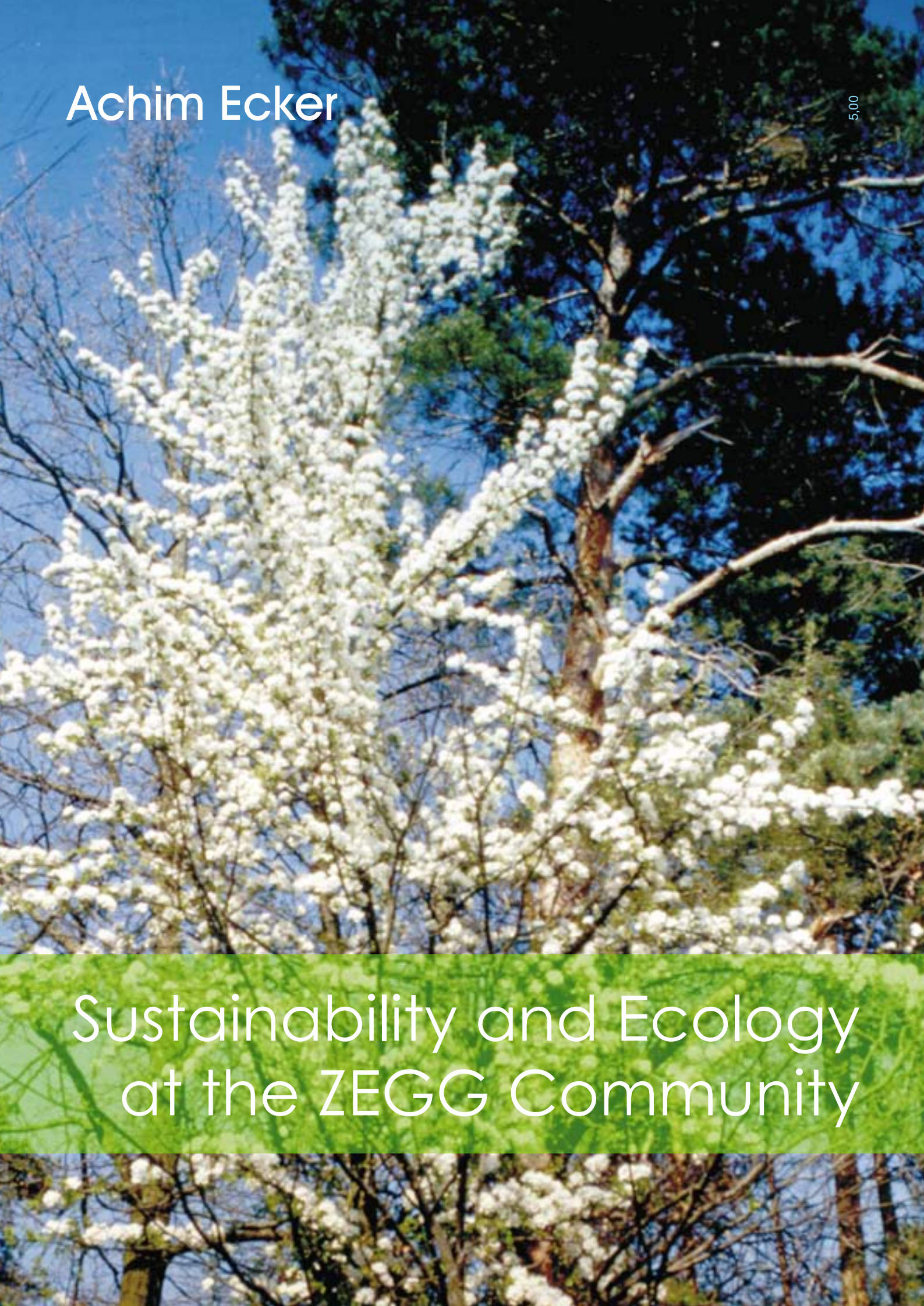

Achim Ecker

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Sustainability and Ecology at the ZEGG Community

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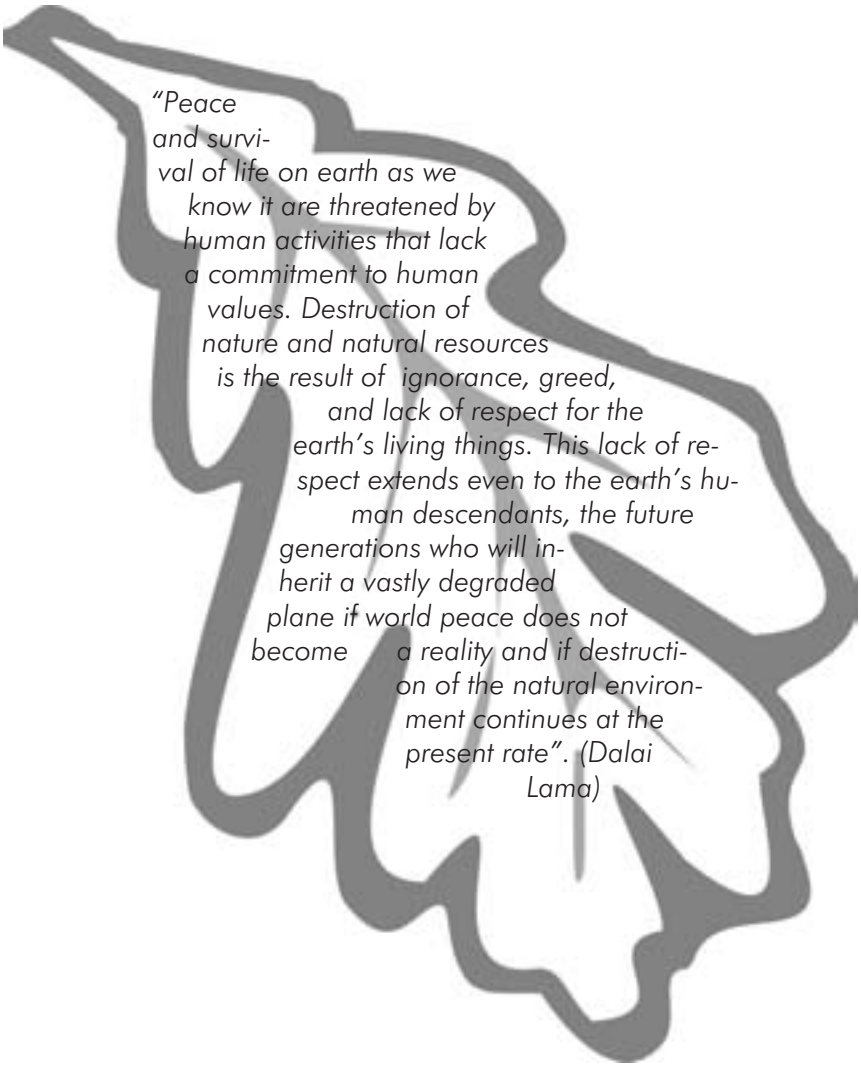

Imprint:

Publisher and V.i.S.D.P.: Achim Ecker
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Texts: Achim Ecker
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Photographs: Achim Ecker, Georg Lohmann, ZEGG-Archive; Cover Photograph: A. Ecker

Layout and typesetting: Hermann Haring, Burkhard Alexander Pranke

English translation: Stefani Ross, Niall Glynn

Print: Joost, D-Kronshagen

1. Edition 2004

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Life within a Living Organism

For millions of years, life on Earth has existed in biological balance: all species co-exist, and all substances are returned in a cycle back to nature. There is no waste. The energy of the sun is the only source of energy which is available nearly without limitations. The sun constantly feeds this cycle on the Earth, thereby making it possible for life to exist.

The ever more obvious climatic changes with all of their accompanying "natural" catastrophes show us that this balance is now seriously threatened by us humans: if we want to survive, we have to change our ways of thinking, and we have to re-learn to live in harmony with nature. This does not mean a simple movement `back to nature´, but a balanced approach both to ourselves, and to whatever surrounds us.

Our planet Earth is a living organism. Animals, plants and humans and the so-called "a-biotic" matter, such as water, winds and rocks, are interconnected. This connectedness between us humans and the biosphere, which was seen as a matter of fact in early cultures, has today been neglected and disrupted. Humankind has lost touch with nature, and can therefore bear to exploit her by violently disrupting natural cycles and relationships. Profit-oriented globalisation, subject every life-process to the laws of the market, signifies a new apex in humanity's insanity. The so-called wars against terrorism are one expression of this disease. They unmask the underlying mechanisms of capitalism, always on the move to secure natural resources and new markets. Terrorism would best be fought by the implementation of global justice and by fighting poverty and illiteracy.

Sustainable development and worldwide justice require, first of all, a new orientation of our lifestyles in the industrialized countries as we already consume much more than our share. If the entire world's population wanted to achieve our standards of living, we would need several planets just like the Earth in order to supply us with the necessary raw materials, such as energy, food and natural resources. Politics needs to provide a supportive framework for this change of attitude and thinking; but most of all it is necessary for each and every one of us to fundamentally change his or her attitude towards the way we use our shared resources and the products of this one world.

Let me quote from the preamble of the Earth-Charta of the B.U.N.D. (a big German environmental organization), dated March 24th, 2000: "We now stand at a critical point in the history of the Earth, at which humanity needs to choose the way to take into the future. As the world more and more interlaced and ecologically fragile, the future holds immense dangers and incredible opportunities. If we want to advance, we need to acknowledge that, despite or even due to our many differences in culture and lifestyles, we are one big family, a global community tied together by a shared fate (…)

Humanity is part of a constantly evolving Universe. Our home, the Earth, offers the opportunity for a unique and diverse community of beings, (…)

The prevailing patterns of production and consumption cause devastation of the environment, exploitation of natural resources and massive extinction of species. The proceeds of the economic development are not spread equally, and the chasm between rich and poor is getting deeper and deeper. Injustice, poverty, ignorance and violent conflicts are spreading and are causing incredible suffering. (…)

We now have a choice: we either form a global partnership, in order to care for the Earth and for each other, or we run the risk of destroying ourselves and the entire diversity of life. Some very decisive changes in our value system, our institutions and our way of life are necessary. We have the knowledge and the technology to provide for ourselves, and to reduce negative impacts on the environment. We need to focus on the fact that if basic human needs are provided for, human development is centred around "being" instead of "having".

ZEGG (see page 35) has made a commitment to develop a way of life which does not cause any further damage to this planet and which contributes to its healing. A communal way of life and joint use of consumer goods are steps in this direction. Within the past years, the ecological work done at ZEGG has undergone some changes: starting out with a more classical approach towards ecology, it has mo-

ved towards a holistic social ecology. Social ecology connects the outer, visible nature of the biosphere with the inner nature of human beings. Ecology in this sense of the word encompasses the healing of humans as well as healing the planet. And healing processes take place whenever human activities begin to harmonize again with the `ways´ of life. Any person incapable of loving himself, will likewise be incapable of loving his human, plant or animal environment. Wherever the natural functions of life, such as vibration, flow, pulsation and rhythm are inhibited by either technological or ideological force, disruptions or diseases will arise.

As years went by, more and more people were attracted to the region of Hoher Fläming, the area surrounding ZEGG. Meanwhile, the realization of a "Hoher Fläming Sustainable Region", with local recycling of materials has turned into the connecting vision for many people who live here. Many of the things we need in order to live should come from this region; and this region is beginning to change. Since 1991, more than 300 people have settled here, in addition to the 70 odd ZEGG inhabitants, all of them searching for more communal lifestyles and a more sustainable economy. They form a loosely woven network. Knowledge, culture and goods are exchanged, and in their wake friendship and many loving relationships have been generated.

Community members, newcomers and original residents work together in a variety of projects, projects which in hindsight may turn out to have been the germ cells of a region `fit for the future´. There is a bartering network, a `Free School´, organic farming, an Info-Café as a meeting-place for asylum seekers and local residents, an alternative Health Center, an alternative to official Health insurances based on a solidarity principle, etc. There are plans also for an encompassing concept for sustainable economy for the entire region, and much more. As more people decide to settle here and to contribute their energy, the more attractive the region seems to become.

This booklet intends to provide an overview of the most important ecological projects at ZEGG. There is still much to do, but we are on our way. My wish is that, with this booklet and its practical examples, ZEGG may serve as a model for other developments, far beyond this region.

The following contributions provide substantial background information on the topic of sustainability. Many thoughts are inspired from the work of the Austrian researcher Viktor Schauberger, whose work during the first half of the 20th century was far ahead of time. In his opinion, too, the state of the world and of nature today is the direct and unavoidable consequence of the ideological and spiritual convictions of humanity.

Schauberger was forester, hydraulic engineer and inventor who, during the 1920's, developed his view of water as the "Basis of all life". As a bio-technician he put his astounding insights into practice and was acknowledged as one of Europe's foremost experts on hydraulic engineering. His inventions on the improvement of water quality received international recognition.

Viktor Schauberger was one of the first natural scientists who warned of the possible results of an intensive exploitation of water and forests. Together with his son, Walter Schauberger, he founded the first Austrian ecology-movement, the "Grüne Front". From the very beginning he was an outspoken opponent of energy generation from nuclear fission. River restoration, for which he was at the time the only proponent, is now being done all over the world. His maxim of observing and emulating nature now seems to express a wide range of what is currently done in the realms of technology and natural sciences. Many of the impulses Schauberger set still reverberate today, and there is still a wealth of work to examine. After many years of obscurity, negligence and suppression, Schauberger´s work is finally starting to receive the recognition it deserves.

May you enjoy reading this booklet and draw inspiration from it!

Achim Ecker

Energy Use and Sustainability

During the past fifty years, the Earth has lost one quarter of its arable farm land and one third of its forests. At the present rate of destruction, we will live to see the loss of 70% of all coral reefs, making up the habitat of 25% of the marine flora and fauna." (Hawken 2000;22)

We all consist of sunlight and water. Radiant heat, visible light and ultraviolet light are the sources of most of the life on this planet. Everything we need for nourishment, heating, building and for our sustenance can be traced back to trees and other plants. With their ability to synthesize matter from sunlight, air and water, by absorbing CO_2 and transforming it into carbon and oxygen, they generously provide us with all of our basic requirements. Without this photosynthesis, we would not be able to survive. Our future on this planet totally depends on oxygen. If we continue to cut down trees, we diminish the quantity of the water and oxygen available to us.

In everything we do, or refrain from doing today, we need to be aware that nature operates with a built-in time-lag. It can take 30 to 50 years before we are able to witness the effects of our present day behaviour. Many of the `natural' disasters we see today, some of which are devastating, were caused by human behaviour 30 to 50 years ago. What kind of world will our children inherit, who will experience the results of our present day activities?

In the course of one year, the current annual consumption of crude oil is 3.5 million tonnes worldwide (numbers from 2001!); an amount the Earth took one million years to produce. We drill, mine, dig and chop as if there was no limit. The inhabitants of the wealthy countries, – 20% of humanity – consume 80% of the natural resources. While Europe is currently slowing down its consumption and pollution, the U.S.A. for example, is not. It is evident that we cannot go on in this way. To live sustainably includes awareness of the fact that on a global level we simply cannot use more energy than what we can catch from the sunlight daily hitting the earth. Here at ZEGG, this is a main consideration in everything we do; in the cultivation of fruits and vegetables, the generation of energy, the selection of building and insulation materials, and of consumer goods.

Another cluster of problems we have so far been unable to handle successfully here, concerns transport. The calculated permissible emission of CO_2 per person, worldwide, is maximally 1.2 metric tonnes. Every delegate who flew from Germany to the Summit-Conference on climate control in Johannesburg in 2002, was already causing 7t of CO_2 emissions, much more than reasonably justifiable. It is clear that rigid rules will not be of any service, but we need to become aware of the effects we cause by choosing to spend our holidays on low-budget trips to faraway places.

The regionalization of the material cycles will go hand in hand with a regionalization of production, and therefore of work. Forestry and agriculture represent two of the most vital activities in rural areas. The objective is to produce, consume, share and recycle as much as possible on a regional level. This creates the basis for a partial exit from the systems destroying the Earth and its inhabitants. Thus we can develop models for change, which can be followed by others. These new models may also include regionally focussed services, leisure and cultural programmes. This promotes diversity and interest in each other, instead of global uniformity.

Under no circumstances should these visions lead to closing off of the region. "Nothing natural or alive may ever keep its qualities in a closed-off system, as all natural processes are open and need to be able to interact with their environment" (Callum Coats)

A short History of Fossil Fuel Consumption

Before the discovery of fossil fuel, the energy available to humans was simply what the sun gave us every day. For a long time, the planet's human population was relatively stable; in 1000 AD it amounted to 500 million people. At that time, a forest was an important source of energy and building materials, and was protected and cared for.

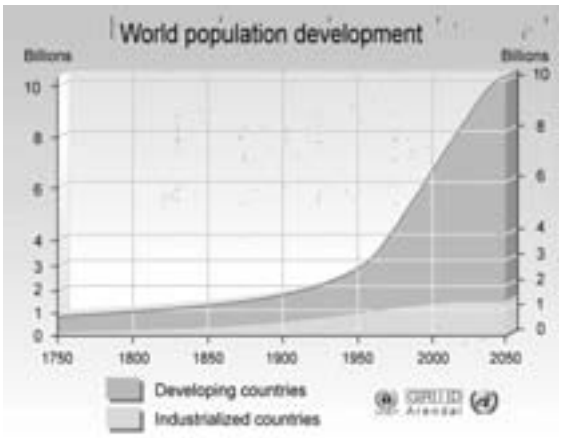
Around 900 AD, coal was discovered and was soon widely used. For the first time humans had a source of stored solar energy which had reached the Earth some 900 million years earlier. The population rose to 1 billion in 1800.

In 1850, crude oil was discovered in Rumania, and in 1859 the first North American oil well went into operation. Now there was even more energy available, and humans learned to use it: for machines, for the production of synthetic materials, artificial fertilisers, and many other applications. The forests, which had hitherto provided energy, food and building materials, began to dwindle, until it was possible to believe that they were nothing but pleasant recreational areas, nice to look at, but otherwise useless. In 1930, there were 2 billion people; in 1960, 3 billion; in 1974, 4; in 1987, 5; and in 1999, there were 6 billion inhabitants of this planet.

In 1933 Viktor Schauberger, in his book "Unserer sinnlos Arbeit" (Our Senseless Toil), wrote: "The temperature on earth is a product of balancing processes involving carbonaceous matter in the earth (note: Schauberger used "carbonaceous matter" to mean all organic and mineral matter like coal, crude oil, natural gas, minerals etc. excluding oxygen and hydrogen) and the oxygen that penetrates the earth dissolved in rainwater. When all this highly organised carbonaceous mater is extracted from the earth by humans, these balanced processes will be interrupted. As a result the outer layer of the earth will cool down and the atmosphere will become colder.

If these essential oxidation processes within the earth cease, large amounts of water will amass, first in the atmosphere and later in the earth itself, because the water then can not be rebuilt and refined any more.

The water that will sink into the earth or evaporate into the atmosphere will be overloaded with oxygen. Without the carbonaceous matter with which it could interact, it will change its freezing point. This will completely change the general climatic conditions. Finally the single pole, charged groundwater, once it has lost its surface tension due to the lack of carbonaceous material near the surface, will sink deep into the earth where carbonaceous matter will still be found. There it will change its boiling point, oxidize early and cause powerful eruptions. After great catastrophes that will come in the form of earthquakes, thunderstorms, hurricanes, floods etc. all of the vegetation of the earth will recede as the ground water sinks deeper and the vegetation layer freezes again in permanent ice."



Source: http://www.grida.no/db/maps/prod/level3/id_1250.htm

During the past 24 hours, more than 70,000 hectares of rain forest were destroyed on this planet. 13 tonnes of toxic chemicals were released into the environment. More than 45,000 people starved to death, 38,000 of them children. More than 130 plant and animal species were extinguished by humans (numbers published in 2001!). And the trend is upward.

The Protection, Conservation and Restoration of Healthy Soil

Worldwide, 24 billion tonnes of fertile soil annually are washed or blown away, or are simply destroyed. This huge mass of material would suffice to cover the entire agricultural surface of the United States. The vast areas threatened by desolation are estimated to encompass 3,6 billion hectares of land by the UNEP, an expanse equivalent to one quarter of the entire global land mass. In Africa alone, 900 million hectares are endangered. The root causes are ecological (climatic) as well as social (Impoverishment)" (see: Der Spiegel, No 15/2000).

Soil is our only source for healthy food/nutrition. In addition to air and water, it is one of the essential environmental systems, which together make up the basis of life for us humans, for the flora and the fauna. Only due to them is it possible to sustain biodiversity, genetic and natural resources. Soil is indispensable for the production of food, for the storage of water and energy, as a filter for pollutants and as a regulator for global bio-chemical material cycles. The improvement and the protection of the soil layer therefore are very important concerns of the ecological work done at the ZEGG.

The Hoher Fläming region is characterised by pure, light coloured, and deep sand soils, interspersed by narrow layers of loam several hundred metres apart. In the forests, the humus layer is no more than 2 centimetres deep. In open terrain a thin grassy sod covers pure sand. The soil is poor in organisms and in vitality, and only limited nutrients are available.

One key problem is the low amount of rainfall, amounting to only 500mm per year, together with the sandy soils and their poor capacity to store water. One or two days after a summer rain, there is no trace of water to be seen in the ground, and there is serious danger of forest fires. The meadows are withered and dry, and the smallest spark can cause a large-scale fire. The prevalent dry eastern winds and the pine monocultures are also contributing to the dryness.

n order to improve the water stoing capacity and the fertility of the sandy soils on our property, we have steadily increased the humus layer by mulching with old straw, leaves and hay from the parks and public gardens of the Belzig municipality, and with cardboard. Mulching creates a habitat for a multitude of organisms and fungi, which, among other things , make nutrients available to other plants through their symbiotic relationship with trees. When you mulch you initially draw nutrients, such

Mulching old straw.

as nitrogen, from the soil: the mulch layer needs them for its own decomposition. But later, the amount of nutrients set free is much greater than what was there originally. In order to remedy this initial burden on the soil, one can concurrently spread a small amount of compost.

Leaf mulch is particularly beneficial in a forest, as in addition to improving the soil it suppresses the dreaded Roth (wood small-reed) (Calamagrostis epigejos) . Leaf mulch also contains seeds from a host of other trees, shrubs and flowers, which all contribute to transform a forest into a mixed forest, combining a variety of fructiferous trees with the typical forest plants. Leaf mulch provides these seeds with perfect conditions for germination and growth (cool/damp stratification).

Mulching with leaves.

Another valuable means of soil restoration is green manure. This is the sowing of plants, which, due to the nodule bacteria living within their root systems, are capable of bonding atmospheric nitrogen, thereby making it available to ecological cycles. These so-called leguminous plants include peas, beans, lentils, clover, alfalfa (Medicago sativa), lupins (Lupinus polyphyllos), broom and black locust (Robinia pseudoacacia) - all members of the pea family (fabaceae).

Alfalfa (Medicago sativa) is able to extend its root system down to an astounding depth of more than 10 metres, enabling it to remain lush and green even during the driest of summers. In this way it makes water and minerals from deep levels of the ground available to many other plants, and permeates the soil with veins of humus. We use a mulch mower for cutting, and subsequently leave the plant material on the ground, in order to create a natural layer of humus. Over a period of several years we have sown a large variety of green manure plants, which now propagate themselves.

In addition to mulching, we have constructed several raised beds, in which we incorporated entire trees, wood scraps and cardboard. After a downpour, the decomposing material is water-saturated like a sponge. These raised beds also introduce welcome contours into an otherwise extremely flat landscape. Their various microclimatic zones offer habitats to many plants, insects and animals, all within very small space. These raised beds were partially planted, and are still mulched every year.

On some of the mulched areas we also spread the compost from our dry toilets, as the nitrogen, phosphorus, the innumerable micro-organisms, fungi and compost worms promote decomposition of the organic material into humus. Initially we scattered clay dust, which forms a mineral compound with humus, therefore improving its ability to retain nutrients and water, preventing their loss by leaching into the groundwater.

In the forests on our grounds we built up so-called Benjes hedges from brush-wood, providing habitats for hedgehogs, snakes, toads, amphibians and birds. The slow decomposition of organic material by and by improves the soil. These hedges retain water and slow down winds. Birds settle on them and drop seeds, which can then sprout and grow protected from game.

Since we began our soil restoration work, vitality has already been considerably improved and a large variety of micro-organisms, insects and fungi may be observed. A very particular healing dynamic has been initiated, which is especially obvious during dry spells. We were able to reduce watering to an absolute minimum, while the vegetation remains vibrantly green for a much longer period.

While we strive to improve the soil in large parts of our land, other areas are left untouched as rough pasture, forest biotope, etc. We very rarely enter these enclaves, leaving them to themselves as much as possible, so that they remain sanctuaries for animals on our terrain, which is sometimes heavily used.

The Forest as Matrix of Life

"Without forest, there is no water. Without water, there is no bread. Without bread, there is no life." (Viktor Schauberger)

"Don't you know that the forests are the life of the land?" (Babylonian inscription)

Trees form a forest. The life history of a tree is also the life history of water. Trees are the highest and noblest plant form, whose giving is universal and unconditional.

Whatever their colour, shape and species, there is one trait they share: they play a crucial role in the biosphere of planet Earth. They regulate the climate by raising the humidity of the air; they slow down wind and mitigate the extremes of heat, frost, drought, floods and storms. They filter the air, store and purify water, conserve soil fertility and inhibit erosion. Trees create a magnetic field around them. A whole forest with its many billion trees has an integral part in building and maintaining the Earth's field of gravity.

The life of a forest is – just like all Life – a unique harmony of continuity and change joined together in one beautiful organism. In a naturally mixed forest, nearly every species has its place without any need to struggle. Contrary to a commonly held doctrine, Nature involves much more cooperation than competition. Without symbiosis, there would be no life in any forest. There would be no forest at all.

By dropping their leaves and needles, trees share nutrients with smaller plants. Trees make salts, minerals and water from deep in the soil accessible not only to themselves, but also to other plants, animals, and even agricultural areas. The roots of a tree permeate the soil to a much greater depth than those of any other plant, thereby providing with water all plants in and around the forest. But by drawing up large amounts of water, the tree also draws warmth from the soil. In accordance with the laws of physics, this cooling of the upper soil levels draws warmer water from greater depths up to the surface. The level of the groundwater is raised and spring water may form. A balanced groundwater level is the result of well-adjusted ground temperatures, a process safeguarded by trees.

Without trees, life on Earth would be inconceivable. And still, every day vast areas are deforested. About 120,000 to 150,000 square kilometres of virgin forest (an area three times as large as Switzerland) is cut down every year. In order to protect the remaining primeval forest on the planet, the world's demand for wood needs to be met by plantation forests only. These plantations would need to be managed in accordance with ecological principles.

Due to a more favourable legal regime, European forests are again growing. Worldwide, though, European demands play a crucial role in the process of forest destruction. The German market is the main customer for wood and cellulose from countries such as Indonesia, Brazil, and the Cameroon. Europe-

What is the value of a tree?

During the course of its life, a 100 year-old tree:

- has lifted about 2500 t of water from its roots to its crown – against gravity – and evaporated it;
- has processed some 18 million cubic metres of air, extracting from the carbon-dioxide therein about 2500kg of pure carbon (C);
- has photo-chemically converted 9,100kg of CO_2 and 3,700 litres of H_2O;
- has stored up some 23 million kilocalories (equivalent to 3,500 kg of hard pit coal) and has supplied 6,600 kg of oxygen (O_2) for the respiration of human and beast, ensuring enough air for one human being for at least 20 years;
- has fixed a mechanical equivalent of heat equal to the calorific value of 2,500 tons of coal;

The combustion of 100 litres of petrol consumes 230 kg of O_2. That is to say, if a person chooses to breathe for 3 years, or to burn 400 litres of petrol or heating oil or 400 kg of coal, then the production through photosynthesis of 1 tonne of oxygen is required (Viktor Schauberger).

an consumers are responsible for the annual destruction of at least 150 square kilometres of primeval forest in the European Russia. Yet Europe is not the worst in terms of global forest destruction. This place is held by the US.

Industrialised, modern forestry regards old, gnarly trees and dead trunks as undesirable breeding places for pests, such as the bark beetle. But their removal and destruction destroys the habitat and food supply for a whole range of organisms. One dead oak tree, for example, hosts 500 different insects and micro-organisms, all of which are important for speeding up its decomposition. In Germany, from 1,350 to 6,000 native beetles breed in dead wood; 60% of these insects are to be found on the so-called Red List, as they are threatened by extinction. Moreover, of the fungi that propagate on dead wood, 25% are considered endangered.

The concentration by German agroforestry on a few, profit-yielding species of tree has led to the near-extinction of fir (abies alba), black poplar (Populus nigra L.), elm (Ulmus glabra Hudson), yew (Taxus bacata L.), whitty pear (Sorbus domestica), wild service-tree (Sorba torminalis) along with various wild species of fruit-tree.

At ZEGG, we aim to foster mixed forest rich in species and habitats, with venerable grandfather-trees neighbouring fresh young saplings, and with moss-covered dead trunks being swiftly returned into the rich, healthy humus by the insects and mushrooms that live on them: A forest providing protection and food to a wide range of inhabitants, and which at the same time depends on these tenants. From a living organism such as this, wood can be harvested on a sound, ecological basis.

In 1991, we took on about 4 hectares of monocultured forest, mainly pine and birch. It surrounds our property and its outskirts seamlessly blend with the park-like vegetation on the remaining 10 hectares. On each parcel of land, the pine trees were of nearly the same age. In some places new growth, mainly of oak (Quercus robur) and black locust (Robinia pseudoacacia), had arisen. There was also a vibrant under storey, - even some old fruit trees (apples, pears and sweet cherries), mostly hollow. Over the last 50 years, pine (Pinus sylvestris), birch (Betula pendula) and oak have moved into the fruit orchard, and have forced the fruit trees to grow higher and higher in the competition for light.

Since 1993, we have been busy creating a forest rich in species. There will be little separation bet-

ween orchard and forest, as we are trying to build up a natural, vibrant sanctuary where humans can visit, harvest and enjoy. We would like to show that there is no conflict between a Nature worth protecting and the human settlement and use of its resources, as long as we take on the responsibility of living in close harmony with natural cycles.

In the beginning, we extensively interfered with the existent, unnatural forest. Pine and birch were cut down in order to create clearings for the seedlings of other trees and plants. Layers of leaves were brought in as mulch and Benjes hedges were laid. Dead wood was left to rot and more brought in. We believe such interference will no longer be necessary in about ten years. Some areas were left for natural succession to take place.

Since 2002, we have two splendid work horses, which help us to pull trees from the forest. This is the most natural way of harvesting wood.

If we include young growth, the ZEGG forest now includes pine (Pinus sylvestris L.), birch (Betula pendula), oak (Quercus robur L.), black locust (Robinia pseudoacacia), field maple (Acer pseudoplatanus L.), aspen (Populus tremula), cherry (Prunus avium), pear (Pyrus communis), apple (Malus domestica and sylvestris), prune (Prunus domestica), lime tree(Tilia platyphyllos and cordata), fir (Abies alba), Canadian oak (Querkus robur C.), walnut (Juglans nigra), chestnut (Castanea vesca), beech (Betula pendula), larch (Pinus larix), whitty pear (Sorbus domestica L.), wild service-tree (sorbus terminalis), ash (Fraxinus excelsior) and yew (Taxus baccata). The under storey has hazel (Corylus avellana), european mountain ash (Sorbus aucuparia and intermedia), hawthorn (Crataegus oxyacantha), blackberry (Rubus fruticosa), raspberry (Rubus Idaeus), red and black elder (Sambucus racemosa L. and nigra), currants (Ribes), Oregon grape(Mahonia aquifolium), European birdcherry (Prunus padus), hips dog rose (rosa canina, budleia (Budleia davidii), lilac (Syringa vulgaris), Dwarf Garden Serviceberry (Amelanchier ovalis) and even, at some sunny outskirts of the forest, sea buckthorn (Hippophae rhamnoides).

Through discussion with the proprietors of the surrounding forests, we seek to foster support for ecologically sound forestry, and to create a network of producers and consumers of regionally grown timber.

It seems that mankind has never learnt that to take away the trees is to take away the water. It is the forest cover that is responsible for fine-tuning the content of water vapour in the atmosphere and for the creation of fresh water itself. Once the forest has been removed, the exposed ground heats up rapidly. As a result the ground temperature in general is hotter than the falling rain. A hot, dry ground-surface inhibits infiltration of the soil with rain water. Until a sufficient number of trees have been planted; not just a billion, but several hundred billions, we will be subjected to the unrelenting , merciless cycle of drought, flood, drought, flood, particularly in equatorial and warm temperate zones. There is only one solution and that is to reforest this planet on a massive scale – now!

A further horrific consequence is that groundwater is no longer recharged; the groundwater table sinks and the supply of nutrients to the vegetation from below ceases. At the same time, the increased intensity of thunderstorms and wind activity and the warming of the ground due to massive deforestation, raises the water vapour levels far higher than normal, even to as much as 40 – 80 kilometres above the planet's surface Here it reaches altitudes where it is exposed to much stronger ultra-violet and high-energy gamma-radiation, which dissociate the oxygen from the hydrogen. Due to its lesser specific weight the hydrogen then rises into space, while the oxygen sinks back down. Worst of all, all that was once water has effectively been removed altogether. It has gone, and gone for good.

This initiates a process, in which the atmosphere is first forced to get warmer due to the overcharge of water vapour, but then, as the water rises higher, it is dissociated and disappears, and the atmosphere cools, because the amount of heat-retaining water vapour has diminished. What follows is a new ice age. All this was elaborated in detail in Viktor Schauberger's writings some 70 years ago.

Quoted from: Callum Coats, "Living Energies"

Permaculture

Permaculture means sustainable agriculture and is a way to support, conceive and to construct durable habitats and systems. These are intended to secure our permanent and fundamental needs – ecologically, socially and economically. As a central aspect before any new design, but also at intervals during later stages of any project, it is necessary to closely observe plants, animals and any other elements involved, in all of their functions. We also need to include traditional knowledge into our work. This serves as a basis for new models, of how living systems can maintain themselves and regenerate. Instead of fighting disruptions, they are utilized as part of the solution.

First of all, permaculture is a method of planning, the aim of which is to build functioning systems, and to take into consideration the well-being of humanity and of nature. These systems could be gardens, or agricultural operations. But permaculture is also viable in urban situations, it may be applied in architecture, in community planning, urban planning and the structuring of organisations and social institutions, – in short, wherever there are complex contexts, needing to be connected within an open, multifaceted structure.

Permaculture uses modern technologies just as much as ancient knowledge: Feng-Shui or geomancy, bio-dynamic gardening or methods developed by Fukuoka, passive houses and solar plants, bartering networks, car-sharing or vegetable boxes. A central role within permaculture is given to the close observation and use of natural cycles, and the recycling of all materials, – locally wherever possible.

"An agriculture set up to feed humanity long-term needs to meet the following criteria: it may not use more energy than it creates. It needs to conserve the integrity of humans, nature and of landscapes, without simply transferring difficulties onto other essential realms of life, and it needs to produce qualitatively and quantitatively high yields. In all of this, it is also important to set limits to the uncontrolled explosion of the population and of consumerism." (Rohr, Jascha: Asking for the roots. Deep ecology giving directions out of the crisis. Hagia Chora, Nr.14, 2002)

This is where social experiments, such as communal lifestyles, may take on an important role, as they allow in-depth recognition and early realisation of basic needs, before they are channelled into a host of substitute gratifications.

The aim of our ecological work is to build up stable systems in cooperation and partnership with animals and plants. This also includes so-called pests, the massive occurrence of which always indicates a lack of complexity. If examined more closely, these insects support the healing-processes of the Earth, as they serve to rectify human mistakes, such as mono-cultures.

We would like to achieve a high level of self-sufficiency in the area of healthy food. To walk through a blooming, green and fertile landscape, is in itself already healing to heart, body and soul. It also generates a space for children to grow up in a variously environment, which leaves room for discoveries, and allows them to experience animals as wild and free, not as dependent of humans. They profit from naturally experiencing diversity and start to understand the natural complementary character of everything around them.

Another important aspect of permaculture is multifunctionality. Each element has several functions, and each function is taken on by a variety of elements. Grapevines, rambler roses and kiwis, for example are trained around an arbour structure, providing shade during hot summers. During the winter, they drop their leaves and allow sunlight to come through.

Mushrooms break down dead wood and keep the natural cycles alive.

During the fall, they provide us with plenty of delicious fruit, and during the summer we delight in their blossoms. On south-facing walls, climbing plants profit from the warmth of the sun, while they shade the building beneath. This preserves the plaster and keeps the house pleasantly cool. On north-facades, we planted evergreen ivy (Hedera helix), protecting the house against heat-loss during the winter.

Fruit trees and bushes should grow wherever people pass, so that everybody can gather whatever he or she needs in passing. The number of plants should be large enough for humans and animals alike to take their share. We do not have to harvest everything we sow. We take what we need, the remainder is left for animals, fungi, insects, all joining to maintain a healthy biotope. We also plant fruit bearing plants specifically for forest animals.

The ecological work at ZEGG is inspired by Sepp Holzer from Austria, and by Masanobu Fukuoka from Japan. From this knowledge, complemented by our own observations and intuition, and influenced by local conditions, we created our very own body of methods and knowledge. In this approach, we also integrate plants, which were not originally native to the Fläming-region. We do make sure, though, that no local species is ousted by our introduced species. Our vision is a "multicultural" one, in which exotic plants may complement and enrich the "natives". This is why we decided to plant kiwi (Actinidia deliciosa), figs (Ficus) and medlars (Mespulus germanica) at appropriate sites. We do not try to eradicate Japanese Bird Cherry (Prunus padus) and Black Locust (Robinia pseudoacacia), which are imports and have turned into quite a plague at some places. We try to restrain them within a certain limit, and otherwise enjoy their various qualities and their beauty.

Spiritual Ecology and Geomancy

The word `Geomancy is derived from the Greek expression for `seeing the Earth , or `perceiving the Earth'. To `see', in this sense, means much more than simply looking at the surface. The geomancer may, for example, feel the vibrations of a certain location or an area, and may attempt to translate these images into definite statements or descriptions. While doing so, he or she is in close contact with the Earth. This type of sensitivity is inherently present in each one of us, but does require practice.

One research objective set by the geomancy group established at ZEGG in the spring of 2002 is to understand the energetic structures of ZEGG and its natural environment, and to modify these wherever necessary. What is required in the beginning is the willingness to take every inner or outer perception seriously, to take note of whatever arises when looking at a piece of land or a building, even if your mind discards a certain perception as `unscientific . After a short while, you realise that there is indeed an inner answer to the questions such as what kind of a feeling characterises a certain place? Is it pleasant to be here, or does it have `holes in its energetic fabric, which might indicate that some detrimental event took place there, or that trees were cut down for no reason or veins of water were sealed off, so that part of its vitality was inhibited. What is the meaning of a landscape, and of the elements characterising it? Each one of us knows the experience of taking a walk in a vibrant mixed forest, and feeling the healing effect on body and soul, or of feeling overjoyed at the sight of a pristine landscape.

Very early on, during the founding years of ZEGG we were twice visited by the British geomancer, Peter Dawkins. His visits were a few years apart. He saw an entire system of chacras on our land, which again is part of a much greater energetic system of energy centres in the Fläming region. To our great surprise, we had intuitively placed the harmoniously corresponding facilities on many of these locations, such as our restaurant, the reception and the reed bed waste water treatment. During his second visit, Dawkins perceived significant improvement in the total energetic condition and revitalisation of the location.

Marko Pogagnik, whose visit during our Summer Camp 2002 inspired the foundation of our Geomancy group, found a spot very vital to ZEGG, which was highly charged with heart energy. He had noticed two trees in the direct vicinity, which had grown around each other as if lost in an embrace. Coincidence? Places such as these need care and attention in order to recharge and to mobilise their power, particularly if their meaning has for a long time been neglected. Progagnik, who is from Slovenia and who first became known as a sculptor, has spent considerable time researching this field of knowledge; his healing work is now well known to many people in Europe. Among other activities, he has been busy as an "energy converter", reactivating

energy at sites where it has been blocked, twisted or buried by human interventions. For this kind of work he used to employ energetic symbols sculpted in stone. These days he prefers to use the healing, heart power of sounds produced by people singing together.

During the 2002 Summer Camp, Progagnik attempted to unblock and cleanse one particular location on our grounds by the "sounding" of 100 people. He advised us to relocate an important ceremonial site to a place nearby, in order to strengthen its vital-energetic energies. The geomancy group at ZEGG will continue to work on these issues, in order to find out which sites are best suited to experience inner peace, clear the mind or awaken joy. A natural flow of the energies of Earth, Water and Air vitalises the encompassing landscape. A river kept from vibrating naturally by modern river engineering, will cause irritation, not only in the physical sphere. It will be paralysing to look at, but also, the energies it radiates in other frequency ranges will be inhibiting. The human master, who would force it into a crippling bed therefore becomes a victim of is own deeds. A vibrant landscape with an unblocked "soul" or essence, will strengthen all creatures living in it, and vice versa: if we humans respect the diversity of a landscape and the characteristics of its "organs", we will strengthen its sacred spaces which enable it to exist in physical harmony.

Another interesting geomantic question is whether there are healing powers hidden within the deeper structures of the land on which ZEGG has settled, and if so, how can we strengthen them. In the immediate neighbourhood of ZEGG, there is a medical rehabilitation centre with an adjoining thermal spa, tapping a thermal water resource deep down in the Earth. Maybe the location at which we've decided to live, is particularly well suited to receive, to promote and to foster new information on healing in the social and ecological realms. We still know so little about the connections between "Heaven and Earth" - between the spiritual and the material. This is why Geomancy is such an exciting field of research for some of us here at the ZEGG.

Cooperation with Animals

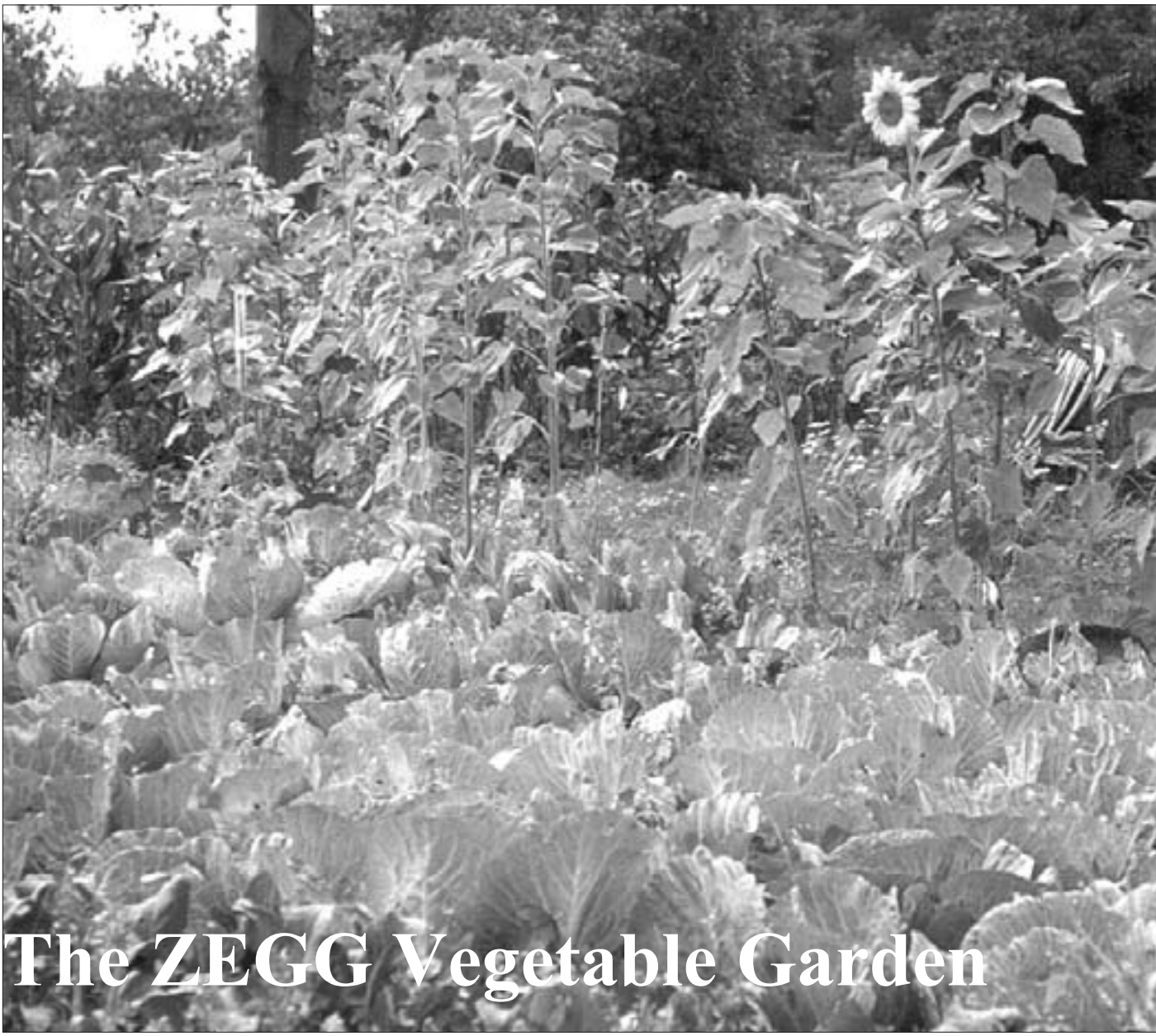
We want to learn how to work together with the plants and animals around us, no matter how small they are. If we include them in our thoughts and considerations, they will cooperate with us in the great challenge of healing the Earth. The following are just a few examples from our experience. Since we started to promote a wider biodiversity on our grounds by taking down large sections of the surrounding fences, more deer (Capreolus capreolus) , wild boar (Sus scrofa) and hares (Lepus europeans) from the neighbouring monoculture forests have come to feed and live on our grounds. As much as we enjoy their trustful presence, they do have a tendency to eat and damage the newly planted shrubs and trees. We therefore protect young trees and single plants by surrounding them with fences while they are too delicate to survive game bite. Additionally, we have planted some of the animals favourite forage plants in the forest. In our thoughts, we try to communicate our welcome and our wishes regarding what we would like them to eat and not eat.

Butterfly caterpillar

European starlings love cherries. We could keep them from eating all the cherries by spreading large nets over the trees. We prefer to invite a starling family to nest in a cherry tree. One needs only to put a nest box in the tree. The `resident family will then defend the tree against all uninvited guests, but will leave enough cherries for us to eat.

If, during a particular year, butterfly caterpillars had nibbled off the leaves of a plant, it very often turned out to benefit this plant later, when it got drier, as the plant suffered a lot less evaporation loss.

During guided tours through our gardens, people very often deplore the fact that they have too many slugs in their vegetable patch, expecting us to give a patent remedy. In our view, slugs serve as a regulating measure in nature. They "set the table" for all kinds of other animals, such as toads (Bufo bufo), lizards, frogs, slow worms (Anguis fragilis), hedge hogs (Erinaceus europeus), birds and moles. When these animals come to feed, we like to welcome them by offering them a comfortable place to settle down - nest boxes, piles of rocks or tree-cuttings, wild hedges, small ponds or watering holes. We find that by taking a closer look, by observing natural process and by re-examining our habitual mindsets we can find ways to support Nature in her work. Is it really so important that a garden is so neat and tidy that there is no room left for any other creature to live there?



The ZEGG Vegetable Garden

Nature doesn t make mistakes. If paradise does not become reality in the garden, it's humans who've made the mistake" (Sepp Holzer)

Felix Matile, the ZEGG gardener, talks about his work in this way: "In our garden, we try to do as much as possible the way nature herself does it. For example, nature does not know compost heaps. Everything just drops wherever it happened to grow. For crops with exceptionally high nutrition needs like potatoes (Solanum tuberosum), pumpkin (cucurbita), corn (Zea mays) or tomatoes (Solanum lycopersicum), we add some of our own compost; otherwise we don t fertilize at all. All we do is feed the organisms living in the soil, the worms and the bacteria. These will then in turn feed the plants. We sow leguminous plants, such as beans (Vicia faba L.), peas (Pisum sativum L.), lupines (Lupinus polyphyllos), clover (Trifolium ..), which draw nitrogen from the air into the soil, via the bacteria living within their root systems. We do buy and introduce soil for seedlings and stone meal, a by-product product of stone masonry. Just to give you an example how nature produces stone meal: in Egypt, the river Nile used to flood the soil once a year. The sludge deposited by these floods served as fertilizer to the Nile valley farmers, and as building material. Now they ve got the Assuan Reservoir, and all of this stone meal is collected within the reservoir. The farmers have to buy artificial fertilizers and they are getting poorer and poorer. For us, it s important to know the ph-values of our soil. The soil here has too little lime. I can balance that by using wood ash, a by-pro-

duct of our wood-burning heating plant.“

The ZEGG garden is not intended as a commercial horticultural enterprise, but as a place for learning about organic gardening, for experimenting, for regeneration and for growing vegetables for our own consumption. There are no “weeds“ at the ZEGG garden. There are wild herbs and indicator plants. Neither are there any `useless pests or `beneficial creatures; there are only animals and all kinds of insects.

On ¾ of a hectare, we produce enough fresh vegetables and fruit to feed our community and our many seminar and conference participants and other guests during nearly six months of the year, with still plenty left over to preserve for the winter. To provide valuable organic produce for ourselves during the Summer and Fall means a lot to us: we know how to care for our vegetable cultures, and we can be sure that no herbicides, fungicides, pesticides or artificial fertilizers are used. Meanwhile, the fertility of the soil and the yield have risen year after year. We eat the vegetables which are grown here, and any remains are again given back to the land as compost. This comparatively small and closed cycle has great political significance to us: it strengthens our connection to the land we live on. At the same time, we become aware of how dependent we are on nature. Any losses due to unfavourable weather conditions are painfully felt. We gratefully accept the gifts nature presents us with.

We sow and we harvest vegetable plants, but we also take note of any other little shoot in our garden. All wilds herbs are indicators of the soil s needs and condition, telling us what needs to be done in order to nourish it. Our garden teaches us how we can improve the soil, and how we can live off and on the land without depleting it. Our willingness to get out of the way, as Paradise emerges, is rewarded by less work for more bountiful crops every year!

In 2004 we started to use copper gardening tools following the ideas of V. Schauberger and we are curious to see the results

In addition to the vegetable garden, the ZEGG gardeners also care for a beautiful flower garden. These flowers are given as gifts and are used to beautify our seminar spaces, rendering us independent of the flower producing industry. Most flowers bought at the florist s have not only travelled considerable distances, from Africa or Latin-America, but have been produced under inhuman conditions, often involving massive exploitation and destruction of natural resources. Cut flowers are treated with even more chemicals than food crops! Flowers from our own garden are therefore not only a visual delight and a `soul food , but also an expression of our political concerns.

The gardeners also take on the task of passing on their experience through guided tours and consultations, i.e. for gardens planned elsewhere. Preschool children regularly join the gardeners to participate and to help. In this way they soak up a lot of knowledge on plant growth and how to cultivate seedlings and vegetables. We like to offer them an opportunity to feel their connection with the land we live on, and to take responsibility early on for our own nourishment and the nourishment of the soil.

We are also committed to supporting `fledgeling gardeners. For school classes or groups of at least ten visitors, we offer guided tours

View into the deapth of the vegetable Garden.

Awareness in the Kitchen and while Shopping

In addition to ecological and health aspects, the decisions we make each day when we shop have a political aspect as well. Whom do we support by what and where we buy? Do we support transparent regional structures, or do we contribute to the exploitation of people in other parts of the world? Do we foster contamination, erosion or the leaching of valuable soil, or do we contribute to care and regeneration of the soil? Are we able to be responsible and recycle, preferably regionally, the goods we´ve bought?

Power is moving away from the hands of elected politicians and into the hands of multinational companies. Behind closed doors, the GATS Agreement (General Agreement on Trades and Services) is used to sell off even the last basic goods humans need for their survival (i.e. water). As consumers we find ourselves in a new role, with quite unexpected influence and power. Our political influence by way of consumer behaviour is already much greater than the influence we have through the occasional election. But this power is based on information on the origin of the products we choose, and on the knowledge about the social and ecological conditions of their manufacture. Millions of people are frustrated, sitting in their one-bedroom flats, feeling powerless , thinking that there´s absolutely nothing a single person can do. But by deciding what to shop, we have the power to (s)elect, every day. It´s we who decide to whom we´d like to give our money and our power; every one of us, every day!

"The rule of multinational companies will collapse if we refuse to buy what they are selling – their ideas, their version of history, their goods, their weapons, their vision of inescapability" (Arundhati Roy; a well-known Indian author and anti-globalisation activist)

To feel good, we do not need a large number of things, but we need goods which last, and which don´t harm the environment. We do not need to personally own everything we use from time to time. The joy of life does not lie in our consuming more, or in having more of our lives commercialized by multinational cooperations. Sustainability is intended to counter this trend.

One small word on meat-consumption: a large part of the primary food produced on this planet is fed to animals raised for slaughtering. Every day more tropical rainforest is cut or slashed and burnt for meat production. But we do not need meat. The greater part of humanity adequately lives on a vegetarian diet. Meat consumption in the rich countries is responsible for hunger and deforestation in other parts of the world. We have an opportunity to satisfy the material needs of humanity without destroying the planet.

This is one of the reasons why the ZEGG community kitchen decided to provide only vegetarian dishes for residents and guests, even not all of the residents are tough vegetarian. At the same time, a growing number of people would like not to eat any animal food at all – to be vegan.

We do not buy eggs produced by factory farming; our suppliers are regional farmers who leave their chicken to roam as they want. Coffee is provided by `Fair Trade', which guaranties fixed prices to growers, as opposed to multinational companies who exploit these coffee farmers. Our aim is to reduce our "complicity" in inhuman production of foodstuffs. Wherever possible, we refuse goods whose production involves the blood or pain of animals or humans, or damage the environment.

A very high priority is our own production of foodstuffs. We grow as much as we can, supplementing this by food we can buy regionally. When not available regionally, we buy through `Fair Trade' and organically grown produce. We refuse to buy genetically modified food.

We try to improve the local availability of valuable foodstuffs. We were able to convince a local baker to bake organic bread for us. He then offered organic bread also to everybody else who came to his shop. In 2004 we started to bake bread and cake ourselves.

The soil, the garden, the people working in it or in the kitchen ... all of these are valuable resources. That is why another goal at ZEGG is to eat or buy only what we really need. We seek to develop an awareness of whether we are really hungry, or whether our `hunger' is only a substitute for some other need. We'd like to develop a more satisfying culture in which this false `hunger' no longer occurs because our true needs and desires are fulfilled. Our aim is not renunciation – rather sensual delight. We seek not to be morally superior – rather to be more aware of our interconnectedness.

The Greening of Roofs and Façades

At ZEGG, there are quite a few flat, bitumen-covered roofs - most of them inadequately insulated. We decided to insulate and landscape some of them, as far as this was financially feasible and necessary for the building's maintenance. Insulated green roofs improve a building's heat insulation and bind about 500 grams of air-bound dust per m² per year. This is particularly important for cities. The green roofs filter the nutrients and pollutants contained in rain, thereby contributing to the clarification of surface and ground waters.

Green roofs also slow down the run-off after heavy downpours. Spread over the entire year, the substrate and the vegetation release 75% of this moisture directly into the air via evaporation. For about 2000 , it is possible to green about 50m² of roof, with a 10cm layer of substrate, which can store about 1.5m³ of water after a heavy rainfall with 30mm of precipitation (=30l/m²)

Among those plants particularly suited for growing at these lofty heights are some robust survival artists such as sheep's fescue (Festuca ovina L.), English bluegrass (Poa compressa), brome grass (Bromus tectorum) and a number of sedum-varieties. As little as 0.5m² of unmowed grassy vegetation generates the oxygen required by one person. The decomposition of the plants takes up the same amount of oxygen: it is therefore a closed oxygen-cycle.

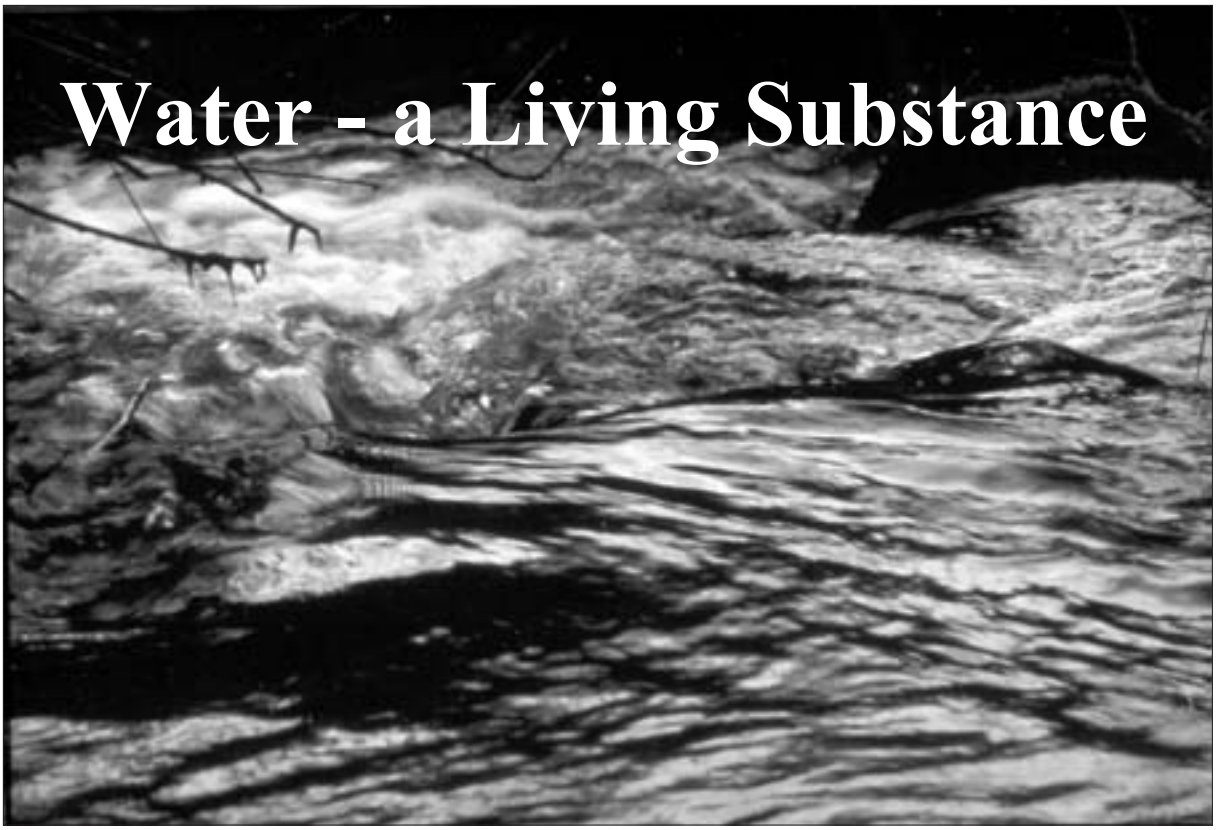
In order to seal the green roofs we use an environmentally friendly, recyclable EPDM (Indian rubber) liner. The substrate is a mixture of soil and pumice stone, or soil and expanded shale, which is much lighter than normal soil even when thoroughly soaked, but can store much more water (an interesting fact for any stress analyst!). Greening protects roofs from corrosive UV-rays and extreme fluctuations of temperature, thereby extending their lifetime.

Greening a façade is a lot cheaper and easier to accomplish, as no sealing and no substrates are needed. For ivy (Hedera helix), kiwis (Actinidia), grapevine (Vitis vinifera), knotweed (Polygonum aviculare), clematis (C. Integrifolia) and honeysuckle (Lonicera japonica 'Halliana'), trellises are all you need. Virginia creeper (Parthenocissus tricuspidata Veitchii) doesn't even need that. Virginia creeper, ivy, clematis, and honeysuckle prefer walls which do not face the sun, but grapevines and kiwis enjoy basking in full sunlight, at least at our latitude. After a period of acclimatisation, grapevines become very drought-resistant, due to their extremely long roots (up to 40 metres). Our grapevines grow to a height of 8 metres, delighting us (and the birds) with plenty of delicious fruit.

Grapevines lighten the somewhat massive façade of the ZEGG's seminar building.

Greening does not only serve to beautify a façade, but also protects it from temperature fluctuations and driving rains. Additionally, the plants produce oxygen and provide welcome nesting places for a variety of birds and many rare insects.

Water - a Living Substance



The Upholder of the cycles which supports the whole of life – this is WATER. In every drop of water dwells a deity, whom we all serve; there also dwells Life, the Soul of the First substance – Water – whose boundaries and banks are the capillaries that guide it and in which it circulates. Let me summarize: healthy air, healthy nutrition and healthy water together support not only a healthy body, but a healthy, positive human character also." (Viktor Schauberger)

Water is a remarkably complex substance. Its significance as a life-giving element is expressed in a multitude of myths. The early philosophers identified water as being one of the fundamental elements which, together with fire, soil and air, make up the whole world. Even now, looking upon water with more educated eyes, and describing it in terms of its chemical characteristics, we are still aware of the fact that all life needs water. In particular, we humans: our physiological need is 3 litres per day.

But how we satisfy this need, plays a crucial role. Water is not simply water. Drinking water from a spring is subtly different from drinking that which flows constantly from a tap and gurgles, after use, down a drain. When we drink from a spring our disposition towards our fellow human beings, to society and to nature is subtly changed.

As early as 1933, Viktor Schauberger had made it plain that there is something fundamentally wrong in the way we treat water. In his book, "Our Senseless Toil", he wrote: "For about a decade the groundwater has been falling so fast in many areas, that we can reckon on our fingers how soon people will be forced to abandon their higher settlements and houses, because the necessary water can no longer be brought to them, or only at great cost. Along with the falling of groundwater levels, springs dry up, water ways fall dry and the glebe, which is supposed to give us our daily bred, dies of thirst. At other places the water will rise above the earth, rivers will break their banks and landscapes will turn into swamps."

Today (more than 70 years later!), scarcity and pollution of water, in addition to climatic changes which have a disastrous effect on the regeneration of water resources, are the most pressing worldwide environmental problem of this century.

Globally, 97% of water is salt water. A mere 3% is fresh water. Of this 3%, as much as 79% is stored in the pole caps as glacier and another 20% in the form of groundwater. The last 1% of fresh water is surface water. These numbers illustrate the limited availability of our global fresh water provisions; while at the same time, the planet's population and its need for water is growing exponentially. Currently, humans consume 50% of the available fresh water, leaving all the plants and animals on the planet to share the remaining half.

"The proper ways will themselves lead us back to nature, and therefore to the source of all life, to healthy water, which, lifted by inner po-

wers, the higher the better, flows from Mother earth when it is mature enough to do so, that is, when it has achieved its optimal physical composition, and has no choice but to leave the ground.“ (V. Schauberger)

As a compound made up of the two gases hydrogen and oxygen, water in its pure form could technically be described as an oxide of hydrogen. But water is no isolated substance, as it possesses a multitude of characteristics according to the medium or the organism in which it resides and moves.

As a molecule, water has an extraordinary capacity: it can combine with more elements and compounds than any other molecule. This is why it is sometimes described as the universal solvent. Water behaves in a way which is fundamentally different from other liquids. While all fluids become denser with cooling, water does so only down to +4° Celsius (39.2 Fahrenheit). Below this temperature it once more expands. This is the so-called “anomaly point”, which is decisive in terms of its potency and has a major influence on its quality. At +4°C water has its greatest density, 0.99996 grams per cubic centimetre, and is virtually incompressible.

At 4°C, water also has its highest energy content and is in what Schauberger called a state of `indifference . In other words, when in its highest natural condition of health, vitality and life-giving potential, water is in an internal state of energetic equilibrium and in a thermally and specially neutral condition.

“A further life-giving property of water is its high specific heat and thermal conductivity, namely the ability and the rate at which it absorbs and releases heat. This means that a large input or extraction of heat energy is required to bring about a change in density and temperature. The lowest point of the curve of the specific heat values for water, however. is +37,5°C. It is remarkable that the lowest specific heat of this `inorganic substance, at which the greatest amount of heat or cold is required to change the water’s temperature, lies at only 0.5°C above the normal human blood temperature –. This property - of being able to resist rapid thermal change - enables us, with blood composed of up to 90% water, together with many other animals and creatures, to survive a relatively large range of external temperature fluctuation and still maintain our own internal body temperature. Pure accident, so we are told, or is it by clever, symbiotic design? If the blood in our bodies had a lower specific heat, it would mean that in hot weather it would heat up much more rapidly to the point where we would start to decompose , or it would freeze solid, if exposure was to the extreme cold.” (Callum Coats)

In contrast to a seepage spring, true spring water has a water temperature of +4°C. Born in the cool, diffuse forest light, water begins its long, life-supporting cycle as a living and translucent stream. Naturally flowing water always has a tendency to flow in darkness or in the diffuse light of forests, avoiding the detrimental effect of direct sunlight. With increasing warmth and light, water gradually loses its vitality, its health and its capacity to enliven and animate its surroundings as it passes. As it by and by transforms itself into a broad river, it becomes more and more turbid. But even this cloudiness still serves an important purpose: it protects the deeper strata of the river from too much heat and light from the Sun.

“Water is the issue most crucial to all life on Earth. Water, flowing as sap, lymph or blood, is the life-blood of our planet, the life-giving fluid of all organisms, plants, animals and human beings alike. Our very existence is therefore intimately connected with the quality of water available to us. It is vital for our own lives and those of our children that we become seriously concerned not only for the health, vitality and quality of the water we drink, but also for its source and the treatment it receives. Apart from our consumption of it, this same water is also used to grow everything we eat. If we want to live in health and happiness, then the living entity – water – should be highly revered and the most sensitive care should be taken of it.” (Callum Coats)

Here at ZEGG, our weed bed water purification system, with a capacity adequate for 300 inhabitants, has been working since 1992. The water we draw from the Earth for our needs is cleaned and given back to the natural cycle. After it has nourished, washed and rejuvenated us, it seeps back into the ground and is returned to the groundwater.

In the times of company-dominated globalisation, in which water is degraded from being a basic human need and a right to a mere commodity, access to good water is increasingly important. We insist on our right to keep our own water sources, and we try to convince the community of Belzig not to follow the example of many other larger German cities, which is to sell their water works to international companies, at cut-throat-conditions, and then lease it back from these same companies, which in turn use this water as a speculative value, - all in order to save taxes on a short-term basis. A sensitive and caring treatment of water is important to us.

We do use rain water occasionally, for watering plants during dry spells. Its collection and use in our existing building would demand a large and costly re-construction; for new buildings we plan to use rain water for flushing, watering and laundry purposes.

View at the high growth of the purification plant.

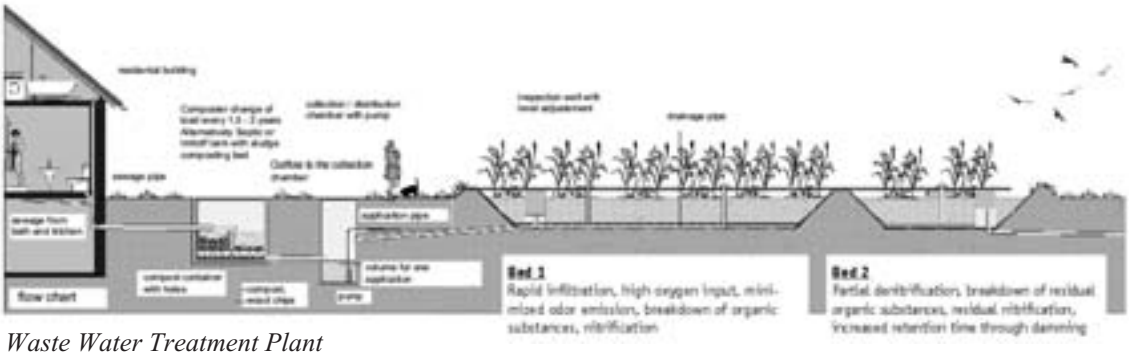
Waste Water Treatment and Composter

An essential prerequisite for the ecological use of water is a decentralized system for the purification of waste water to a quality which allows it to be reused .

Since 1992 all waste water from ZEGG is purified in a treatment plant which uses natural processes. Minimal technical effort is needed. It needs only 900m² of space and is able to clean the overall waste water produced by 300 inhabitants. The required space per person is 3m². Using newer methods we have been able to reduce this requirement to only 1m² per person.

The first step is one of mechanical purification and takes place in a composter. This is an alternative to the traditional septic tank. In the composter the solid matter is filtered out, and the waste water is pre-treated mechanically and, in part, also biologically. Contrary to common 3-chamber-pits, this process does not turn the solids into faecal sludge. They are left to rot, and after about two years may be used to improve the soil as valuable composting material. The nutrient cycle is closed.

The resulting pre-purified waste water is then channelled into a duct for collection and distribution. From here it is brought to the surface at intervals, and spread on the filter beds of the waste water treatment plant. Purification takes place in the planted soil filter, which is



Waste Water Treatment Plant

vertically permeated. Part of the water flows back into the duct and goes through the plant again. This improves the purification performance and makes the inclusion of a buffer tank redundant. The pollutants in the water are broken down by micro-organisms living in the soil filter. During the entire process, the waste water is rich in oxygen (4-6mg/lO2). This aerobic environment enhances the cleaning power of the plant and assures nearly odourless functioning.

In the treatment plant at ZEGG we mainly used plants producing a lot of biomass, which can be harvested regularly. The plants used are: Japanese silver grass or Eulalia (Miscanthus sinesis), a local type of common reed (Phragmites pseudodonax), a local type of willow (Salix viminalis "Mötzow") and chinese poplar (Populus simonii).

The output water quality is tested at regular intervals. A very high quality is achieved throughout the year, even during the coldest period when temperatures are for more than 4 weeks below -15°C. The plant reduces concentrations of pollutants to levels consistently below German concentration limits. The unit at ZEGG is a model for small communities and for households which are outside of towns and off the grid. It demonstrates a process for waste water purification which utilizes well the regenerative powers of nature. These units also enrich and beautify the environment by adding a wetland biotope, offering valuable living space to many species of plants and animals.

Since November 2000 our purification plant has been the subject of a three year research project. The aim is to optimize its output levels and reach a quality which would allow widespread reuse of the water. The water can be used to water forest gardens and landscapes.

The research project is part of a combinated endeavour of German and Mexican research facilities and companies. The project includes different climatic regions and different research questions. It is hoped that the results will be applicable to a wide range of climates and regions.

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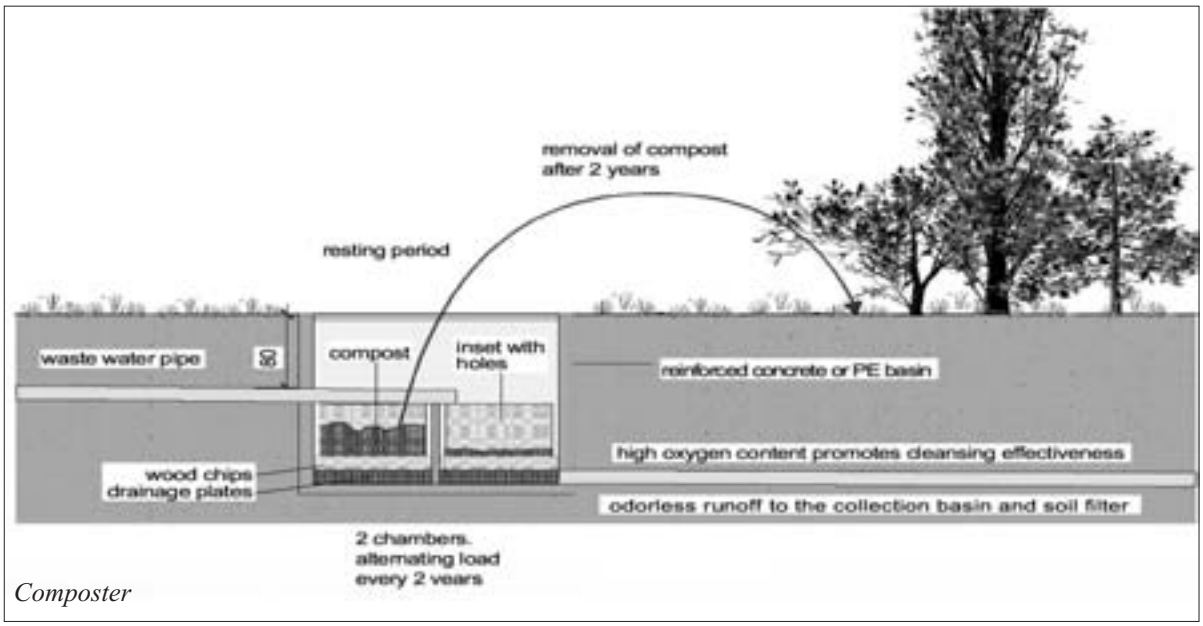


Composter

Natural Pond Clarification

At ZEGG there is a fire fighting water basin containing about 420 m^3 of water. We started to superficially filter the water through a small soil filter planted with aquatic plants, pumping the filtered water back into the pond. This soil filter offers a habitat to many natural pond-dwellers, thereby strengthening the self purification powers of the basin. We intend to promote a close-to-natural pond-biotope.

The method of purification just described is insufficient during the summer, when hot temperatures draw residents and guests to bathe and refresh themselves in the pool. As we do not want to use chlorine, we set out to research efficient, environmentally friendly methods of purifying the water. This search led us to discover the various beneficial effects of the so-called "Effective Micro-Organisms" (EM) (see box).

During our first two years here, we had to exchange the water twice a year, as so much algae were growing due to the many nutrients in the water. At hot spells the ecosystem collapsed at intervals. Since 2000, we have employed EM in our fire pond and we get a professional lab to test the water quality towards the end of the summer - the time when ponds are normally most polluted. Every year, these tests have proven our water to be of excellent quality and hygienically in perfect condition.

Since 2000, we have also introduced Red-eye Rudd (Scardinius erythrophthalmus) and Carp (Cyprinus carpio), which so far have thrived without any supplementary feeding. Rudd mainly live off mosquito larvae and insects which fall into the pond, whereas carp mainly feed on algae and decomposing leaves and grass which settle on the bottom. The Rudd are spawning at a high rate, so that we have decided to bring in a perch (Perca fluviatilis) in order to control their proliferation.

During the fourth year of our experiment – of no longer exchanging the water - is has become evident that while the bacteriological condition of the water is excellent, the visual aspects are less than satisfactory. The side walls are covered with algae, there are lots of tiny algae floating in the water and the water itself appears murky. The reason is an increased ph-value connected with a heightened nutrient content due to organic matter introduced into the water. On the bottom of the pond, for example, a layer of leaves dropped by the surrounding trees sometimes begins to ferment during hot spells in the summer.

During the summer of 2003, we decided to continue the efforts already under way to clean and maintain the pond with a natural chain of living organisms. We siphoned off a portion of the mud and spread part of the 2.30m deep section of the pond with a layer of washed sand 10 cm deep. This offers a good habitat for the water-filtering Goose Barnacle (Anodonta cygnea) and other sludge-digesting organisms. A fully matured Goose Barnacle, which is an endangered species in Germany, can filter up to 2000 litres of water per day. They achieve a size of up to 25cm and live for up to 300 years, placing them among the most long lived animals on this planet. They feed off fine floating algae and, in order to build their shells, draw lime from the water, which in turn lowers the water's ph-value. They live in a symbiotic relationship with a small fish, the Bitterling (Rhodeus sericeus amarus Bloch); each relies on the other for procreation. There is another type of mollusc which can filter water. It is the Painter's or Freshwater mussel (Unio pictorum), which is also red-listed. We also introduced Gudgeon (Gobio gobio), a fish feeding on organisms living in the sludge. The employment of these molluscs could help to create a new habitat for these animals, and could serve as a basis for their re-introduction into their natural biotopes.

The vertical, side walls of the pond are "grazed" by the River snail (Viviparus viviparus) and Ramshorn snail (Planorbis corneus). In one corner of the basin, we plan to install floating beds of water plants to clean the water with their root systems, offer shelter to spawn and young fish and provide vegetable matter to the carp.

In 2004 the water quality is still good and we have hundreds of young fish and even quite a number of Crested newts (Triturus cristatus). We have taken out several hundred small fish and quite a number of big ones and brought them to other ponds and lakes in the area. Some of these are on the endangered species list.

Effective Micro-Organisms

The idea of EM was originally developed by a japanese man Professor Higa. It consists of a mixture of cultures of micro-organisms naturally occurring in the environment, which are used as an inoculation in order to raise the micro-bacterial variety in soils and plants. Higa discovered micro-organisms which can co-exist in mixed cultures and which are physiologically compatible. When these cultures are introduced into a natural environment, synergetic effects are activated, multiplying the individual beneficial impacts. EM contains no synthetic substances. Research in Japan and in other parts of the world has confirmed that inoculations of the soil or of a plant system with EM raises general soil and plant vitality, as well as improving the yield and the quality of crops. EM is completely harmless to humans, and can also be used externally for treating skin diseases and internally for gastro-intestinal complaints.

Source of supply for EMs: EMIKO, Reinhard Mau, Gebr.-Burch-Str..9, D-53881 Euskirchen-Kirchheim, phone: +49-2255/950733, fax: +49-2255/950734, or: Gönna Pezely, Axstetter Str. 1, D-27628 Bramstedt, phone: +49-4746/6998

Compost Toilets

Hundertwasser's explicit statement is today widely accepted as the truth: the water-closet with water-borne sewage system has turned out to be an ecological dead end, in more ways than one. A very valuable raw material for fertilising is withdrawn from the natural cycle, so that nutrient-deficient soils need to be up-graded with chemical compounds. One third of our precious drinking water is used as the means of conveyance for our excrement - approximately 20,000 litres per person per year. The diluted faeces can no longer be used on fields and in gardens. If you consider the cost of a sewerage network and a central waste water treatment plant, which are operated at ever higher expense, with extremely complex technology requiring more and more energy and chemicals, it is possible to speak also of an economic cul-de-sac. In many cases, compost toilets are a real alternative. The great advantage they offer is their non-reliance on drinking water, but in addition human excrement with its inherent nutrients -mainly phosphorus and nitrogen - is re-introduced into the nutrient cycle.

There are two main systems of dry toilets: aerobic and anaerobic composting. We have decided on aerobic decomposition - decomposition with a supply of air/oxygen. This is basically the same composting process as takes place in garden soil or in a forest without any human assistance. The process requires the presence of oxygen, and is for the most part odourless. Anaerobic decomposition (in which air/oxygen is excluded) is actually a putrefaction (rotting) process, releasing smelly gases which can be used as biogas. Faeces can contain viruses and the eggs of parasitic worms (Helminthic ova). The duration of the decomposition process, its temperature, the ph-value and UV-radiation are the most important factors for killing off gastro-intestinal pathogens. In order to result in a hygienically safe product, faeces need to be either kept for a longer period at normal temperatures before deployment , or stored for a shorter period at high temperatures. The latter may be supported by aerobic-thermophilic composting, which reaches temperatures of up to 70%, together with other organic waste. In most systems, after one or two years of storage the resulting compost is safe to use as fertiliser.

At ZEGG, we constructed our dry toilet in 1995. We selected a continuous system, similar to the

Shit turns into earth which is put on the roof. It becomes lawn, forest, garden

Shit turns into gold. It is satisfying to grow richer and richer in this way.

The cycle is closed. There is no more waste, the environment recovers. Every time I use an English water closet, it gnaws at my conscience, just like when I travel by car or by plane.

Water closets are one of the many dangerous dead ends of our civilisation: such a waste of pure drinking water, just to flush away a bit of shit and urine. 1kg of a valuable substance is turned into 50 litres of toxic waste, polluting the groundwater, wells, rivers, lakes and oceans.

Ruthless exploitation is multiplied as a vital substance is wasted. The land is impoverished. Artificial fertilisers are no adequate substitute. Water closet: 1,000 grams of shit turn into 50,000 grams of garbage - poison.

Humus toilet: 1,000 grams of shit turn into 50 grams of raw material - gold.

Now why should I give away my shit and poison the environment with it?

I prefer to keep it for myself and convert it into gold.

In a humus toilet, shit and kitchen scraps turn into a valuable resource, only 5% of the original volume and weight.

No waste of water, no canalisation, no pathogenic germs, no spreading of epidemics, no garbage, no garbage collection, no latrines, no cesspools, no manure transports, no chemicals, cheap, less waste water treatment, odourless, reusable as humus"

(Friedensreich Hundertwasser, from the shit Manifesto, Vienna 1975)

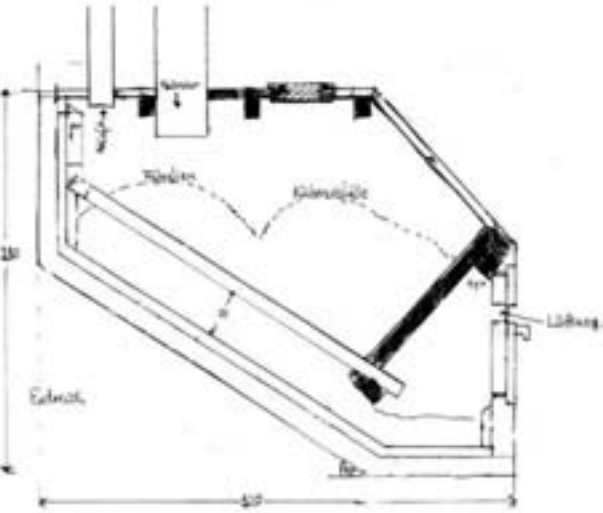
Compost toilet at ZEGG.

well-known Swedish Clivius Multrum. For quite a number of years now, it has been transforming large quantities of faeces, kitchen scraps and cardboard containers into a small amount of high-quality compost which we use to fertilise fruit trees. The toilet requires very little maintenance. During periods of intense usage we sometimes add wood-ash from our wood burner or stone meal in order to control the ph-value. Sometimes we use effective micro-organisms (EM) to promote the bacterial conversion process. The main job is done by fungi, micro-organisms and worms. There is no need to turn over the pile at any time. Faeces with their high nitrogen content are well complemented by paper board and wood filings as litter, and kitchen scraps with their high content of potassium.

Our toilet is located in the woods and is sealed off from the groundwater by a layer of water-proof concrete made with a fine aggregate. Any excess of seepage water is selectively used as fertiliser. The upper portion of the toilet is constructed of wood and cob. Due to its scenic location and its lack of odour our dry toilet is popular.

Water purification plant at the time of construction 1992.

Energy Generation from Renewable Resources



Vertical cut through the body of the compost toilet.

When we took on the property in 1991, the ramshackle and extremely polluting heating system (brown coal heating plant) was converted. Heat generation at the ZEGG is now done by an automatic wood chip combustion plant, burning wood from our forests.

By using this renewable fuel resource, the CO_2-cycle is closed, that is, the neighbouring forests absorb the exhaust generated and transform it into oxygen. The heating station has an output capacity of 875 kW. By employing a heat recovery system, and due to energy-technical optimisation-measures, the emission of pollutants and the environmental burden caused by the new system amounts to only 20% of the burden engendered by the previously used brown coal central heating boilers. The ashes are uncontaminated and are used as fertiliser in our gardens.

The plant can also be run on biomass, such as elephant grass or other plants from the waste water purification system. Since the summer of 2002, ZEGG has been cooperating with an engineering office to introduce CO_2-neutral production of electricity also.

One idea that cropped up during the process of deciding how to go forward, was the installation of a new block-type thermal power station based on wood combustion. But as small units using this tech-

nology are not yet technically mature we decided to wait before investing in a co-generation plant.

In order to decrease CO_2 emissions and to cut down on energy-related expenses it seemed most sensible to invest in heat insulation to save 100 to 130 KW. These recommendations are being put into practice . As the annual heating requirement is above 70kW, extensive savings are possible through thermal insulation and window and façade improvements.

To decrease the demand for heating is always the best measure to save energy costs, as this energy does not have to be produced in the first place.

Also in the planning stage, is a peak load regulator to monitor the demand for electric energy. This will enable us to save up to 90% of the electricity costs. The peak load regulator will automatically shut down electric appliances for short periods of time and at intervals, whenever peak load is achieved.

In order to decentralise the warm water supply system, one building was equipped with a thermal solar plant several years ago, and two other large systems followed in 2004. We also installed a small, 60kW woodchip plant to provide warm water in summer. This enables us to shut down the big plant during the summer, giving it a break from duty and giving us time to take care for it.

In fall of 2004 we will install 180 m² of photovoltaic panels on one south facing roof, producing around 24 kW of electricity.

Recapitulating, CO_2 -emissions are balanced by the employment of renewable resources.

Info: ingenieure@andreas-schiller.com, http://www.andreas-schiller.com .

Cars run on Vegetable Oil

Some of the cars run by ZEGG have been converted to run on vegetable oil. Generally, this can be done on nearly all diesel engines, which can then be run on rapeseed, sunflower, soy, corn or any other unprocessed oil.

Vegetable oil is not to be confused with Bio Diesel. Bio Diesel requires an energy consuming process of transesterification, rendering it a product of questionable ecological value. The much better lubricant effect of vegetable oils actually benefits many motors: motor performance is raised and consumption is lowered, and there is much less wear. Vegetable oil cleans the fuel injectors and the injection pump, thereby raising combustion efficiency. The sulphur emission is reduced nearly to zero, and the emission of soot particles and CO_2 is decidedly lower. Vegetable oil is an edible product and 100% biodegradable. Its high ignition point makes it safe to store in large quantities, without any special safety precautions. Vegetable oil is not subject to petroleum tax and is a renewable resource: driving with vegetable oil is therefore cheaper and CO_2-neutral.

The only disadvantage of vegetable oil is that it is less suitable for cold starts due to its higher viscosity,. When operating such a vehicle during winter time, it is necessary to pre-heat the oil. The tank heating system is fed by the cooling circuit of the motor. For cold starts, an additional small diesel tank, which can be disconnected by a manual switch after 2 to 4km, is fitted into the vehicle's boot.

Conversion may be done by using serial parts only. The motor itself remains unchanged. The TÜV (German Technical Inspection Agency) controls whether this additional tank is properly installed. If the car is decommissioned, nearly all parts may be reused in other vehicles. Conversion is therefore worthwhile - even for older vehicles.

Even though conversion is relatively easy to do, most authorised workshops have no experience, and tend to discourage any inquiries. Still, there are by now hundreds of vehicles (including tractors, trucks, passenger cars as well as ship diesel engines) successfully using this technology. At ZEGG, we have been operating 4 diesel-run vehicles with vegetable oil, filling-up at our very own filling station. By now, vegetable oil is available even at some public filling stations.

Building and Insulating with Plant Fibres

A paramount task at ZEGG is the insulation of the existing buildings, the conservation of those buildings and dealing with inherited burdens, such as old roof coverings containing cement asbestos called "Eternit". Within our financial limits we are working our way from building to building. Every year we manage to replace the cement asbestos on several roofs with harmless materials , and to improve heat insulation.

In most cases we use cellulose fibres, made from old newspapers. These are blown into the roof and other cavities. The fibre fluffs are fireproofed with more or less harmless mineral salts, which at the same time protect them from animals such as rodents.

It is possible to insulate using sheep wool, or rye, flax or hemp fibres, but these materials are far more expensive. An inexpensive alternative is offered by light loam mixed with wood chips. This is affordable and offers excellent thermal insulation and humidity regulation. Walls are rendered with loam plaster inside and out. If ready-made loam finery is used, working time may be reduced considerably but the environmental footprint is higher due to transport. These ready-made materials are available at alternative DIY stores.

For all types of work on the interior or exterior of buildings we use untreated wood obtained, as far as possible, from our region, or harvested in our own woods. The latter is cut and prepared by our own mobile lumber mill. In our dry climatic conditions trees grow slowly, rewarding us with wood of excellent quality. The wood is simply waxed or oiled with natural products; if left otherwise untreated, wood naturally protects itself with a weathering layer.

Wood should not be in contact with humid ground, and will become damaged if sodden. However, if it can dry off again after becoming wet, it can tolerate moisture without problems.

It is important to choose the right kind of wood for the task. Our newly constructed restaurant tables, which were treated only with natural wax, have been able to withstand extreme wear by many people and children, with only a few blemishes to show. For our terrace, we have refitted old lawn chairs with black locust (Robinia pseudoacacia). Black locust has qualities comparable to teak , which is mostly produced under ecologically questionable and unsocial conditions and is transported long distances.

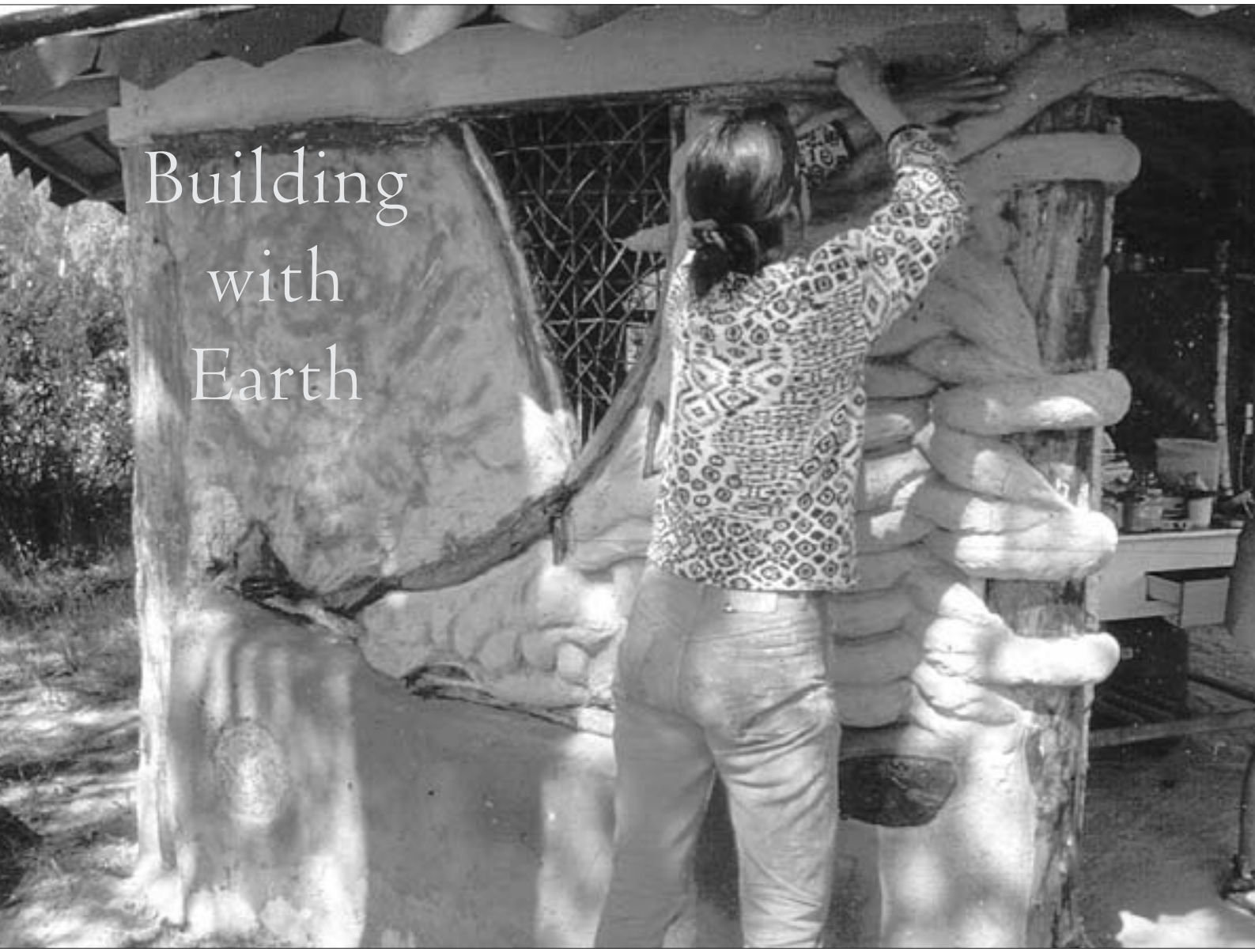
Insulation with woodchips in clay.

For constructing new buildings we rely on loam, wood and glass. We aim to confine the use of cement to foundations and moisture-ridden areas. For interior renovations also, we have started to use loam, as it contributes to a pleasant interior climate. Due to its diffusion capacity, slaked lime finery is a very good alternative to cement finery for exteriors.

Many windows in our old buildings were glazed only with single panes of glass. As new windows are very expensive, in many cases we chose simply to fit a second pane of glass, which has considerably improved insulation efficiency. In 1997 we also decided no longer to paint our window frames, as paint doesn't last anyway, and it doesn't really comply with our ecological standards. Every year we manage to remove the old varnish from quite a number of window frames and to oil them, - with a lot of help from our friends! This type of treatment is quite time-consuming, but it is very simple and in the long term it saves a lot of time.

We employed natural stones to lay new paths, or used stones from the Fläming region, which are round gravel stones, in a paving technique widely used in this area. This paving technique is actually an old art, which we hope to keep alive in the Fläming region.

Building with Earth



One of the Mandala Pavillons at ZEGG with various artistic ways of building with loam.

Building with loam is an ancient and time-tested technique with many facets. Due to the heightened awareness of environmental poisons in our direct vicinity, i.e. in our houses, the technique is experiencing a well-deserved renaissance.

Loam, as used in building, consists mainly of clay minerals mixed with various grain sizes(very fine up to 1mmØ) of sand. Loam is perfectly suited to satisfy the requirements of a gentler treatment of nature, and for energy conservation: it is locally accessible, needs little energy for processing, and is characterised by excellent heat storage capacities and insulation (if combined with organic materials). Loam can be used in baths in order to regulate humidity, as well as in green houses as an energy-storage agent. Loam assures an air moisture of 50%, which is felt as very agreeable by humans. If the atmosphere suddenly becomes more humid, it absorbs the excess humidity; if the atmosphere becomes drier, the loam releases water vapour into the room.

The demolition of modern, well insulated buildings leaves behind large piles of hazardous waste, which must be locked away, as it cannot be ecologically disposed of, or decontaminated. On a demolished loam building, on the other hand, one can safely grow vegetables, or reuse the loam for creating a new structure. Loam can be used in combination with other natural materials such as natural stone, wood or straw. But increasingly it is employed in combination with glass and steel, demonstrating its universal applicability and its positive contribution to a pleasant room climate. Loam buildings may look pleasantly nostalgic, but the design can also be airy and artistic, and

contribute to an enhancement of modern architecture.

Loam is cheap and ecological but quite time-consuming to use. Nowadays, new processing technologies are applied to loam, making it easy to use and more competitive with other prefabricated building materials.

As part of a number of loam building workshops, several loam buildings have been constructed on the ZEGG grounds since 1998. It has also been used with great success to renovate existing buildings. The communal dining room, a seminar room and several residential rooms have received a loam refinery. Some were painted with lime-casein paint, others left in the colours of the earth ranging from white through all shades of yellow, ocre, orange and red. The walls of our Mandala-Pavillons were used as a model for different techniques, and were built using a variety of methods - rammed earth, loaves, cob, woodfibre-reinforced lightweight loam, loam bricks, infill with an earth-and-straw mixture, and finished using different renderings etc. However, all is connected by a harmonising, overall design.

The outdoor dry toilet has half-timbered walls , which are filled in with light loam. In a second dining room, the ceiling was executed as a dome, both for reasons of design as well as to improve the room climate. A wood-fired bread oven was built from loam bricks, and next to our "village square", there is now a well-insulated and beautifully decorated toilet made from loam and wood. One seminar room and a big public bath were plastered with several layers of loam rendering, setting a new standard for ZEGG renovations.

Every year we organise loam building workshops, during which it is possible to learn this exciting building method from experienced teachers and get hands-on experience.

Living Buildings with Willows and other Trees

It is possible to build with living trees. They are planted close to each other, and within a number of years, they grow together to compose a closed wall, with "windows and doors"; a single living organism, able to shelter a human being in its midst. Many kinds of trees are suitable. Willows (Salix) grow fastest, but they also have the lowest life expectancy. Willows also thrive when planted as cuttings." (Kirsch "Naturbauten aus lebenden Gehölzen")

In March 1996, the first willow-dome was planted at ZEGG, right next to our pub. The willows were harvested from our waste water recycling system. During the summer, this living building is an attractive, shady arbour.

The willow shoots can be braided into the existing body, or can be bolted to other stems: the cambium injury and the fixture will cause them to join together permanently.

In 1997, in cooperation with the adult education centre of Belzig, two outdoor showers were screened from view with fences made of willow cuttings. They become very dense in springtime and offer privacy. The run-off from the cold water showers waters them and their root systems purify the used water.

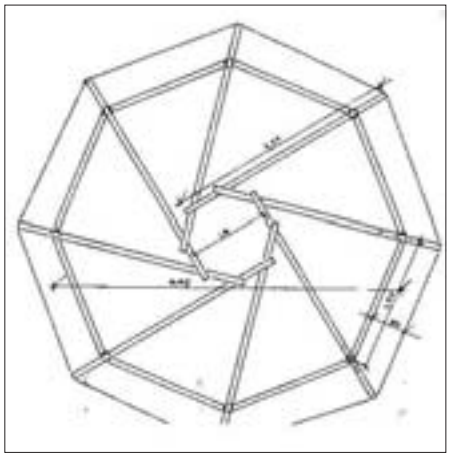
In order to set up such arbours or fences, it suffices to stick the willow cuttings 15-20 centimetres deep into the ground, just before shoots appear, and to water them regularly. Willows require a humid location, and need to be watered during dry spells. Maple is also very suitable for easy-to-care-for, living fences which were common in parts of the UK. They can become very dense after some years.

Due to the low precipitation in our climatic zone, living buildings have been rare. However in England, France and particularly in Germany, quite a number of living buildings, grown from a wide variety of trees, have been created since the beginning of the last century.

Mandala Pavillons

Mandala Pavillons are circular buildings with a self-supporting roof, in which all rafters carry the same proportion of the weight. Therefore the load is not passed on to the posts, but is spiralled outward in an infinite circle. The shear rate is negligible, and there is no necessity for a peripheral tie beam to support the posts from being pushed out radially by the rafters. The load occurring at any point of the roof is transferred to all of the rafters of the construction in agreement with a dynamic principle.

With this type of construction, it is possible to build self-supporting roofs with diameters ranging from 3 to 20 metres.



Roof construction

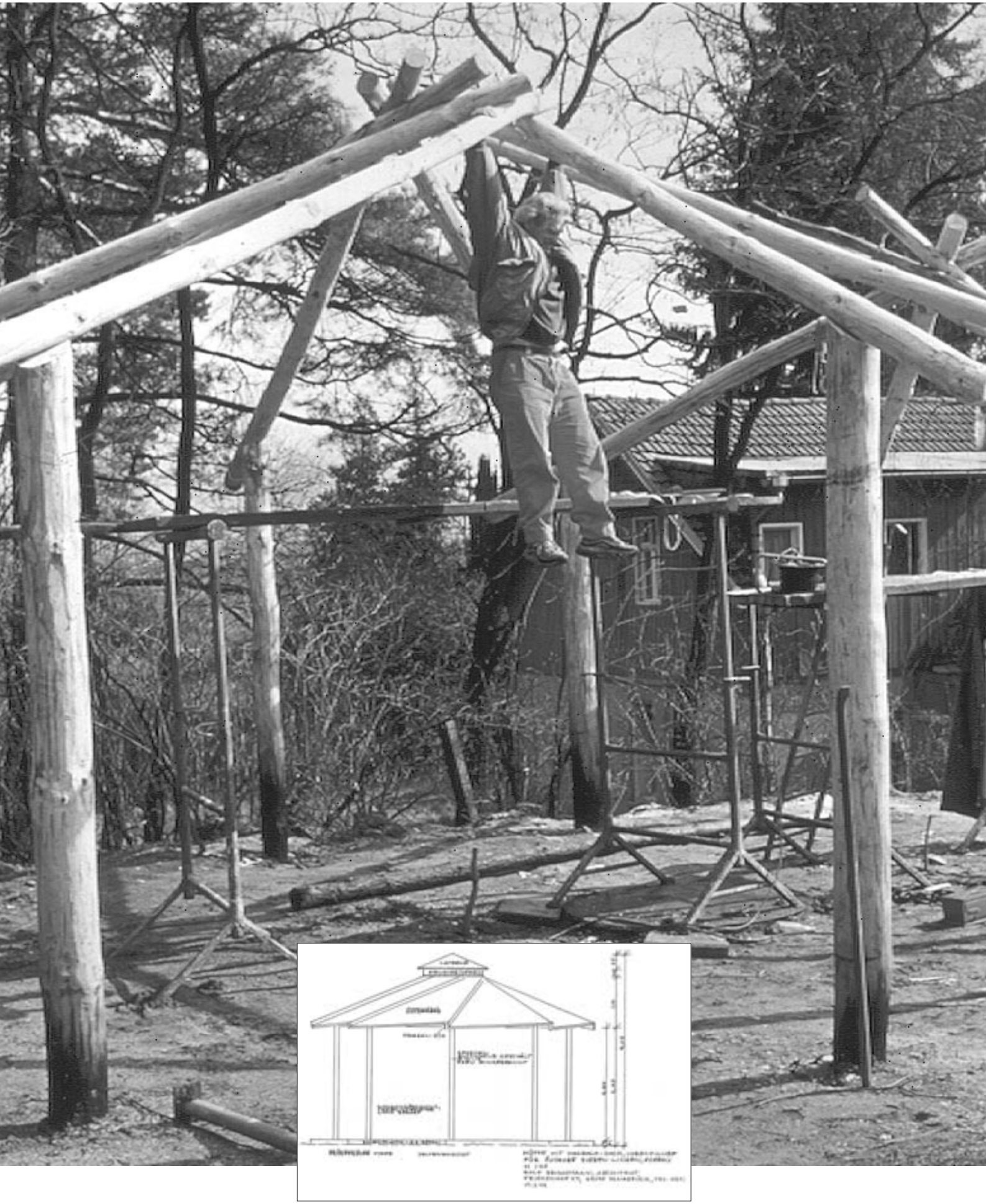
The system is very variable in terms of the number of rafters needed; at least three are necessary, but any larger number is possible taking into consideration the strength of the rafters and their shape.

These Mandala roofs are complex structures, in which each rafter is equally important for the stability of the whole. Every little modification, such as at the support point in the centre circle, the number or the strength of spars, or the size of the opening in the middle) has an effect on the entire system. In a way this type of construction illustrates metaphorically some basic aspects of communal life.

The first three circular lodges with Mandala-type roof construction at ZEGG were built in 1998. The idea caught on, so that now there are many of these lodges all over Germany and Switzerland. Later on, adobe walls were added in order to screen the interiors from view and as protection against the wind. In 2000, we constructed a twin Mandala-lodge, built entirely from round timber harvested on our land. The two interlocking roofs support each other via a connecting rafter.

The load-bearing posts of the lodges are embedded 1 metre deep into the sand. A foundation is not required for this type of building. The logs were cut on days said to enhance their durability by a traditional farmers´ almanac. Additionally, the wood is protected by the soot produced by the campfires lit in the lodges, and by the adobe and its humidity-regulating property. During the summer, the lodges serve as kitchens for the tent camps.

In Great Britain, Graham Brown has founded a company and has patented this type of building. Graham Brown, Out of nowhere, Easter Tearie, Darnaway, Rorres Morray, IV 36 Ost, phone/fax: 01309-641650, e-mail: oon@aol.com, http://www.outofnowhere.com.



Triangular Huts from Auroville

Triangular hut at ZEGG.

The construction of these huts is based on the equilateral triangle. The triangle is the most stable form; equilateral triangles can be used to construct domes or huts like the following. The basic shape is that of the tetrahedron, with sides measuring about six metres. These larger triangles are bisected by smaller ones with side lengths of three metres. Half of this again is the height of the floor, which is located about 1.20 metres above the ground. These huts need no foundation: the construction simply sits on slabs of stone.

The design was developed in Auroville - a large, spiritual community in India - and was intended to provide cheap and simple housing for tropical climates. The huts were roofed with the traditional covering of palm leafs. In tropical regions, the huts are ideal as, like a hammock, they are surrounded by air and therefore pleasantly cool. During the monsoon periods they are high enough above the ground to escape flooding.

Since 1998, we have built two such huts on our grounds. The basic construction is made of black locust (robinia pseudoacacia) grown here on our land. Adapting to our climatic conditions, one of the roofs is covered with wood, while the other is protected by tar pasteboard shingles. The huts are used for different kinds of meditation. The second actually represents an improved and refined version of the first: it has a hexagonal roof projecting outward so as to offer protection to the side flaps. Due to its lower floor level it is also more spacious. It is covered with wood.

Epilogue: There is no time to waste

Callum Coats writes: „We are (...) forced to admit that our present ideals and value systems have brought us no utopia. While there have been tremendous improvements in many areas of human endeavour and compassionate understanding, despite the constant promises of recovery, the human world is still in constant disarray, economically and socially, and full of conflict. Intolerance is rife with man against woman, sect against sect, nation against nation, while the rich are comfortably buffered against increasing poverty and privation with full bellies just as bulbous as the bloated bellies of the starving.

Falsity is heaped on falsity and one deception after another is foisted on us by those who seek to regulate events for their own benefit, while controlling every aspect of our lives by immersing us in irredeemable debt.

We are not alone in our travails, however, for this state of strife, discord and spiritual instability is also mirrored in an increasingly diseased and sickening Nature who, in her present state of fever shivers between record heat and record cold. Mother Earth is now seeking, with all the forces at her command, to re-establish her own equilibrium and health, thrashing about with increasingly violent storms, sweating in catastrophic floods, parching with devastating droughts, writhing in all-consuming conflagrations and shivering in rending earthquakes. Beset from all sides by these awesome events, we have the effrontery to call them `natural disasters´, blaming Nature for what we ourselves are responsible. For there can be little doubt that we are the true instigators of these cataclysmic episodes. These are not `Acts of God´, but misdeeds directly attributable to the senseless activities of humankind.“

Glabal reforestation is necessary for the support of life on earth.

We need to act fast, if we want to avert the worst. Some steps towards a vision of a globally sustainable life, can be found in the book „Subcoma“ by the Swiss Author P.M. (see bibliography). What I miss there is a stronger awareness of the human factor. Why have our ancestors begun to destroy the Earth and themselves? This question needs to be answered on all levels, before we can hope for a peaceful and more just world.

From my point of view, we need to be committed and strong and act on three levels:

* We need to massively reforest the Earth. The reasons have already been explored within this booklet.

* We need places at which work and research is done on the conscious dissolution of the potential for violence within human beings.

* We need people and organisations to apply leverage at the centres of power, where wars are planned and prepared. An example of this type of activity is the work done by innumerable NGOs. Another important task is the distribution of reliable information.

Commitment to work on any of these levels is essential for our collective survival. Those working any of these spheres should also be aware of what is being done by others, and should be willing to cooperate with them.

Reforestation needs to take place over the entire planet. For me, community and communal ways of living are the keys to the second level, the overcoming of humanity's propensity for violence. Communities are where people may `straighten out´ and, even more importantly, where children can grow up free and unbroken.

Another central topic, which can and must be addressed in communal forms of living, is fear. We can only act non-violently if we are aware of and in charge of our own fear. Fear only breeds violence and propensity for violence. People who have not yet faced their own angst are easy to control and to dominate. Their unconscious fears makes them easily manipulated into submission to criminal regimes and orders. "Fear needs to be erased from the face of the Earth", as Mikhail Gorbachev said before the Berlin Wall fell.

There are many more reasons for this propensity for violence, all of which need to be taken into consideration; to discuss them all here would be go totally beyond the scope of this booklet. ZEGG is one of those places where the human potential for violence can be dealt with and gradually overcome.

On an ecological level, many resources could be conserved, and overall consumption could be lowered, if we could again experience how few material goods we actually need for our own happiness (key idea: reduction of substitute gratifications) That´s why I have lived in a communal setting for more than 20 years.

Since the war on Afghanistan, at the very latest, we know that war is by no means the last resort of politics, but is an integral part of a strategy to enforce this politics. Most wars are waged by aggressive, neoliberal nations to enforce market-conforming policies.

Wars, and their preparation in people's minds rely on this human propensity for violence. So if we work on overcoming this we are on a good, long term path to deprive violence and war of their base. But we should not forget that politics knows many ways to create a threatening atmosphere and thereby bolster the propensity for violence. This means that it is necessary to act on both levels at the same time: the long-term dissolution of violence within ourselves, and resistance against the political powers-that-be.

The war on Iraq totally violated the law of nations. It had been decided on long before in line with mainly US-American desires for hegemony and was justified with many lies that now do not count any more. The impressive world-wide protests against it were seen by many as a light at the end of a tunnel. It is my hope that the anti war protests develop into positive actions and promote a new way of life. This movement's only chance of longevity and to contribute to more global equity, peace, sustainability and trust, is if protest can be turned into compassion, and if the question of a different way of life is raised; a way of life in which war can play no part. This work begins in all our relationships and in our every-day lives, when we refuse to buy what is offered by the ruling powers – their goods or, as Arundhati Roy said, their visions, concepts or ideas.

To me the recent changes in the area surrounding ZEGG, the area of Hoher Fläming, show a path into the future in the sense of regional organization and regional provision of basic needs such as housing, water, energy and heating - and maybe even of some of the non-material needs such as security, friendship, contact and love. This could be a place where a kind of regional self-sufficiency could be implemented, which is so urgently needed for future generations and which at the same time is in interaction with the outside.

Achim Ecker, 45, has been a ZEGG resident ever since it was founded in 1991. Previously, he had lived in various preparatory communal projects for many years. At ZEGG, he works as the resident ecologist and keeps delighting the community by planting beautiful shrubs and trees. His vision of a locally adapted permaculture is nurtured by his awareness of the natural processes occurring on the ZEGG grounds.

Additionally, he works as a FORUM facilitator and group leader in the human growth area. His political commitment in different parts of the world strenghtened his realization that it is important for our survival to create autonomus, regional structures that are both socially and ecologically sustainable.

What is ZEGG?

The acronym ZEGG stands for Zentrum für Experimentelle Gesellschaftsgestaltung (Centre for Experimental Cultural Design). The centre was initiated in 1991, after many years of preparation by a group of committed individuals. Its origins go back to 1978 in the south of Germany. It is located 80 kilometres south-west of Berlin, on 15 hectares of land. The objective was - and still is - to create an international meeting and research centre, at which alternative models for socially and ecologically sustainable ways of life can be developed. Additionally, ZEGG has turned out to be a very diverse cultural centre, a meeting place for the entire region and a networking centre for communities and people committed to peace, ecology and the search for solutions for human coexistence.

Today, the community comprises 80 adults and children, and has undergone many changes: from an originally very homogeneous, pioneering group to a network of people engaged in a wide range of initiatives, spiritually and politically active groups, enterprises, artists and lateral thinkers. What they all share is the desire to find new social forms for intimacy and love free of jealousy and fear and for the realization of inner and outer peace.

At the core is an intentional community working to run the conference centre and to foster community life. These two goals determine how we use our land and how we structure our year. In summer, mainly, the community shares its life with many guests and a wealth of seminars and conferences take place. This is seen by the people who live at ZEGG as a political task: to freely share their ideas and experience, while at the same time being open to the outside for inspiration and exchange. In winter, the community turns its focus inwards and concentrates mainly on growing together, on deepening its internal communication, on developing itsshared vision and on various other topics of research.

The community has organised its work into separate departments responsible for the kitchen, conference organisation, childcare, garden, construction work and landscaping. To a large extent, these departments operate independently of each other. Decisions relevant to the entire community are prepared by a “council of 13" - a panel in which all of the separate departments are represented. The recommendations of this council are considered approved if no other member of the community disagrees, or if they are passed by the Plenary - the assembly of all community members. The Plenary is the highest decision making organ of the community and it makes decisions only when consensus is achieved.

To acquire its land and buildings the community set up a registered company - ZEGG Ltd. This is the legal entity which bought and owns the grounds and buildings. ZEGG Ltd. then rents dwellings to the residents, and rents accommodation to other enterprises located on the grounds. It also runs the seminar and conference business from which, along with the rents, most of ZEGG’s income is generated. All ZEGG members do voluntary work at the Conferences and Camps in order to generate a common income.

Companies and residents are individually responsible for their financial needs. Some residents are employed by ZEGG Ltd.; others work free-lance or run their own businesses located within the ZEGG grounds or elsewhere.

The community gathers together in a multitude of forms for various activities and purposes - at “Sunday Matinees” for mental or spiritual inspiration, at the “Plenary” for exchanging information and making decisions, for seasonal festivities, music, and art events, for dancing, sauna, and philosophical excursions, shared kitchen and meals and for working together. A most important form of meeting each other is the Forum - a ritualised and highly creative form of communication practised by our community. The Forum provides a space in which thoughts, emotions and motivations may be shown and shared. It promotes transparency in the areas of love and relationship, and insight into the power and decision-making structures presently at work. For us, the Forum is an essential component in the development of self-knowledge, and in creating trust and confidence in a community.

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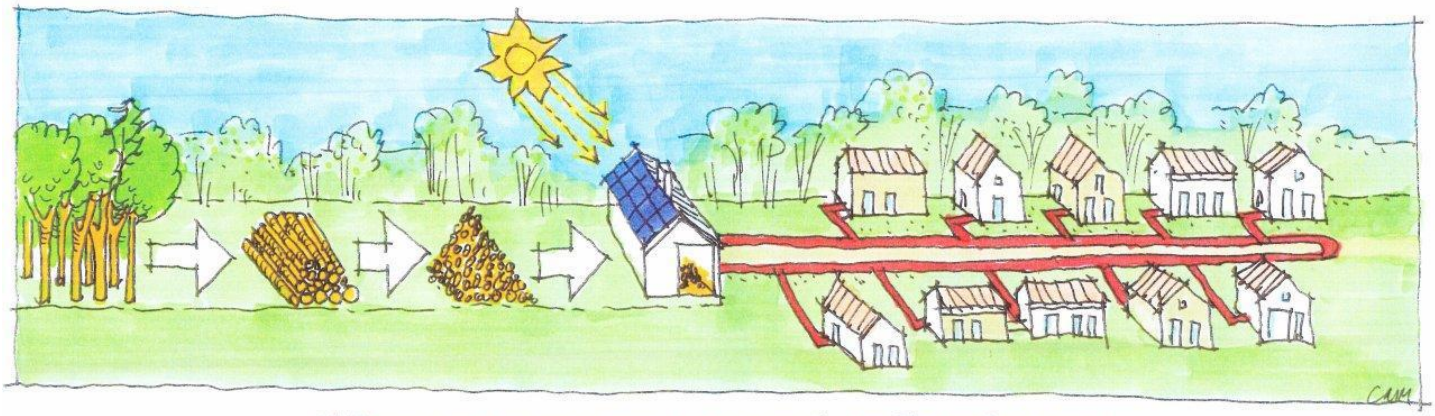
New Energy Plan for ZEGG



Wärmeerzeugung aus regenerativen Energieträgern

A new **energy plan** is being **implemented by ZEGG GmbH** after it decommissioned the old biomass heating system which had served the community well for its first 20 years on the Bad Belzig site. The new plan is based around a new solar-assisted biomass heating plant with the following components:

- **240m² thermal solar plant**
- **a new woodchip storage hall**
- **a new woodchip-fired boiler with 500kW heat output**
- **a log-fired boiler with 350kW heat output**
- **3 combined heat and power (cogeneration) plants, which have already been installed in the basement of the Restaurant building, delivering both heat and electricity**

In addition to the CHPs, some ZEGG residents have joined forces to install and operate a photovoltaic solar power plant with a rating of c. 29 kWp.
This energy mix means that 86% of ZEGG's thermal energy requirements will be met from regenerative sources.

The combined heat and power plants produce electrical energy in a CO2-friendly way because the excess thermal energy produced by the power generation is used directly for heating water and buildings. This leads to CO2 savings of 66,000 kg per year!
The combination of CHP and PV power plants meets more than 87% of ZEGG's electricity demand.

ZEGG GmbH is also completely renewing the site heating network. The deteriorating condition of the pipes had led to heat losses of up to 15% (c. 150kW), which will now be reduced to around 4%. Reducing energy losses through insulation and renewal is as important as building new plants and converting to regional regenerative sources: after all, the energy lost could be used to heat around 20 modern detached houses. For this reason, the existing buildings on the ZEGG site are also being insulated. At the rate of one building per year, full thermal installation is applied, including work on the facades, windows, roofs and floors. The measures being taken to implement the energy plan make significant construction and groundwork necessary around the site. In spite of this, the community is making every effort to ensure that its guests still have an enjoyable and comfortable stay, for example, by building bridges over any open pipe trenches. However, we do apologise for any unavoidable inconveniences and thank you for your patience.

These investments ensure that ZEGG GmbH continues to be a trailblazer when it comes to the use of renewable and regional energy sources. The previous woodchip-fired boiler had an output of 850kW, so it is being fully replaced by the new boilers. It had been visited by some 1000 people from universities and other institutes of higher education as well as politicians since it was a pioneering example of its kind – the first woodchip boiler in its output class (over 100kW) to be installed in the German federal state of Brandenburg.
The implementation of the new energy plan is being supported by the promotional bank of the state of Brandenburg ILB and the German development bank KfW. The financing bank is the Berliner Volksbank.
The consulting engineers are IG Schiller & Drobka mbH from Bad Belzig. They are active throughout Germany as specialists for regenerative energy systems and water recycling systems.