The Permaculture Practitioner, Journal 5 – Understory (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.

Understory

I remember the day very well. It was early in the New Year and I hadn't been able to visit the orchard for some time though I knew the area had experienced an extended dry patch of up to six weeks with no rain.

In the drive up to the orchard every field and paddock I passed by looked like tinder ready to go up in flames. With no artificial irrigation systems to speak of I feared the worst for my little orchard.

As I approached it appeared those fears were soon to be realised. At a glance the orchard looked no less alive than the surrounding countryside. I couldn't even see my seedlings amongst head high grass and thistles, all long dead from the drought.

And then, as I walked into the orchard, hardening to the fact my orchard had expired under the sun, I spied a patch of green. And there, tucked in under the grass, spreading across the orchard, was my understory…

On closer inspection while it was certainly struggling, it had diminished to the point where it was holding onto life just above the soil, I could see that it had evolved to the conditions with some species all but disappeared while others were playing a dominant role. Those that remained were holding the Sun at bay.

I discovered the soil underneath was damp to the touch and there were armies of bugs trundling along, all I'm sure, benefitting from the cover provided and the moisture that had been retained by the understory.

I found my seedlings benefitting in a similar way to the comfrey plants surrounding them still certainly struggling but holding on all the same.

I have no doubt that the understory saved the day. The rains came a couple of weeks later and the understory evolved again. An understory is a constantly changing landscape.

So what is an understory? Well to many it is simply a ground cover of low-lying vegetation living under a forest canopy.

To the aspiring practitioner of permaculture the understory can provide an indispensable set of tools that can be employed to condition our soils, accumulate and distribute minerals and nutrients, to shelter and attract beneficial insects and even deter other insect pests.

In this journal we're going down to the understory to see what it can do for us and we'll examine our own understory at the orchard. But first of all we'll take a look at some important founding concepts, employed as best we can at the orchard, from Masanobu Fukuoko, Japanese Taoist and a pioneer in the art of no till farming…

The One Straw Revolution

On his fathers hillside orchard on the Island of Shikoku in the south of Japan Masanobu Fukuoka (1914-1988) developed a style of farming he coined `do nothing' farming.

Not to be taken literally `do nothing' farming revolves around the assertion that nature is the true perfectionist and practitioners of farming should disrupt nature as little as possible to obtain a truly sustainable yield.

Indeed by taking natures lead Fukuoka was able to, over time, obtain yields comparable to any other farm in Japan at the time for much less ongoing effort and with a minimum of external inputs.

Fukuoka summarised his approach in four basic principles …

The first was *no cultivation*; rather he left the earth to cultivate itself, through promotion of a healthy balanced soil community. An aspect explored in some detail in journal entry four.

The second was *no chemical fertiliser* or *prepared compost*. He looked to his crops and understory, topped at certain times of the year, as a living compost, to build carbon and humus.

There would be *no weeding by tillage* or *use of herbicides,* his third principle. Rather he employed various natural techniques to control weeds, some we'll explore further in this journal entry.

To establish plants without tillage, and to protect his seeds from birds and mice, Fukuoka devised a number of techniques to encase his seeds into clay pellets. With these techniques he was able to make enough seed pellets in one day to cover several acres.

His fourth principle advocated *no dependence on chemicals*. To ward off disease and pests Fukuoka focused on growing sturdy crops in a healthy environment so their natural defenses were strong enough to protect them.

The Natural Way of Farming

With a unique insight into natures ways, amassed through keen observation over many seasons, Fukuoka was able to effect natural succession strategies to successfully grow rice, various grains, vegetables and produce from the orchard. As a simple example…

In his fields, in autumn, just prior to harvest, white clover and seeds of other fast growing winter grains would be broadcast amongst the rice fields. In this way the seeds were sheltered and protected from the elements and from those who would otherwise consume them.

The seeds would have just enough time to germinate and sprout to a few centimeters tall before the rice was ready to harvest.

Cut with a hand sickle, so as to effect topping rather than tillage, the rice would be harvested and threshed and the remaining rice straw scattered back to the field to return carbon and compost to the soil.

Knowing the right time to sow each crop and the right time to harvest was key to achieving success.

Fukuoka also employed various techniques to influence succession such as flooding to weaken clover and weeds so seeds from the next crop could outcompete them.

In the Fukuoka's mandarin orchards permanent ground cover, or understory, of various species were introduced…

He would rely heavily on legumes, as the pioneers of the understory, to support the four principles in his orchards. Clover and alfalfa were the first species used to establish a permanent ground cover.

As legumes they are particularly useful as a design element because they have the ability to fix atmospheric nitrogen, something we discovered back in journal entry one on tagasaste.

Remember nitrogen is a core element in the amino acid building blocks of protein structure, which are vital to healthy plant growth.

Vegetables were also grown amongst the fruit trees and understory. Once again timing was key.

To grow spring vegetables a swath in the understory would be cut away just as the winter species were receding. The seeds would be randomly scattered on the ground and the cut understory would be layered, as mulch, back on top of the seeds.

With this method, in a semi wild fashion, Fukuoka would successfully grow burdock, cabbage, tomatoes, carrots, mustard, beans, turnips and many other kinds of herbs and vegetables.

Following germination the understory would require cutting back maybe two or three times to allow the vegetables to flourish.

To compliment the understory, in much the same way as we have with tagasaste in our orchard, Fukuoka leveraged the morishima acacia as a legume to nurture soils, as an attractant for beneficial insects, as a windbreak and as a fodder crop for livestock.

At the Orchard

At the orchard we've employed a diverse understory that we believe will benefit the soil community and our trees…

An Understory Dominated by Clover

As with Fukuokas method's, clover varieties dominate our understory. I think of subterranean clover (*Trifolium subterraneum)* as the foundation, and stalwart, of the understory. So called because seed development occurs underground, an aspect unique to this particular clover variety, subterranean clover is as tough as old boots. It's able to withstand drought conditions many other species in our understory would expire in. Being self-fertile it can propagate without the help of insects.

Dutch white clover (*Trifolium repens*) provides the primary biomass for the understory atop the subterranean clover. It's an aggressive clover that we can employ to outcompete other invasive grass species that would otherwise dominate the orchard.

As it responds more favorably to foraging than most other species we simply top the whole understory in late winter and late summer to give white clover the edge it needs to flourish.

Red clover (*Trifolium pratense)* although present year round, tends to present itself in our orchard more so in winter when the other understory species have died back. So nitrogen fixing continues through all seasons.

All of the clovers we employ make for excellent fodder for poultry and if location weren't an issue for us we would certainly incorporate ducks and/or chickens, at times, to the orchard and into the overall design.

Fukuoka often introduced ducks to his crops. They would provide their own direct benefits, such as eggs and meat, as well as manure, full of nitrogen and phosphate, to enrich the soil.

You may remember back in journal one on tagasaste that phosphate plays a big role in the overall health of our soils and seedlings. Phosphate acts like an `usher' locking on and transporting minerals up into our plants and seedlings. It is then cycled back into the soil to begin the process anew. I certainly recommend incorporating animals and their manures into your own orchard designs, as they are one of the few sustainable ways to get phosphate back into your soils.

To Better Manage Insect Pests

We employ a number of herbs, primarily from the *Umbeliferae* family, to attract beneficial insects to the orchard.

Beneficial insects, in this context, are insects that prey on other insects that if left unabated could cause problems for us at the orchard. Lets call them insect `pests'…

Aphids, lemon tree borer, leafrollers, codling moth, cicadas, and midges all have the potential to undermine the health of our fruit tree seedlings and their produce. If you're reading this with your vegetable garden in mind be aware that the list of insect pests can grow substantially.

I think it's important to note that while we may call these insects pests they are all part of the natural ecosystem and food chain. They are pests only in an unbalanced ecosystem where, left to their own means, they would breed above and beyond their natural order.

So complete eradication of these pests is not the aim. Rather we're looking to promote the presence of their natural controlling agents so a balance is achieved.

For instance, ladybirds, in their larval form, are adept hunters of aphids as are hover flies and lacewings. Both the hover fly and lacewing prefer to pray on small soft bodied insects so will also make an impact on leafrollers.

Parasitic wasps and flies can also play a role as natural control agents. Parasites spend a good deal of their early lives inside the pest host, or their eggs, and eventually kill them emerging in their adult form.

When they're not eating pests, or being hosted inside one, our beneficials like the odd drop of nectar and barring ichneumon wasps, which can be quite large, comparatively speaking, most of our beneficial insects are very small and as such prefer very small flowers to forage on for nectar.

And that's why they tend to be attracted to the tiny flowers from herbs of the *Umbeliferae* family. At a glance these herbs appear very similar, all standing around a metre, more or less, with clusters of small white flowers.

They include dill (*Peucedanum graveolens)* bishops weed (*Ammi Visnaga*) and queen anne's lace (*Daucus carota*) also often referred to as the `wild carrot'

We also use white alyssum (*Lobularia maritima benthamii*) in our understory mix for the same purpose.

So we have a wide range of flowers that should encourage our beneficial insects to stay right where we want them. Though aside of a good diet of insects pests and nectar they also need water and shelter nearby.

The understory can provide some shelter, as can the edges and slopes of our orchard terraces. While we haven't done this yet, artificial shelters, made to mimic the tunnels and hideaways our beneficial insects prefer as homes, could also be employed.

The increase in biodiversity and habitat should encourage other beneficial's, such as spiders and ground beetles, to make their homes in our orchard also.

Another way we manage insect pests is with flowers that produce chemical deterrents such as nasturtium (*Tropaeolum majus*) Nasturtium is known to deter aphids and whitefly from nearby plants. So it's useful in and around the orchard.

Though not yet implemented we hope to augment the understory at some stage with marigolds (*Calendula officinalis*) known for their ability to deter much larger pests, such as rabbits and possums.

For Pollination and as Green Manure…

We want bees around in abundance, to support pollination and fruit set as our seedlings mature.

The bees will collect both pollen, their source of protein, and nectar as their carbohydrate source to feed the hive. Now as a general rule of thumb blue flowers tend to attract bees more so than others…

We employ phacelia (*Phacelia tanacetifolia) o*ften called the lacy phacelia, as our primary bee attractor. It produces long running nectar rich blooms that are also favoured by many of our beneficial insects, such as hoverflies and parasitic wasps.

We also use chicory (*Cichorium Intybus*) and buckwheat (*Fagopyrum esculentum)* to attract bees.

Buckwheat provides additional benefits; with up to 16% protein content it can be an important fodder source for poultry. It's also able to obtain and cycle phosphate more effectively than most other plants.

All of our bee attracting plants are good green manure crops, crops that when topped or turned over provide raw organic material and nutrients to support soil building and conditioning.

In line with Fukuoka's principles we do our best to leave the topsoil layer alone so we never turn over our green manure crops. Rather we top the whole understory twice a year.

We tend to lean on these live green manures as key sources of organic matter and for humus building at the orchard.

For Soil Conditioning

Our understory works above the ground and below. The diverse range of species we employ, and their equally diverse root systems, cultivate the earth at different depths. And as they thrive and expire they leave behind organic matter that will contribute to the humus content of our soils.

In their place pockets and tunnels, which can fill up with air and water and indeed members of the soil community, will remain.

We leverage the deep reaching taproots of the daikon (*Raphanus sativus*) sometimes called the Japanese radish, lucerne (*Medicago satvia)* also known as alfalfa, and comfrey *(Symphytum peregrinum)* much like organic crowbars, to break through the clay layers we have present in the soil so we can ensure good soil drainage.

Comfrey, as we discovered in journal entry two, is able to extract and accumulate large quantities of potassium (around 7%) and to a lesser extent phosphorous (around 1%), calcium (around 3%), magnesium and other trace elements.

The comfrey leaves act as storage bins for the cache of extracted minerals. The resulting proportions of minerals stored make for a well-balanced, readily available form of fertiliser that's ideal for our seedlings.

Planted in and around the drip line of our seedling roots comfrey will suppress weeds and retain moisture at ground level. In winter the comfrey leaves die back and deposit their cache of minerals right where our seedlings need them, up in the topsoil.

In a balanced system grasses are equally as important as the other understory members. While the orchard terraces began as predominantly couch grass, summer grass and crowfoot grass we have also introduced elles cocksfoot.

Elles cocksfoot (*Dactylis glomerata)* is tough drought hardy grass that is known for it prodigious root mass that should contribute to the organic matter in our topsoil over time.

Establishing our Understory…

Fukuoka once said that he knew more about what can go wrong growing agricultural crops than anyone else in Japan. But he persisted and he eventually succeeded.

And this I believe is very much the case with an understory. There are so many variables involved in understory development that it's hard to predict with certainty what will happen. And once you have an understory it will evolve and it will change with each season. It's always in a state of transition.

Our first seed mix was made up of dutch white clover, subterranean clover, red clover, phacelia, chicory, buckwheat, dill, bishops flower, parsnip, ammi visnaga, fennel, daucus carota, bergamot and alyssum.

At that time, given our desire to have an understory dominated by clovers we went heavy with clovers. On reflection I think maybe a bit too heavy on the clovers. I still prefer a clover dominant understory but I believe, given a clean slate, I would scale back the clover proportion to be more evenly balanced with the other species. Then as need be I could re sow individual species to tune my understory evolution

The proportions used and the application rate you might use really comes down to your own design goals and the specifics of the site you're dealing with. So no one rule fits all I'm afraid.

For those of us in New Zealand the folks at Koanga Institute in New Zealand offer a premade mix that will ensure you have something growing year round.

We implemented an understory that we thought most applicable to our situation and environment. For the most part it worked as expected but not everything panned out as we had planned...

This seed mix was applied in spring after our first and last visit of a digger to remove some old tree stumps, shape the terraces and create channels for natural irrigation along each orchard terrace

While tillage of the earth is not advocated by Fukuoka, with no other irrigation systems to speak of, we saw this activity as a once only must do activity.

The actions of the digger weakened the established grass species so we grasped the opportunity to sow our understory seeds. I must point out that once again, contrary to Fukuoka's principles, we brought in prepared compost and mixed it with lime flour, as a source of calcium, and RPR, a source of phosphate.

This was a conscious choice based on the results of a soil test that we'll describe in some detail in journal entry seven. Though needless to say with the soil in the condition it was in, after many years as a commercial pine forest, we decided that without these amendments our understory species wouldn't germinate well and the birds would have consumed the majority of our seeds.

Given our situation I suspect Fukuoka would have employed his seed pellet technique but with no prior experience in seed pelleting we decided not to attempt this.

In the first month it was such a buzz to watch our understory burst into life and take hold. The combination of spring sun and rain meant that within a month we had a knee high understory and we could see everything, aside of the chicory and daikon, coming through.

After two months the phacelia, dutch white clover and alyssum largely dominated the landscape while random pockets of members of our *Umbeliferae* flowers had established themselves well.

The comfrey was really struggling I suspect due to a lack of nitrogen so every time we appeared at the orchard we'd pee on the comfrey. It seemed to work as in the second season, once their taproots had firmly established themselves, they took off.

Towards the end of that first summer the change in the overall environment above the ground, was quite profound.

I remember soon after Christmas sitting on one of the orchard terraces and I could hardly hear my own thoughts from the buzz of insects that had made our orchard their home. The previous season the only insect activity we noticed was flies.

Though not all was well…

We noticed the clover was being outcompeted in quite a few areas by the resident grasses. If I had a sickle, and I knew how to use one, I would have used it but instead employed a petrol weed eater to top the entire understory in late summer giving the clovers a slight advantage over the grasses. In badly affected areas we topped again in late winter. This technique works really well for clover and after a couple of seasons the clover really took off.

Our phacelia also struggled coming into the second season. I'm still trying to work out why it continues to struggle. But now along with alfalfa and red clover, we re-sow in spring. Spring is by far the best time to get legumes away.

I noticed chicory coming up, in small patches, for the first time in the third season and I can't say I've seen a daikon yet!

On the lowest terrace reeds became the dominant species up until the third season when the clover finally succeeded in establishing itself. After some research I came to understand that reeds tend to persist when drainage is limited and soil moisture content is high.

The mere presence of those reeds provided me with an insight into the soil conditions on that lower terrace. And it got me thinking about what other insights I could gain from the rest of my understory…

Every plant has a story to tell

Of all the awesome things I've learnt developing my orchard for some reason this topic intrigues me the most.

Our ancestors weren't able to leverage modern soil labs as we do today, so with knowledge and experience passed down from generation to generation they were very adept readers of the stories that plants, and indeed the soil, offered.

So I began to explore this subject a little further, and I found that learning about your soils from your plants has some distinct benefits over our modern soil testing techniques.

The first, and I think one of the most important, is that your understory can provide a continuous and live feed of information, so you get history and you begin to get a sense for the evolution of your soils as you develop your orchard. Whereas a soil test provides insight into only a single snapshot in time

The second is that your understory, as it covers your entire orchard, can provide a more complete sample of information as compared to an aggregated soil sample, of perhaps no more than two hundred grams, used for soil testing.

The third, of course, is that it's free. With these benefits I can see how useful it would be to develop these skills…

If we can learn to read our wild endemic plants we could learn much about the history of our soils on the land before we begin manipulating the site to our own designs.

The wild plants and indeed our own introduced plants can tell us many things about our soil structure and makeup, mineral content, nutrient levels, acidity and many other aspects that are key to producing healthy nutrient dense produce.

Some introduced species and the stories they tell are better understood than others. Clover is a good example of that which is a bonus for us as our understory is largely dominated by clovers.

For instance in soils lacking in calcium the leaf margins of all clover species become scorched. There are other symptoms of calcium deficiencies but I distinctly remember seeing these scorch marks in the first season.

I was concerned that there wasn't enough water to support the understory but on reflection, and from subsequent soil testing, it may have been caused from a lack of calcium.

Learning to read soil conditions from our plants, and understory, is an entirely new subject for me. I think it will take some time and good deal of experience before I can trust my observation skills and not lead myself astray.

I certainly wouldn't consider abandoning soil testing at any stage. Rather I see soil testing and the ability to read your plants as complimentary. We'll dig into soil testing, and a technique known as visual soil analysis, further in journal entry seven.

But for now, understanding that there are important insights to be gained, I'll be looking more closely at my understory and keeping more notes on my observations so with some good resources, I've listed a number in the references section of this journal entry, I can continue to build on my knowledge.

A Natural Approach

I've only had experience with the understory implementation at my own orchard.

The research I've gathered and the notes produced in this journal entry I hope will provide you with some useful insights that might help you develop your own understory as part and parcel of whole design.

Fukuoka's principles can serve us all as guides in the whole design process. Nature's way, as Fukuoka advocates, is indeed the most sustainable.

With Fukuoka's principles and the concepts we've explored here you can start to think about what your understory might be composed of and what species would flourish and provide the benefits you desire in your own environment and situation.

In *Design Your Own Orchard* Kay Baxter shares her experiences on orchard development and their related understory's from a number of different situations and climates. As Kay proves there really is an understory for every situation…

The Downside

I think it's fair to say that more sustainable paths can take longer to travel. Fukuoka, for instance, spent many years honing his techniques before he was satisfied he had it right.

And for many of us the soils we are working with are severely demineralised. To restore our soil back to life, in a way that will enable us to grow food that is truly healthy for us, we need to bring in the minerals we know are deficient and in the right proportions with others.

Once we have these mineral relationships in place in our soils, combined with other systems and soil restoration techniques, we can achieve sustainable growing conditions. We explore this subject in much more detail in journal entry seven.

And at the orchard it took three seasons before we were comfortable that our soils had transformed enough to the point where they could support our fruit tree seedlings.

Implementing an understory that works for you in your situation will take time. And there's no doubt you'll encounter your own unique challenges before you succeed. But with some patience and fortitude you'll get there…

Other Journal Entries in the works

In the next journal entry we look at the concepts, strategies, systems and techniques employed by biodynamic practitioners to invigorate soils and promote soil health. We explore 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.

Related topics covered include the Biodynamic Compost Pile, Carbon and Terroir

And in journal entry seven 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.

And thanks for the Help!

To Shar Packer and Kay Baxter 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

The International Permaculture Solutions Journal Volume 1, Number 3. A Yankee Permaculture ISSN: 1046-8366

Test Your Soil with Plants! By John Beeby. An Ecology Action Self-Teaching Mini Series Booklet #29

Designing and Maintaining Your Edible Landscape Naturally by Robert Kourik A Metamorphic Press Publication ISBN: 0-9615848-0-7

Roots Demystified by Robert Kourik. A Metamorphic Press Publication ISBN: 978-0-9615848-0-1

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