comfrey Research and Cultivated Fungi Research. (Suggested Koha for downloads - $3.50 each or the set for $20)

These journal entries may be updated or added to on occasion, and I'm hoping to add more journal entries when I can, so do check the website from time to time. Share this knowledge! Please find others who would benefit from this information and pass these journals on.

Cheers and Thanks,
Tim @ Pig in the Mud