

Trees - fundamental to life on Earth

Reprinted from the Men of The Trees internet web site <MenOfTheTrees.com.au>

Richard St Barbe Baker 1889-1982 was the most practical and visionary forester the world has ever known. Through his efforts alone millions of people have come to plant hundreds of millions of trees. He was the founder of the world wide organisation 'Men of The Trees'. In 1979 he visited Perth in Western Australia and founded a branch of the movement here. This branch continues his work being responsible for the planting of upwards of 800,000 trees every year.

'St Barbe' strove throughout his long life to help people of all countries to understand the importance of trees and forests. Let's look at what he considered to be the seven most important functions of trees. His words are quoted in italics.

Our long prehistory

"Trees worked for millions of years to make it possible for human kind to live on this planet"

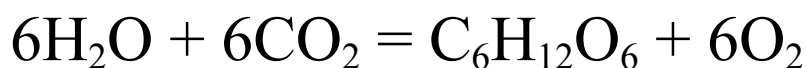
That is so, for if you think about it we cannot live in a desert, or on an ice cap, or even at sea, unless we have air to breathe which has been refreshed by trees, water to drink which has been transpired by trees, and food to eat which has been grown in a soil built up by trees.

Oxygen – our first need

"The most important product of a forest is air – oxygen. We live less than five minutes without air. So I regard oxygen as the primary product of a forest"

We take for granted the most precious components of our biosphere which are fundamental to life. How much better it is to breathe country air than the heavily burdened air of a city. I wonder how much effect good clean air has on our mental well being. Let's appreciate how much clearer our thinking is, how much more at peace and at our creative best, when our lungs are filled with tree-purified air. Even in a city our planners realise how important it is to have parks. How popular they are for people taking a short break from their air-conditioned offices or shops!

A tree converts our foul air, our carbon dioxide (CO₂), into oxygen for us to breathe and 'carbohydrates', sugar-like substances, which are the basic building blocks of the wood of the tree itself. The chemical equation goes something like this:



water + carbon dioxide carbohydrate + oxygen

But the magic ingredient, which doesn't appear in the formula, is chlorophyll which gives the green colour to leaves. This complex substance that we call an enzyme, enables the tree to utilise the sun's rays which provide the solar energy to make it all happen.

Of course we all need oxygen to breathe, and we all desperately need oxygen to run our cars and power stations. So you can see how important it is to plant trees and conserve them. Men of The Trees offer a service to all motorists and other energy users called CARBON NEUTRAL to help us all contribute to getting the balance right. To learn more go back to the Home Page and click on the CARBON NEUTRAL button.

All life depends upon the water cycle

"After Oxygen comes water. Trees are absolutely essential in the water cycle. We live less than five days without water so I would put that as number two"

As forests of the world have retreated so has the rainfall. The great Sahara Desert reveals many places where woodlands once flourished, all that remains now are the fossilised stumps of once great trees. As the Amazon basin is cleared the rainfall that sustained this tropical jungle is declining. Australia, too, is experiencing far more drought years than were recorded 50, 80 or 100 years ago, and we also must accept that we have cleared three quarters of the forests and woodlands that once covered our continent in order to make room for farming.

It has also been recorded that trees will actually 'rain' on the ground beneath. Rain gauges set up in forests, and also in small clearings in the same forest, can demonstrate that two to three times the precipitation (falling water drops) occurs under the trees themselves. I have stood under trees on a cattle ranch in California in June, at 9.30 in the morning with a blue sky above and been rained upon! In fact I even captured the event on videotape.

Trees not only draw down rain and create a water cycle within their own canopy; they also maintain a water balance within their root zone. Trees close down their stomata (tiny breathing holes in their leaves) to limit transpiration when under stress, opening up and transpiring freely when soil moisture justifies it.

Without soil to grow food we starve

"And number three is food. We live less than five weeks without food, and trees are absolutely essential in creating the biological conditions necessary for the production of food."

Without soil there can be no plants, and without plants there is no food, neither for domestic or wild animals, nor for humans. Soil is the most misunderstood and neglected gift on the surface of our planet. Soil is so complex that it would be better to consider it as a 'process' rather than as a mineral or mineral/humus mixture.

Broadly considered a good fertile soil (and it is worthless to consider anything less) consists of approximately 40% minerals, 5% humus, 25% moisture, and 30% air. The balance is critical because soil is teeming with life and all living organisms need air, moisture and food. It has been calculated that there is so much life in soil that the total of all that lives below ground is five times the mass of all that lives above. Sadly we poor humans who really only

see what is above ground tend to neglect, even to count as worthless, all creatures who live in the dark world of our planet.

If one could enter the soil as an earth worm, or preferably something much smaller, one would recognise it as a vast city extending throughout the whole of the countryside. It is a city of multi storey apartments, great labyrinths of passages connecting every level from the atmosphere at the surface down to bed rock, storehouses of dead organic materials being processed by hordes of living organisms, fungi, bacteria, slaters and tiny creatures called mesofauna which are only just visible under a magnifying glass. It would take a book and a half to describe everything that goes on underground. But suffice to say that without all this activity there could be no life at the surface, no plants, no food and no people.

What does more than anything else to nurture this wonderful soil is the activity of trees and their roots. Remember that trees are constantly drawing CO₂ out of the atmosphere and through the process called photosynthesis they are producing carbohydrates from which complex organic compounds are built up. These organic compounds not only allow the tree to grow upwards, they also build a vast root system which spreads throughout the ground searching for mineral nutrients, moisture and air. (Yes, trees breathe through their roots and will drown if you subject them to long term flooding). Fine root hairs thread their way outwards in an endless exploration. As each root hair exhausts the nutrient in its cluster of soil molecules it dies and is shed, much like our own skin is constantly flaking away and new skin takes its place. As each root hair dies it leaves more nutrient to be recycled and also its tiny passage way which allows air and moisture to supply the organisms of decay.

You can now see why soil is really a process. Its a process we can destroy through chemicals and toxins, through flooding, through allowing salt to come up into the landscape, and through too much mechanical digging and compacting. But the fastest way to put soil into decline is to clear away perennial vegetation, trees and shrubs. When we do clear the land for agriculture we must always bear in mind the terrible grief we have inflicted on that enormous mass of soil organisms and very thoughtfully do whatever we can to care for them.

Erosion takes our soil away for ever

“The fourth product of a forest could be to prevent accelerated erosion”

Before the Amazon forest was cleared it was estimated that the amount of soil loss was about 300 grams per hectare per year. Today the loss is close to 10 tonnes per hectare per year. And the same can be said for every river in the world where forests have been cleared to make way for agriculture on the river catchments. Fly over any river estuary during the rainy season and you will see extensive plumes of turbidity, muddy water extending far out to sea. That is all precious soil lost for ever. And it is easily visible from space. Today we are far more clever. farmers work together in catchment groups planting trees to reduce water run off. But you will still find many examples of gully erosion and especially sheet erosion where heavy rains simply run straight off the surface of non-wetting soils sweeping precious surface organic matter before them.

“You could double your crops if you put 22% of the land back to trees. You would take away 22% of the land but you would grow double the crops on what is left. This is being done in Alberta, Canada”

Another major problem is wind erosion. Australia's soils are very prone to blow. This is particularly so in late summer when crop land has dried out, when sheep have grazed down the stubble even to the point of pulling out the last dead roots that might have held onto the soil. Again farmers have become aware of the value of trees to create long windbreaks across the line of the most fearsome winds. A well established triple line windbreak will protect the land ten times its own height downwind. Furthermore, windbreaks help growing crops. By cutting the speed of the wind the tender leaf of an emerging crop is protected from drying out and from being shredded. This means that the plant can put much more energy into producing its harvest.

Maintaining an ideal temperature for all forms of life

“A fifth product of the forest could be temperature. The only scientist who seems to have paid very much attention to temperature is the physician. Now if your doctor finds you have a temperature he does something about it pretty quickly. But not so the farmer or the forester. But its just as important for him to know the normal temperature of that part of the farm or that particular forest because if you don't have the normal temperature you can't get the proper production”

It goes without saying that on a hot day we always aim to park our car under a tree. How logical to extend this simple observation to every other situation. Our homes would be much cooler in summer with shady trees to cool and moisturise the surrounding air. In fact trees are the original air conditioners!

We have seen how important it is to look after the soil, that 'process' beneath our feet which is teeming with living organisms. Think of their comfort. You only have to walk bare foot a few steps on sand under a sunny sky to realise we are subjecting them to thoroughly unacceptable conditions when we remove tree cover. So run back quickly under a tree and let your feet tell you how important it is to keep soil shaded. When Richard St Barbe Baker spoke of 'production' he was of course referring to the comfort of that vast army of soil organisms; fungi, protozoa, bacteria, algae, and all the bigger micro-beasts upon which all plants depend for healthy growth and fat harvests.

'Biodiversity' a new word in our vocabulary of ethical behaviour

“The sixth thing could be the balance of nature and all the flora and fauna in the forest, which is very fragile. And if you upset the balance of a natural forest you upset all those things”

If there is one thing we are becoming aware of it is this fact we call biodiversity and the importance of maintaining it. Every part of the planet, every region of Western Australia, and even every little grove within every region has its own special mix of trees, shrubs, herbs and grasses. And living in that little region are just the right number and species of 'animals' whether they be birds, mammals, reptiles or invertebrates. We take the first step in recreating the conditions for biodiversity when we collect seed only from within or near that site from which to propagate our trees and other perennials for rehabilitation. Botanists would be hard pressed to define a Jarrah tree from Nannup as distinct from a Jarrah tree from Mundaring.

But naturalists accept that site specific adaptations have occurred over thousands of years and that only truly indigenous plants should occupy their hereditary home.

Timber – the least of the tree’s gifts

“And the next product of the forest is lumber, timber, so it’s way down the list, seventh”

It is a sad reflection on our age that we put so much of our thinking and action into ‘bottom line accounting’. This means that we first consider the worth of a tree in monetary terms. Of course trees are the only source of timber. Timber is the most widely utilised raw material on this planet. Richard St Barbe Baker had a list of over 4,000 products all produced from trees. But not one of them is as valuable as the first six on this list!

Of course we need timber and it is right that we should grow it as a crop rather than cut it from the wild. Well planned plantations are a forester’s delight and we can take pride in the fact that every hectare of plantation grown timber saves cutting at least 10 hectares of native forest. What is essential is that we must adjust our profit horizons. Trees need many years to grow. The best timber often takes longer, and we must not hurry the process but instead establish a plantation forestry industry that will demonstrably meet all our needs beyond the second and third rotation.

A final word about peace

a meeting in Lesmurdie in September 1980 Richard St Barbe Baker related this story about how Mau Mau terrorism had skirted the lands that were planted to forest by the first Men of The Trees in 1922. Chief Josiah Njonjo, welcomed to England for the Coronation of Her Majesty Queen Elizabeth II was asked about Mau Mau terrorism by the press:

“Well, that is a long story,” he said. “I am no politician but I can tell you this, that in my district we had no trouble at all.”

”And how do you account for that, Chief?”

“Well, you see, over thirty years ago an English Forester came out. he taught us how to protect our native forest and plant native trees. We kept the promise made to him over thirty years. We have had plenty of timber, plenty of fuel, plenty of water, plenty of food. No trouble!”

He had proved in a microcosm among the Kikuyu in Africa what could happen all over the world, if only people would attend to their land by planting trees and protecting their indigenous forest.

Barrie Oldfield