

Raised beds and ridges

By Sepp Holzer

This alternative form of farming that is of great importance in my kind of permaculture can be implemented anywhere on earth, especially in exposed areas where it can be connected with terrace and platform farming. This type of farming has also proved particularly successful even in the tropics.

Allow me to describe some personal experiences. For many years, taking potato furrows as a basis, I have created smaller and larger raised beds. Based on my own personal feelings I included various materials such as dry leaves, straw and branches in these raised beds. I always achieved results and success, so that I conducted ever more new experiments. I pushed ahead with raised beds into the spruce forests and cultivated the poorest soils. Even at these so-called boundary locations I was still able to grow attractive cultures on ridge beds.

Initially I shredded the branches and trees before mixing them under the soil. I did it like this. Using an excavator I drew furrows about 0.5 to 1m deep in the forest soil and placed the grass turf with the chopped material in this. Then the bed was covered with fine soil material if this was available. Any stones were placed on the raised bed, since they regulate heat and moisture. Water of condensation forms under the stones and this is where the worms make their home. Worms help to convert the rotting inner material and thus bring nutrients to the plants.

I created raised beds in this way and farmed them successfully for many years.

Quite by chance I have now modified this practice. One day we had an excavator on the farm to excavate the bed foundations. My wife and I were shredding brushwood and spruce trees with the tractor, which the excavator was then to bury. Since the large machine was working faster than Vroni and I, we were under pressure of time with our chopping and shredding. Finally I said to the excavator operator who was waiting impatiently that he should bury the whole shrubs and trees. It wouldn't be so bad if the few beds still awaiting completion were not shaped as nicely as the others. Enough said! The entire arrangement was then planted and seeds were sown in the same way.

Already in the course of the summer I ascertained that the vegetation on the raised beds that were about half a meter higher than the others, in other words the beds containing the whole spruce trees with a trunk diameter of 20 to 25 cm, was flourishing more than on the other beds.

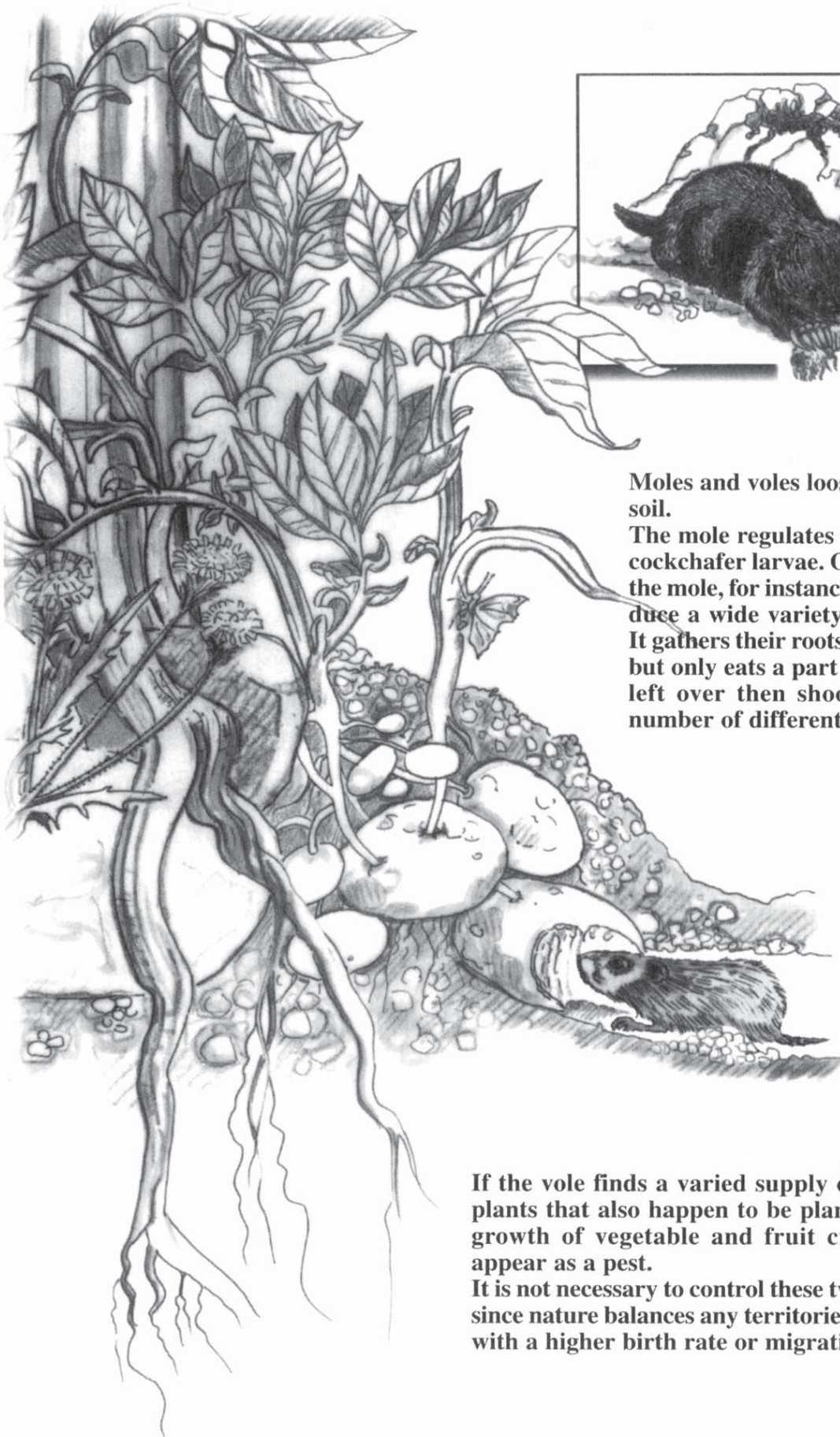
When it came to the harvest in autumn I was able to harvest considerably more potatoes and vegetables from these raised beds than from the others. I soon found out why this was the case. The earth was much looser in the beds with the whole trees or trunks, which resulted in better growth.

If conventional beds are not created carefully and if the chopped material is compacted too much, then the bio-substance acidifies, since it does not receive enough air. This doesn't happen as easily when whole trunks or trees are buried. The whole trees with their branches move comparatively more strongly in the bed, since they warp as a result of dryness and moisture. The swelling and shrinking of the branches create movement and this loosens the soil.

I also placed homemade worm substrate in the beds. This contains various kinds of worms with soil and worm eggs. The different kinds of worms process the soil and make the natural nutrients accessible for the plants.

Microclimate zones can be created in terrace farming with raised beds. However the beds must be set out against the wind, and solar radiation must be used to the full. The capillary effect of the raised beds and terraces balances the moisture. So nothing can dry out, but nothing can drown either. This can be of great advantage in plane areas subject to flooding.

Important workers



Moles and voles loosen and drain the soil.

The mole regulates the population of cockchafer larvae. One of the tasks of the mole, for instance, is to help reproduce a wide variety of plant species. It gathers their roots as a winter store, but only eats a part of them. The bits left over then shoot up again in a number of different places.

If the vole finds a varied supply of suitable forage plants that also happen to be plants promoting the growth of vegetable and fruit crops, it does not appear as a pest.

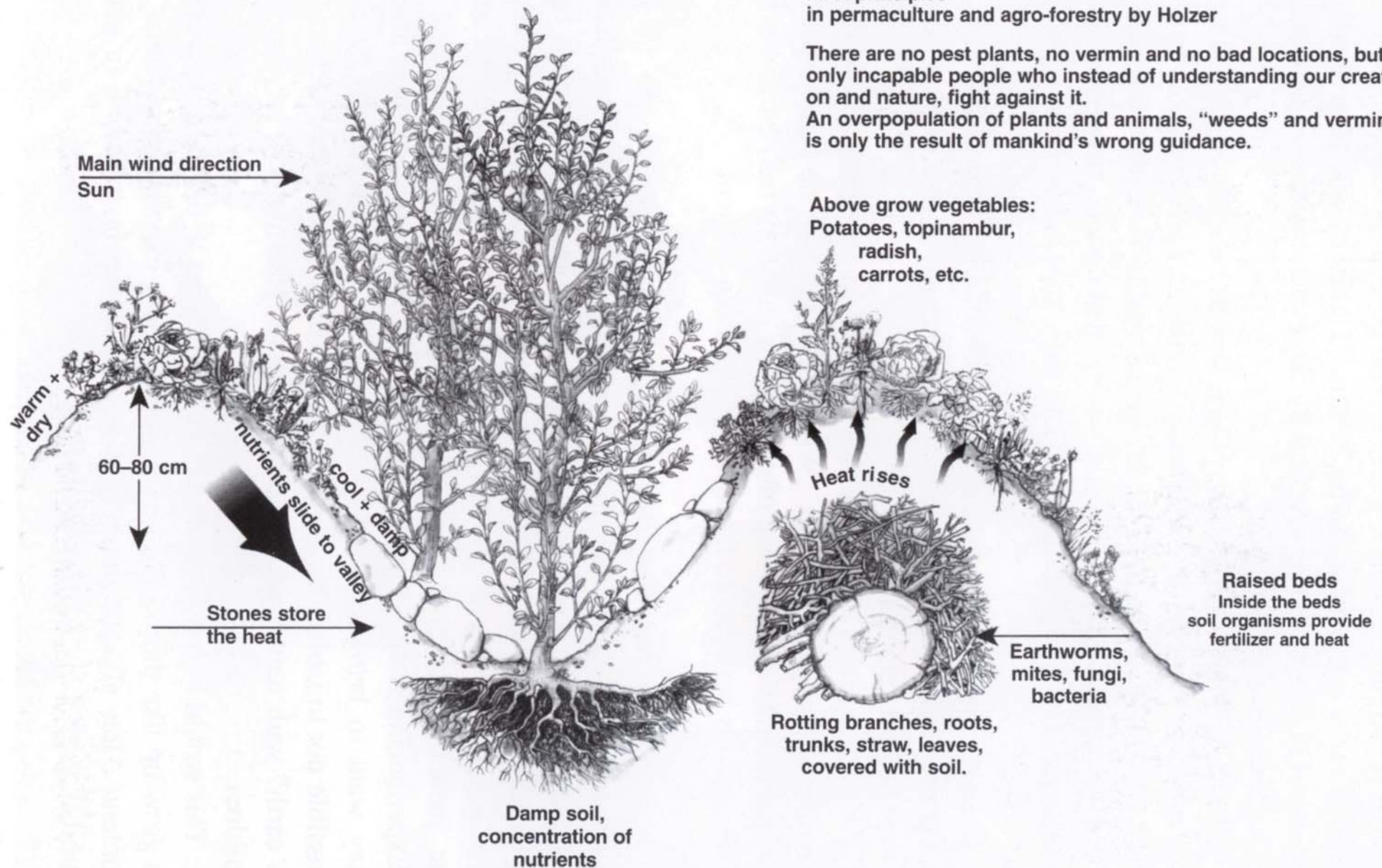
It is not necessary to control these two animal species, since nature balances any territories that become free with a higher birth rate or migration.

Holzer's methods of gardening and cultivation

First principles
in permaculture and agro-forestry by Holzer

There are no pest plants, no vermin and no bad locations, but only incapable people who instead of understanding our creation and nature, fight against it.

An overpopulation of plants and animals, "weeds" and vermin, is only the result of mankind's wrong guidance.

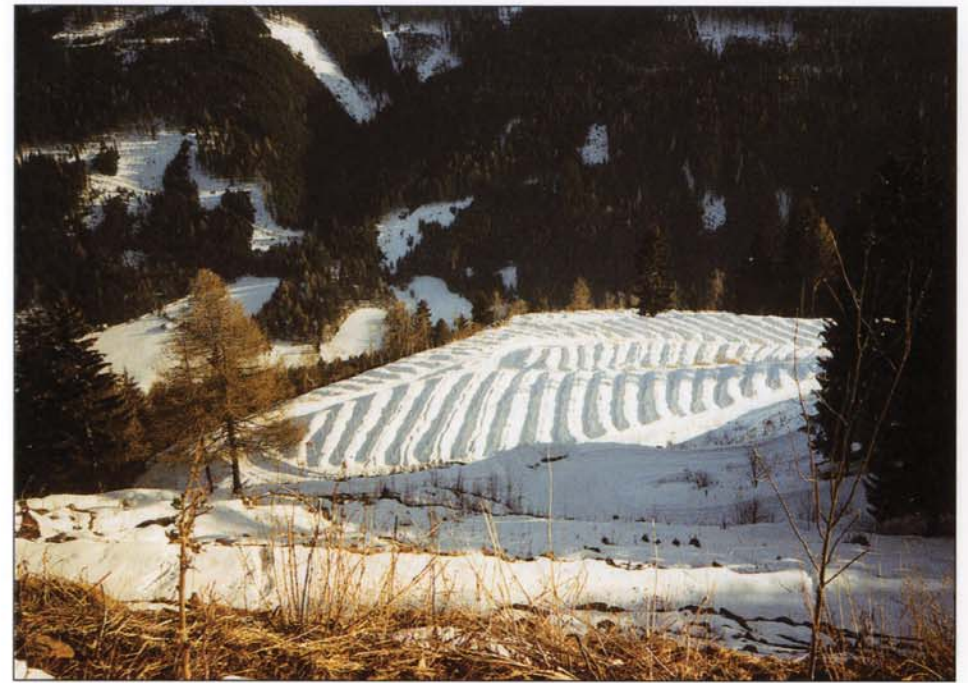




Fruit shrubs planted out in accordance with my shock method flourish particularly well especially between raised beds.



These newly created raised beds in the former spruce monocultures are used for forest grain and wild potatoe breeding.



Raised beds in winter. As a result of the constant growth, the plant symbiosis and the microclimate, the raised beds do not freeze right through. The snow additionally insulates them so that in some cases fresh vegetables such as radishes can be harvested in the raised beds on the Bärensee mountain pasture (below) in winter too.





Large vegetables grow



... between large stones.

First transplanting attempts with fruit trees

By Sepp Holzer

In my youth we grew a wide variety of crops on our farm. Oats, wheat, rye, barley, linen, as well as beans were cultivated successfully for our own use up to elevations of about 1,350 m.

However, there was one difficulty. Above all roe deer and red deer caused quite a lot of damage to the crops. We were able to defend ourselves quite well with various protective measures such as scarecrows, however. For instance we stuffed old clothes with straw and made man-sized dolls that were hung up and intended to drive off the game. We also tried to frighten off the game with small fires. Another method was to construct knocking machines that were fed with water and in which hammers regularly banged against a tin can. This noise drove off the game very successfully.

The variety of plants cultivated in those days proved to me that contrary to the opinion frequently expressed today that nothing will grow on the mountains, in fact a wide variety of plants could grow and flourish there.

On the way home from school I often roamed across meadows and through woods. One time or another this shortened my school path, but often enough looking round like this made me late. However, since work was waiting for me at home it was something of a disadvantage for me if I stayed away too long.

During my rambles across the country I discovered a lot of interesting things, such as a foxhole, an old mill building in the ditch, or a number of wild fruit trees. Wherever there are large trees, you will often find small trees, growing nearby. I found these small trees. I often dug them out and took them home to put them in my plant garden.

Once, it was nearly the end of the school year in June, I discovered a few wild apple trees. They were already about 2 m high. Since they had grown on a stone slab I could pull them out together with their roots without digging and take them home with me. I dragged the thin trees home. My mother saw me coming home, covered in sweat. She scolded me and said it was a pity about the trees since in summer they would die off because they had already got blossom and leaves.

However, this didn't disturb me. I planted the trees in my plant garden despite this. I pulled off the leaves and blossom by hand, since my mother said that the trees would die off because of this, since they had developed shoots. It was not possible for me to water them in my garden. The bed was too far away from the house and there was no water nearby. As well as I could I dug the roots into the ground and covered them with thin grass and leaves. I put stones on top so that the trees could not fall over. I had often gained positive experience with stones. A few weeks later when I thought that the trees had died off already because the young shoots had become so thin, I discovered new buds and leaves on the tree.

This experience was very important for me, since I still do my best business today with this type of planting. I buy what is left over in the tree nurseries at the end of the season in May and June at a low cost. I use the experience gained in those days, but I don't pull off the individual leaves from the many trees any more. Instead I lay the trees out briefly in the sun, but cover the roots with jute bags. This is important because naked roots do not withstand the sun at all. The leaves and blossom are completely exposed to the sun. Since the tree wants to survive by nature it quickly rejects its leaves and blossom. The trees lie in the sun for one or two days. I only plant the trees once the leaves and blossom are completely dry so that they won't flourish anymore.

Throughout this entire period I don't let a single drop of water reach the roots, since otherwise the tree won't cast off its leaves. Even after planting them I don't water the trees. Watering would make the buds and leaves shoot out much too quickly. The fibre roots could not grow into the ground fast enough to ensure continuous supply for the tree. If the tree is planted with blossom and leaves or without leaves and then watered, the old or the new blossom and leaf shoots take too much out of the tree and the trunk dries up.

However, if the leaves and blossom have fallen off and the tree is not watered, it does not use up any energy and the roots can develop further in the soil at this late time in the season and grow in well. The moisture in the soil is completely sufficient for this. If you then place stones or leaves on top, you have done the best you can for the tree.

During the last decades I have planted many thousands of trees using this method in my alternative tree nursery and sold them later for a good price. This example shows how important practical experience is in dealing with plants. In other words what my mother reproached me with quite unintentionally as stupidity in those days was to be the foundation for my subsequent success.

Training as fruit tree attendant

By Sepp Holzer

After the agricultural vocational school I was trained as a fruit tree attendant at the Agricultural College Winklhof near Salzburg. During this training we learned about all fruit varieties, bushes and tree forms. We were taught grafting, fertilizing, pruning, spraying, as well as poisoning and fumigating voles and other undesirable animals. On completing this training I was given a poison license entitling me to procure the strongest poisons.

Following this technical training I naturally wanted to translate what I had learned into practice and began to "clear up" in my plant gardens. First of all I cut the trees down to size, then I fertilized and sprayed them with appropriate quantities of the right agent, and finally I caught, poisoned and fumigated the voles so that the desired orderliness and regularity I had learned prevailed in my gardens too.

Just one year later I suffered great losses and damage in my plant gardens. Initially I couldn't understand the reasons for this and spent a long time wondering what had happened. My discussions with experts, reading up on the subject in textbooks and other investigations revealed that it must be the altitude that prevented me from farming successfully along these principles.

However, I didn't find this answer satisfactory. I could not accept it, since in the meantime customers for whom I worked were also contacting me. They too had suddenly suffered damage similar to mine, in other words chilblains, frost cracks, as well as total losses.

The situation became worse as time went on and I developed a feeling of complete insecurity. Should I give up my farming as a result of this failure? I considered this over and over again and wanted to find better answers than those given by the experts. After all, before that I had been extremely successful with my plant gardens from childhood on.

By precise observations in every free moment - and with the aid of chance too - I noticed that I had spared some of the trees I had planted from this radical cure. I had simply overlooked them. Some of the customers whom I had not managed to visit to regiment their gardens with the methods learned also informed me that everything was in good shape and that the plants were flourishing optimally.

This gave me food for thought. By and by I drew my own conclusions. Since I generally dream very intensively, I had a few thoughts on the subject while asleep too.

In such situations when I am seeking assistance or advice I find it helps to put myself in the position of my protagonist.

Let me describe an example. I see a blossoming plant that normally blossoms dark red, but has a subdued colour and looks ill. A little further on I see another such plant, but this time with strong and deep red blossoms, growing luxuriantly. Now I examine the two locations precisely and look at every detail. Among what other plants is the sick plant growing, and what surrounds the healthy plant? I generally don't need to look much further. What I can see here is like reading a written report. I merely have to know the plants. Looking at the sick flowering plant I will discover that it is not being supplied with the right quantity of nitrogen. Furthermore it is suffering from potassium and phosphorous deficits, since these elements are responsible for forming the colour. The nitrogen is responsible for growth.

So there are probably only a few grasses, or perhaps only shallow-rooting plants round the sick plant. The healthy plant with the strong colouring will certainly be in the midst of pulses (plants from the papilionaceae/legume family), perhaps a comfrey, viper grass or nettles, to name but a few of the positive neighbouring plants. They supply this flowering plant with sufficient nitrogen, potassium and phosphorous. The pulses bind the atmospheric nitrogen and eliminate it through the nodule bacteria in their roots into the soil. Comfrey, viper grass and nettles sweat their nutrients out through their leaves and these ultimately reach the roots of the flowering plant through dew and rain. Their roots also eliminate nutrients.

A further important task of this healthy plant symbiosis is fulfilled by soil beings. There will be hardly any soil life around the sick flower, while we can ascertain a variety of soil dwellers around the healthy plant. What is important therefore, is to observe correctly and read the book of nature. There are no mistakes in this book, while the coloured brochures I took home from the vocational school and from the fruit tree attendant school showed utterly contrary knowledge that did not help me any further.

Something else became clear to me. Using artificial fertilizers for fruit trees resulted in greater growth. After the trees were pruned many secondary shoots developed which naturally had to be pruned. The cambium, in other words the growth layer beneath the bark, was driven to excessive growth by the fertilizer. This meant that the plants could not adjust sufficiently to the climatic conditions and suffered great frost damage or froze completely during the winter.

My own experience and the findings described persuaded me to move away from what I had learned at school again and to return to my proven method. I should like to explain with the aid of a further example how my experience differed greatly from teaching opinions. At school we combated voles and moles with poison and gas. However, I tried to use these animals as „assistants“. Both animal species loosen and drain the soil and are also useful for fighting off pests, as well as in the reproduction of certain plant varieties (see diagram, page 62).

Regulating varieties in agriculture generally and in fruit growing specifically involves massive disadvantages. The modern select breed varieties are not suitable for our altitudes. However, the old cultured and wild forms are much less demanding, more robust, and more valuable as regards their contents too. These old varieties hold their own at rough, high altitudes as well. Above all the seedlings developing naturally grow strongly and have strong branch formation already from the soil. This makes them more resistant to game damage. If I leave the natural branch formations on my trees, in other words if I do not prune them, they can also develop in extreme slope positions. If the branches are heavy with fruit or if there are heavy snow loads, the branches can support themselves on the ground on the hill and valley sides. Mice, hares, stags and deer are able to nibble at these projecting branches and thus do not harm the main trunk.

Pruning the trees is superfluous for the following reason too. Since the branches drop due to the heavy fruit load, the tree crown receives sufficient light and sun. It stabilizes itself with the branches supporting themselves on the ground. The formation of secondary shoots is also stopped since the long leader and fruit branches with heavy fruit yields guide off the energy flow. Thanks to appropriate plant symbioses the fruit trees are optimally provided with nutrients and moisture.

At the Tamsweg College of Agriculture I also attended an explosives course for crop blasting work. I naturally applied what I had learned on my own farm first of all.

After being issued with an explosives license I was allowed to buy various explosive agents and could thus carry out blasting for many other farmers in the Lungau district too. Above all we blasted the allegedly disadvantageous stones and rocks that inhibited the use of machines out of fields and meadows. There were very good agricultural grants for this too.

However, we soon found out that as a result of the natural weather effects several terrain corrections became necessary. Ever more rocks and stones came to the surface, which in the aftermath made this work appear not so cost-effective after all. It was by no means uncommon for a hidden tip of a rock to damage tires, mower blades or ploughshares. The fact that blasting away the rocks and stones also involved negative consequences for nature only became clear to me later.

Fruit trees ...

... conventional farming



Pruning the trees causes unnecessary stress for the tree and energy output for humans. It results in increased danger of branches breaking due to the weight of snow and fruit, since there is no longer any spring action. Moreover the tree has to be supported with a post when planted. The surplus energy results in strong sprouting of watershoots.

... taking natural cycles into account



If the natural branch development is left the tree is well stabilized, even on mountain slopes. The branches burdened with snow or fruit can support themselves on the ground on both the hill side and the valley side. Co-inhabitants (mice, hares, deer, stags) can nibble at projecting branches and so they don't harm the main trunk at all! Pruning the trees is superfluous, since as the boughs bend with the weight of the fruit enough light and sun can reach the crown of the tree.

Watershoots don't sprout because the long main and fruit branches with their high fruit yield absorb the flow of energy, preventing the development of watershoots. Using plant symbioses it is possible to achieve optimal nutrient and moisture supplies for the fruit trees.

Conventional method

Holzer's method



Creating bales with net/fencing causes a lot of work.

The tree has to be supported since the round bale in the middle remains movable (wind/snow pressure / fruit weight).

Cut out the bale in a triangular form and place on the soil or plant it only at the depth necessary. The plant community reinforces the root bale. Thanks to this plate form of the bale, the tree stabilizes itself.

This reduces the work input, since the net, the fencing and the support pole are no longer needed.