Living Lightly on the Earth: a Fieldweek at the Centre for Alternative Technology

Stories from Practice

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Having ascended the water-powered cliff railway that takes us from the carpark up to the main site we stand on the cantilevered deck of the upper station looking out across the hills and autumn colours of the wooded Dulas valley below us. The branches on the silver birches are whipped by a cold wind blowing in from the Dovey estuary as we turn to walk across the old slate workings that are now the site of one of the best known eco-centres in Europe. Later, having been given a guided tour of the site, we retire to our self-catering cabins where we split and stack the wood that will later keep us warm. The annual Gobal Futures fieldweek at the Centre for Alternative Technology has come round again.

Global futures

Global Futures is a multidisciplinary subject located within the Faculty of Applied Sciences at Bath Spa University College. It is part of the institution's wider modular scheme and can be taken as a Single Honours or as part of a Combined Award (ie. paired with another subject of the student's choice). Global Futures operates on two main axes: spatial and temporal. The spatial axis is concerned with the nature and effects of globalisation and understanding the interrelationships between local and global issues, especially those to do with environment and development. The temporal axis is concerned with the historical origins of environment/development issues, various aspects of the current debate about the nature of sustainability, and ways of both avoiding unsustainable futures and of working towards more just and sustainable futures in the local/global community.

Students are able to chose from a range of modules which include: Alternative Futures, Human Resources, Appropriate Technology, Energy, Land and Water, Economics and Development, Development Issues in Africa and Issues of Sustainable Management. The fieldweek described in this article is a required part of GF301 Alternative Futures, a compulsory module taken by all students in the first semester of their second year. This module pursues themes that have been introduced in the first year, particularly those relating to the nature of futures studies, the value of a futures perspective on global issues, and the prospect of working towards a more sustainable future.

Prior to the fieldweek students have explored the field of futures studies (Slaughter 1996, Bell 1997), debates about the nature of postmodernity (Walker 1996, Littledyke 1996) and the need to be able to envision preferable futures (Boulding 1994, Hicks 1998) including those that embody indicators of sustainability (Trainer 1995, Douthwaite 1996). These themes offer a theoretical underpinning for their visit to the Centre for Alternative Technology in Powys, mid-Wales.

The centre for alternative technology

History

In 1974 a derelict slate quarry in the Dulas valley just north of Machynlleth in mid-Wales became home to a small group of idealists who were inspired by the challenge of building a living community in which the emerging alternative technologies of the time could be put to the test in a highly practical way. Originally the Centre was conceived as an experimental, largely self-sufficient community, but interest in both this and the innovative technologies in evidence at the site led to the Centre being opened to the public. Its forty acre site now has working displays of wind, water and solar power, low energy buildings, organic growing and alternative sewage systems. In 1990 the Centre became a public limited company in recognition of the need to respond to a growing public interest in environmental issues and CAT offers practical ideas and information on environmentally sound practices to organisations, students and the public as one of the major visitor centres in mid-Wales (CAT 1995).

Services

In addition to the resources on the site itself the Centre offers an information service on all aspects of sustainable technologies. It produces over eighty publications which together provide a comprehensive guide to sustainable living. Information about courses and publications are available via the CAT website (www.cat.org.uk). The Centre offers a professional consultancy service to advise larger projects requiring specific expertise, for example in relation to project design and assessment. Much of CAT's work is also particularly relevant to Local Agenda 21 initiatives.

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The education department receives 25,000 school age visitors each year and produces materials for pupils and teachers to use on site and in schools. Residential visits and professional development services are also available. The Centre offers an extensive programme of over 120 courses each year including a highly respected range of workshops on renewable energy, self-build, water treatment and organic food growing.

The eco-cabins

Just off the main visitor site are the two eco-cabins which provide the main residential accomodation. They are built in the timber framed style pioneered by Walter Segal and are well insulated, with turf roofs and double glazing. They are designed for educational groups to 'experience' sustainable living at first hand. In close contact with each other, students learn how to monitor and manage their own electricity generation, wood and water consumption, and sewage recycling.

The cabins are isolated from mains electricity, so that all the power used must be generated at the cabins. There are separate 24 volt batteries for each cabin, which are charged by four energy sources: wind generators, a mini hydro-electric scheme, photovoltaic panels, and a diesel generator for emergency use if renewables run out. The use of these energy sources can be monitored by an instrument panel in each cabin, together with the total energy input and consumption.

The cabins are heated by wood burning stoves, the wood coming from local forests which are regarded as a renewable source. The stoves may be used for cooking, but gas cookers are also provided. Wood consumption is monitored by weighing the wood before burning, while gas consumption is also metered. The water supply for each cabin is from its own large tank which can be filled automatically or, alternatively, students may fill the tanks with buckets from a nearby tap. By keeping a record of the latter it is possible to calculate how much water is actually used. The cabins have flush toilets, but a compost toilet is also provided, the use of which considerably reduces the number of buckets of water which need to be carried. Each flush of the toilet uses about two buckets.

The fieldweek

Purposes

The facilities provided at the Centre offer an intensive experience of study and communal living and for this reason a residential week at the Centre has become an integral part of the Global Futures course. It provides an opportunity for students to get to know each and it becomes a shared experience to which they refer throughout the rest of the course.

The fieldweek has three main purposes. These are: i) to carry out practical scientific investigations into appropriate technologies using equipment and expertise not available at the university; ii) to explore the vision of the future that inspires CAT and the sort of place that has been created as a result; iii) to experience one version of 'living lightly on the earth' in a communal and co-operative context.

The program

On arrival at the Centre students are given a tour of the site and an introduction to the eco-cabins before joining in a community wood gathering activity which begins the process of working together. This continues throughout the week through the shared responsibilities of buying food, preparing meals and washing up, maintaining the water and wood supplies to the cabin and monitoring electricity use to avoid a power cut. The outline programme is shown below.

Monday

- Guided tour of CAT site
- Introduction to the eco-cabins
- Community activity: fuel wood supply
- *Lecture: Introduction to the Centre*

Tuesday

- Workshop 1: Efficiencies of hydro/wind/solar generation
- Workshop 2: Organic horticulture and soil analysis
- Lecture: The power of place

Wednesday

- Group activity: Spirit of the place
- Excursion to Aberdyfi
- Group presentations on place

Thursday

- Workshop 3: Making and testing a solar panel
- Workshop 4: Analysis of effluent from reedbed sewage system

Friday

- Review of eco-cabin date
- Depart Machynlleth

The programme of workshops, lectures, student presentations and communal living focuses attention on various aspects of sustainability which taken together often have a major impact on participants.

The workshops

The first main purpose of the week is to investigate the operation of selected appropriate technologies. Students take part in four workshops run by Centre staff. The size of CAT's facilities means that the scale of these investigations is much more realistic than would be possible at school or university. Living in the eco-cabins and monitoring their energy use also provides data for investigation. A brief description of the workshops follows.

i) *Energy conversions*

Measurements are made to calculate the efficiency of both the mini hydro-electric power scheme for the cabins and that

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of the large system for the Centre (Boyle 1996). The cabins have their own small reservoir which can be discharged through a turbine when required. Measurement of the water flow rate and the height of the reservoir above the turbine allow the potential power available to be calculated, while a simultaneous reading of the instrument panels in the cabins allows the actual power being generated to be recorded. Similar calculations are done for the large hydro system on site. A comparison of the efficiencies allows discussion of why there are differences, raising issues of loss of energy due to friction in the pipes, turbine design etc.

The efficiency of the photovoltaic panels used to charge the cabin batteries is also estimated. This involves simultaneous measurement of solar insolation, current and voltage being produced and the area of the panels. The efficiency of the wind generators supplying the cabins may also be calculated. This requires an anemometer reading to find wind velocity, an estimation of the area swept out by the wind turbine blades, and the amount of electrical power generated.

ii) *Reed bed sewage system*

The site is not connected to the usual form of sewage disposal but has a large reed bed system for dealing with all the waste from the main site and a smaller system for the cabins (Weedon & Light 1995). The technology of this increasingly attractive procedure can be readily taught from inspection of the systems, and measurements taken of turbidity and dissolved oxygen levels at various points in the cabin system. These show the great improvement in water quality as it passes through the system and by the end of the treatment it can be safely discharged into the river.

iii) *Solar water heaters*

In an attempt to show students that individuals can make steps towards living in a more environmentally friendly way with little expense they are given the opportunity to construct a simple solar water heater (Trimby 1995). It is encouraging to see the way in which students who have had no prior experience of techniques such as soldering or sawing soon gain confidence when undertaking this task. The solar panels constructed are taken back to the university where their efficiency is measured in a later module on Energy.

iv) *Organic gardening*

Whilst the Centre is situated on a barren slate quarry it now produces considerable quantities of organic fruit and vegetables used on site in the restaurant. A fertile soil has been created by careful use of composted organic waste, including residues from the compost toilets and the reed bed systems. Displays illustrate the various composting methods available, both for large and small scale applications. Students are shown a variety of techniques for increasing the rate of composting and many come away determined to try some of the methods at home (Dudley 1991).

A sense of place

The second main purpose on the fieldweek is to facilitate an engagement with place, ie. the actual site of the Centre in a disused quarry and the wider mountainous environment. Both are strikingly beautiful and it is the sheer impact of the place, especially in good weather, which always plays a major part in the success of this week. However, developing an appreciation and deeper sense of place is not left to chance. Thus on the second evening a lecture explores ways in which contemporary Western society has often cut itself off from any direct appreciation of the natural world.

The differences between anthropocentric and ecocentric perspectives on the environment are highlighted (Sessions 1995) and also the argument put forward by ecopsychologists (Roszak *et al.* 1995) that the alienation found in industrialised societies today may well have at its root the repressed pain of our separation from nature. Wilson's biophilia hypothesis (Kellert & Wilson, 1993) is also referred to and, in particular, research evidence which shows that people are less stressed and heal more quickly when in natural environments. Sleeping on these ideas helps sets the tone for the main activity the next day.

The task here is for small groups to explore the site in order to make some record of the 'spirit of the place' as they experience it. They have four questions to consider:

- What does this place *say* to you?
- What catches your *imagination*?
- What lies at the *heart* of this place?
- How can you capture its *essence*?

For the first hour this is an individual activity and students are instructed to find some place which attracts them where they wish to be alone. They are asked to slow down and see what the place says to them if they 'listen' and then to record this in some way. Then this becomes a co-operative venture in which the group has to weave together and synthesise their individual insights. In the evening each group makes a creative presentation on what they perceive the 'spirit of the place' to be. Their comments included:

> Here people are living an experimental lifestyle within their every-day lives, they are idealistic but realistic. The mountains and rivers allow the imagination to run wild.

> This place says we have the opportunity for new adventure, it awakens the pioneering spirit. There is a sense of cleanliness and rejuvenation. The place speaks volumes about hope, it rewards us with a sense of our own empowerment, our imaginations fired by practical applications. I feel more forgiving of myself as if I've found my niche; to be here makes the difference.

> People come up on the cliff railway and see a glimpse of the future. There is knowledge and expertsie on tap. People here stand up for what they believe in. There is a co-existence here between nature and humans.

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Each year the presentations show that as a result of this exploration students make a much deeper connection with the place, and hopefully other places, than they might otherwise have done.

Living together

Living in the cabins contributes to the third main purpose of the fieldweek. Each cabin can sleep up to eighteen people and is self-catering with a communal space adjacent to the kitchen area. A wood burning stove both warms the cabin and supplies the hot water. Before arriving the group is split into twos or threes, each small group being responsible for providing breakfast, an evening meal and lunch over a 24 hour period. Living and eating together amicably in such close proximity requires the development of good communicative and co-operative skills. The group gradually becomes aware of the importance of such skills in the effective functioning of the cabin as they find that not everyone always pulls their weight equally.

Over the short period that they are together students therefore gain a taste of both the benefits and difficulties associated with the creation of community. Apart from the specific tasks that have to be done, this element of the fieldweek is not specifically prepared for in advance. Rather they begin to learn from their immediate experience about the benefits and dilemmas of communal living. Being able to work cooperatively together and to create a sense of community is, it can be argued, a vital element in any notion of a more sustainable society (Metcalf 1996). A subsequent lecture in the module looks at issues relating to the setting up of intentional communities.

Student responses

As part of their work for the week students are asked to keep a journal in which they record their responses to the workshops, lectures and other experiences each day. Some flavour of how students responded to the three main strands of the fieldweek is given by the comments below.

In commenting on the *workshops* many students were struck by the simplicity of much of the technology at the Centre and how applicable it was to other much wider contexts. However the biggest impact was in relation to the understanding they had gained of how particular technologies worked in practice and their minimal environmental impact.

> Its amazing that we ever used fossil fuels in the first place when there is such an abundance of clean fuels to be used.

> The use of hydro-power and its non-polluting potential, just borrowing rainwater from the environment

> It was fascinating to see that there was a more natural way of disposing of effluent than constantly pumping it with chemicals.

All students expressed a very positive appreciation of the Centre and the *place* itself. CAT was described as visitor friendly, with excellent information available for visitors and staff who explained things clearly and who were themselves often an inspiration.

> All was explained so simply, it was inspirational, I want to start living some of these ideas.

> I really admire the people there, they showed a possible, cleaner future. That you should only take from nature what it's prepared to give you.

Many comments on the quality of the location were expressed in single words such as: wonderful, idyllic or beautiful. Many were affected by their daily proximity to the natural environment.

> The river affected me a lot, I felt in harmony.

> With nature all around it seemed even more important to value it.

> The tranquility merges well with the theme of alternative technology.

What struck students most about the *community* experience was how they had got to know the rest of the group much better. This included having to adjust to the habits of others and interacting with students and staff who they might otherwise not have spent time with. Some were struck by the varying degrees of responsibility taken by students in contributing to communal tasks.

> I have very mixed emotions about this aspect. It was apparent that some have the knack of sitting doing nothing. They seemed to lose the sense of why they were there.

> Some did not participate in the work load, I found this hard to understand and it had a big impact on me.

All commented that they been much better fed and kept much warmer than if they had been back in their digs in Bath!

Epilogue

The Centre for Alternative Technology provides an inspiring vision of the future. It has held to the ideals of its original pioneers but also kept pace with the needs of the times. CAT's rural location adds to its attractiveness but the principles and technologies it espouses are applicable anywhere. As one group aptly commented in their presentation 'Appropriate technologies have one foot in the past and one in the future'.

Meadows (1992), in arguing the need for visioning, stresses the need to dwell upon our 'most noble, uplifting and treasured dreams'. He continues:

> We should say immediately for the sake of the sceptics that we do not believe it is possible for the world

to envision its way to a sustainable future. Vision without action is useless. But action without vision does not know where to go or why to go there. Vision is absolutely necessary to guide and motivate action. More than that, vision when widely shared and firmly kept in sight, *brings into being new systems*.

We need too, says Elgin (1991), 'a simple and compelling story of the future' and this is why places like the Centre for Alternative Technology are so important for the 21st century. They have the power to encourage transformational processes in individuals, groups and cultural systems. The new Earth Centre in south Yorkshire is also set to become a major visitor centre and will itself provide another powerful vision of sustainability.

A fieldweek such as this can make a deep impression on students interested in global futures (Hicks & Bord 1994). 'I could never have imagined a place like this running itself so efficiently', wrote one. 'The only limit is your imagination. It is about what might be, and what could be, if we wanted it to be...'.

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