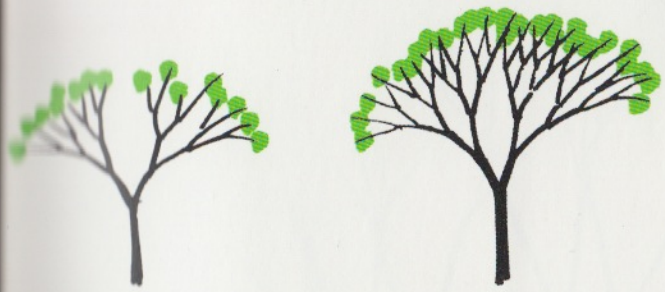
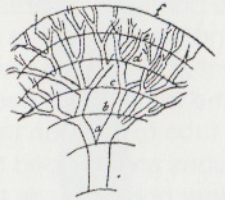
At last winter is finished and, from the ground where a seed has dropped, a vertical green blade appears. The sun starts to make itself felt and the green shoots grow. It is a tree, but so small no one recognizes it yet. Little by little it grows though. It begins to branch, buds germinate on its branches, other branches spring from the buds, other leaves from the branches, and so on. A few years later, that green blade will have become a fine trunk covered in boughs. Later still, it will have produced wide branches which will produce leaves, blossoms and fruit. In autumn it will spread its seeds around, and some will fall beneath it while others will be carried far away by the wind. Almost everywhere a seed falls, a new tree will grow.



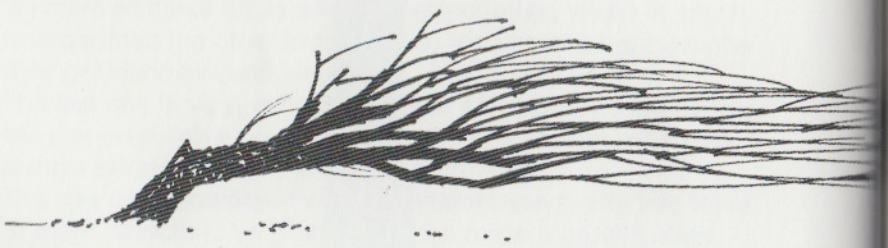


One of my very old friends from the country, a certain Leonardo, born in a small village near Florence, Vinci (postal code 50059), was a very curious fellow. He would spend hours observing the plants, and then he would draw them and note down everything he could about how they branch and other things. Above this passage you will find one of his drawings showing how branching works.
This Leonardo knew lots of things not only about plants but about everything that surrounded him, in fact he even invented things that didn't surround him such as the helicopter. He knew how to change the course of a river, how the organs of the human body work. He even knew how to draw: one of his paintings, small but famous, is in a big museum in Paris.

The tree spreads its branches and, as the years go by, its trunk gets bigger and bigger and the branches more and more numerous. Every leaf at the top of the branches has a tube that goes through the trunk which keeps it in contact with the ground. It uses the tube to suck up its nourishment. The trunk is where all these tubes are grouped together, which is why it is larger than the other branches: as the branches grow higher they get slenderer and slenderer.
The last one is very, very slender and carries only a few leaves. We can establish a rule of growth: the branch that follows is always slenderer than the one that precedes it.
The tree can separate in various different ways, into two three or more branches. Let's see if we can make a growth chart of a tree with two branches. It will always be a double growth: the trunk divides into two limbs, each limb will continue to divide into two, getting smaller and smaller.

the branch that follows is always slenderer than the one before it

This growth pattern is so simple that anyone can draw it. Let's draw it then, even though we know it's a pattern and that it will be difficult to find such a perfectly drawn tree in nature. To grow so exactly, a tree would have to live in a place where there was no wind and with the sun always high in the sky, with the rain always the same and with constant nourishment from the ground all the time.
There would have to be no lightning flashes nor even any sharp changes in temperature, no snow or frost, never too hot or dry...
But in reality we know that these weather conditions do not exist, so our pattern changes, it adapts and looks different. But if you look carefully you can still see it.



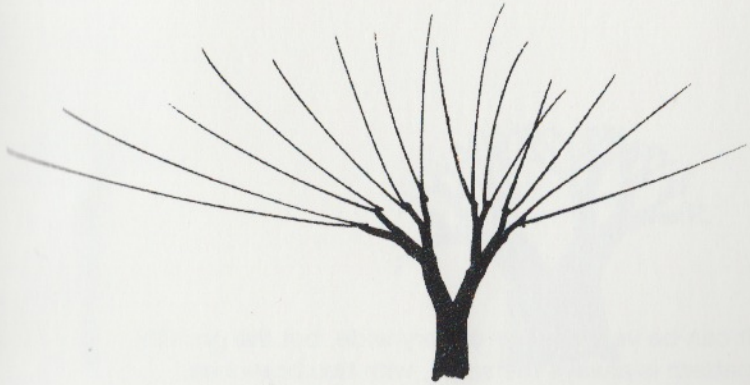
If there's always a lot of wind like at the seaside,

If it's windy the tree grows like this.

If there's a strong wind, more often it grows like this.

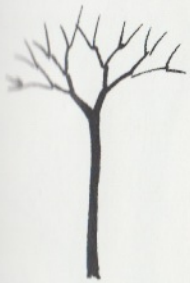
the tree becomes like this. But the structure is always the same.

The same pattern can have a very long trunk and short branches. It can have a short trunk and long branches. It can have a short trunk with long second branches and the others short. It can be normal and only have long end branches.



It can have only very long and curved end branches.

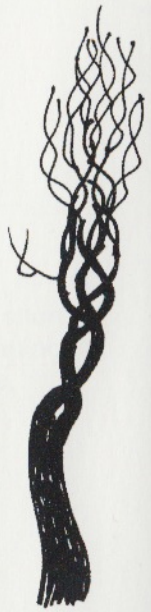
It can be very slender or very wide, but the growth pattern is always the same, with two branches.



We can also say that the branches do not always grow in a fan shape, sometimes they all point straight up, other times they are very open. Sometimes some of the branches go straight up and others go where they want. But the pattern is always the same.

Sometimes a branch grows long and another grows short, although the pattern stays the same the branches can point in different directions. They seems like different trees, but if you look carefully...

The same pattern can be drawn with curved, wavy or sharp-moving lines. So far we've used straight lines, but now the same pattern gives us fresh pictures of different trees: one snakes upwards, another closes in on itself, one expands into space until it touches the ground with the smallest branches.

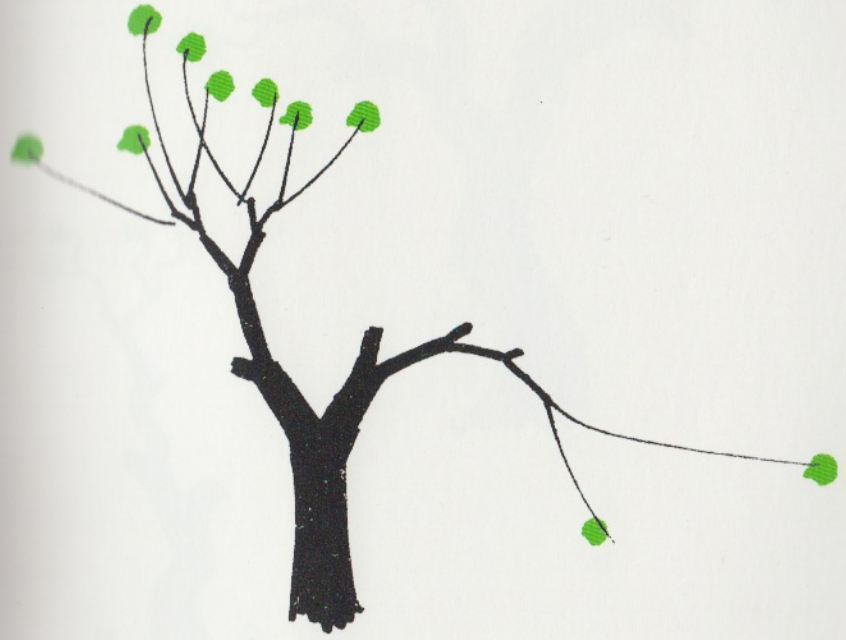


The same pattern can also have branches pointing downwards, like the weeping willow. Or you can draw a tree with a dual growth, where the branches go wherever they want: some go straight up, some bend this way and that, some turn backwards, some escape.

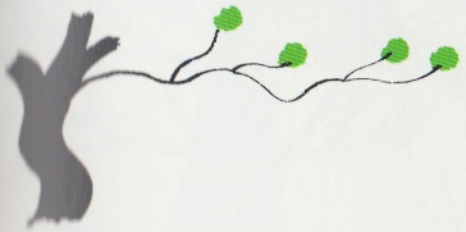
But there's another fact to consider when you draw a tree. The fact is that there are the mad branches too, like in nearly all families. So here's a thin branch emerging from the trunk like an April fool. Small branches can spring out from all over the place and cover the tree. But if you look carefully, you can still see the principal branching pattern.

Here we are at the point where the sky turns dark and a real and proper storm comes, the tree waves frantically in the wind, as if it were afraid. A flash of lightning from the almost black sky hits the tree and disappears in a blaze of light. Through the heavy rain you can see a part of the tree on the ground, a big limb with its smaller branches. All you can hear is the sound of the heavy rain on the leaves.
The next year the tree is different, wounded. New branches still shoot out though, as if nothing has happened. This is how trees change shape: a flash of lightning, the weight of the snow on the branches, insects that gnaw at the wood... and the tree changes shape.

Here are some hurt and wounded trees that seem different, but if you look attentively you can still see part of their structure.

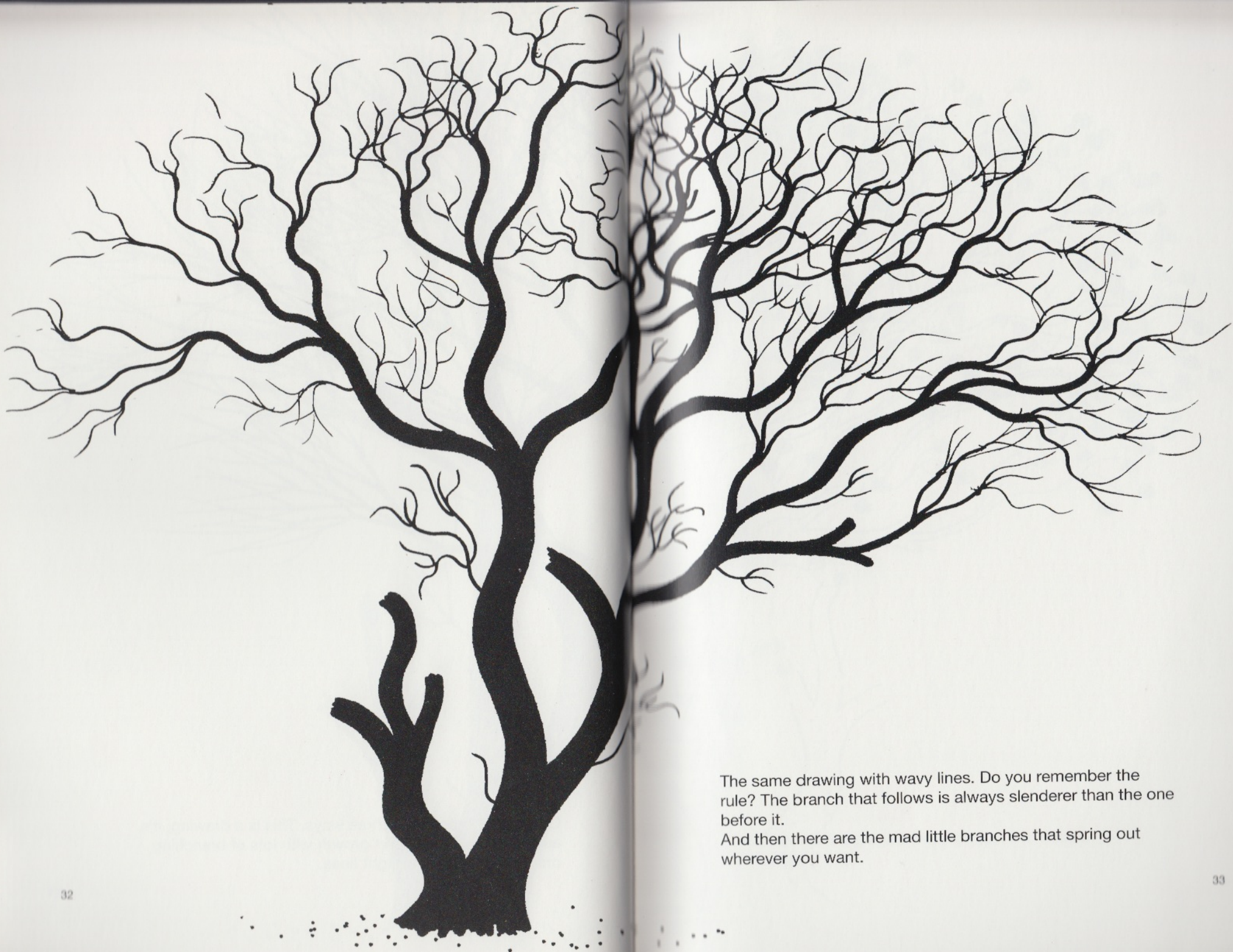


Drawn with wavy lines, they become like this.



Here are two trees with mad branches: one with the branches pointing downwards, one with them going up.

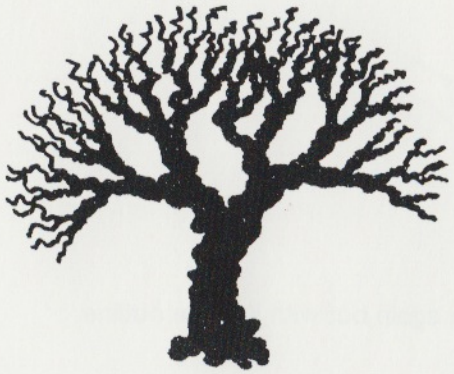
Other trees branch out three ways. This is a drawing, it's easy now, of a three-part growth with lots of branching drawn with almost straight lines.



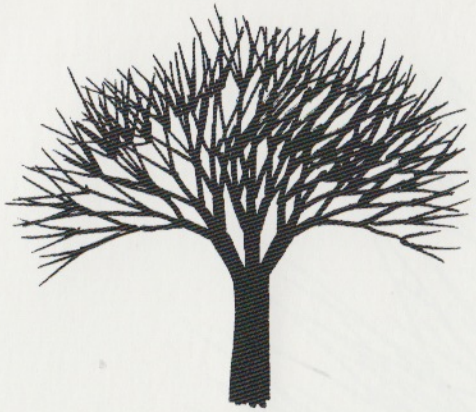
The same drawing with wavy lines. Do you remember the rule? The branch that follows is always slenderer than the one before it.
And then there are the mad little branches that spring out wherever you want.

The same drawing again but with just the outline of the branching.

More variations of trees with dual branching.



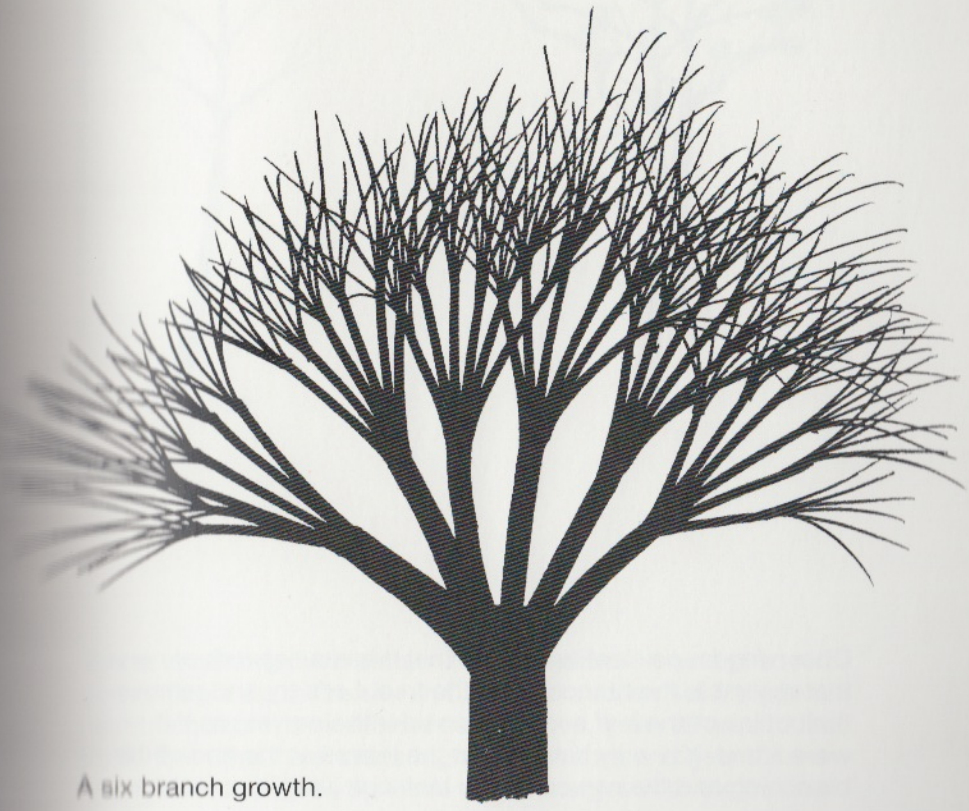
A tree drawn with almost straight lines, with nine branches one behind the other in dual branching.



Other trees extend out into different numbers of branches. The oleander has three, the aucuba four... find out for yourselves by observing the trees you come across. Remember that the branching is never perfect, that distances and times change?

Four branch growth.

Five branch growth.



A six branch growth.

Observing an oak leaf we notice that it has a network of nerves that resemble the branching of the tree. Let's try and remove the outline of the leaf and just consider the nerves, as if it were a tree. You only have to put the leaves at the end of the branching and the nerves on the leaf look just like a real tree.

the branch that follows is always slenderer than the one before it

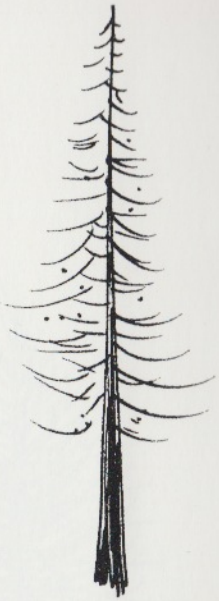
This is another growth pattern found in plants: a central trunk goes straight up to the sky and lots of branches, a bit bigger near the bottom, a bit thinner near the top, grow all around the trunk. Even the trunk starts big at the bottom and gets thinner and thinner as it goes upwards until it merges with the treetop.

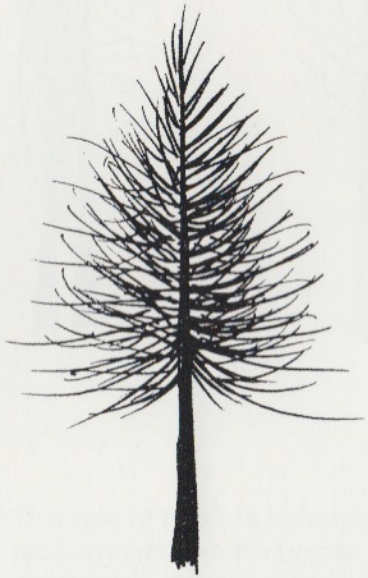
Poplar

This is another tree pattern.

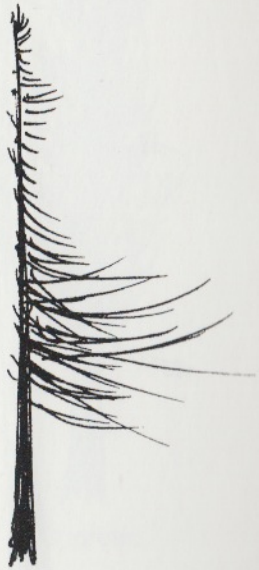
The same pattern with wind.

This type of tree has its variants too: it can have branches that face upwards like the poplar, or more open, or untidy, or all facing downwards, narrow or wide or very wide, nearly horizontal.





Of course, it can have a lot of branches, a huge number
or very few, it can have a lot of branches at the bottom
and not many at the top, or all of them at the top to be nearer
the sun, or all on one side and almost none on the other.



Larch

Siberian elm

Let's try drawing some different trees using this pattern:
the larch, the Siberian elm, the wild cherry, the cypress.

Wild cherry

Cypress

Red fir

Aspen

Red fir, aspen and the big evergreen sequoia.

Sequoia

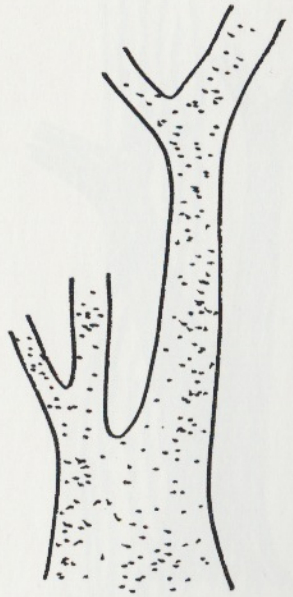
Although there is usually only one, sometimes even the trunk of these trees can divide up into two trunks, but the branching is the same as for a single trunk.

Cork oak

Birch

All trees have bark. Some trees have a smooth trunk that seems like cast-iron, others have a skin that peels, like wrapping. Some trunks are shiny and some are matt. Some have jutting bark, others just have scattered dots.

Elm



.....?

Chestnut

.....?

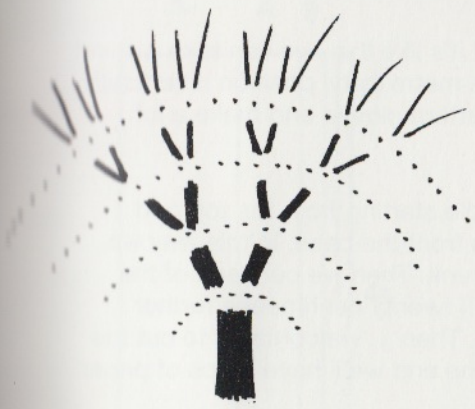
Maritime pine

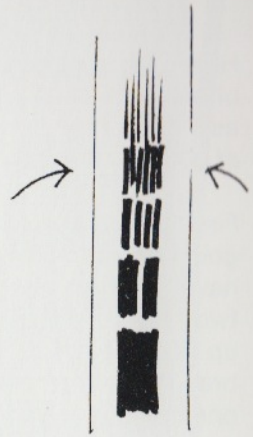
Locust tree

Eucalyptus

Plane tree

Beech

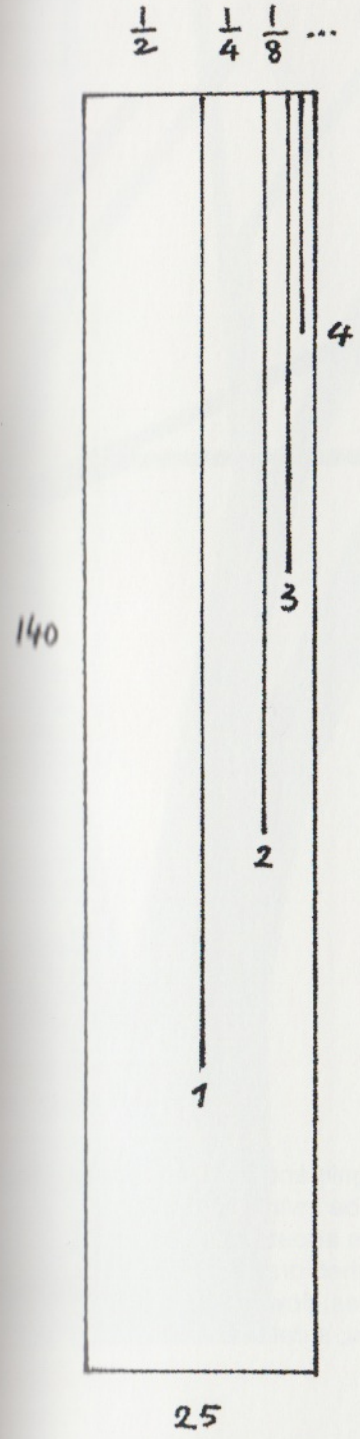


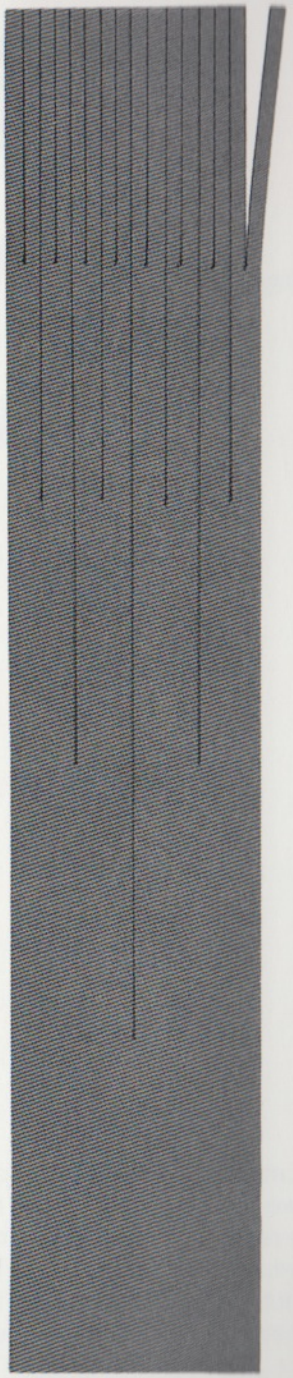


Let's take up the two-branch tree pattern and think about that for a moment.
We can probably close this pattern as you'd close a fan: if you line all the vertical branches up parallel, one near the other, we would probably get a column made of a big mark which is the trunk, that continues divided in half and then these two halves continue divided in half again etc. right up to the last little twigs. The diameter of this column may be the same at the bottom and the top.

Here's the pattern closed. So if it's like this, we can take a sheet of paper 25 centimetres by one metre forty, position it vertically as if it were the space of the pattern closed and make a lot of cuts following the pattern.

First we make a cut in the middle starting from the top and going down to fifty centimetres from the base. In this way we have two large stumps and a trunk. Then we cut each of the two stumps in half (it's so easy!) twenty centimetres further up from the end of the first cut. Then ... we continue to cut the branches as far as we can: in the end we'll have strips of paper one centimetre wide.



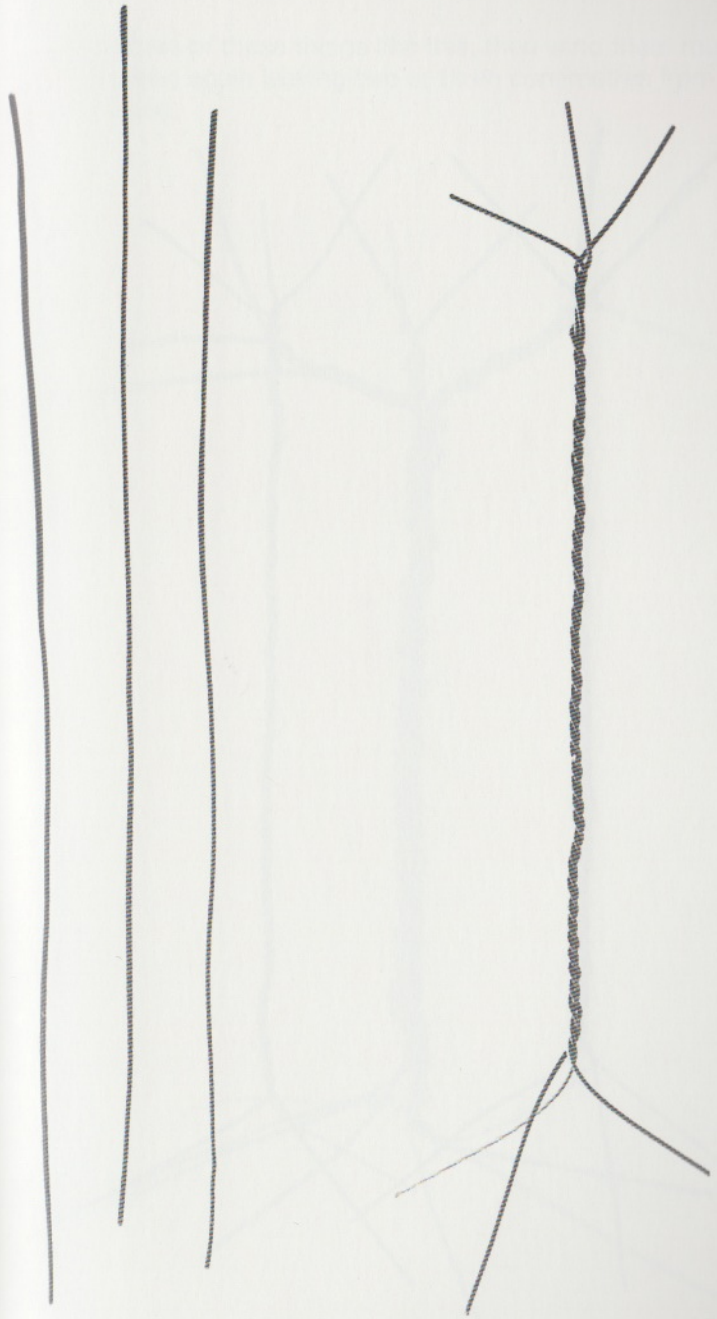


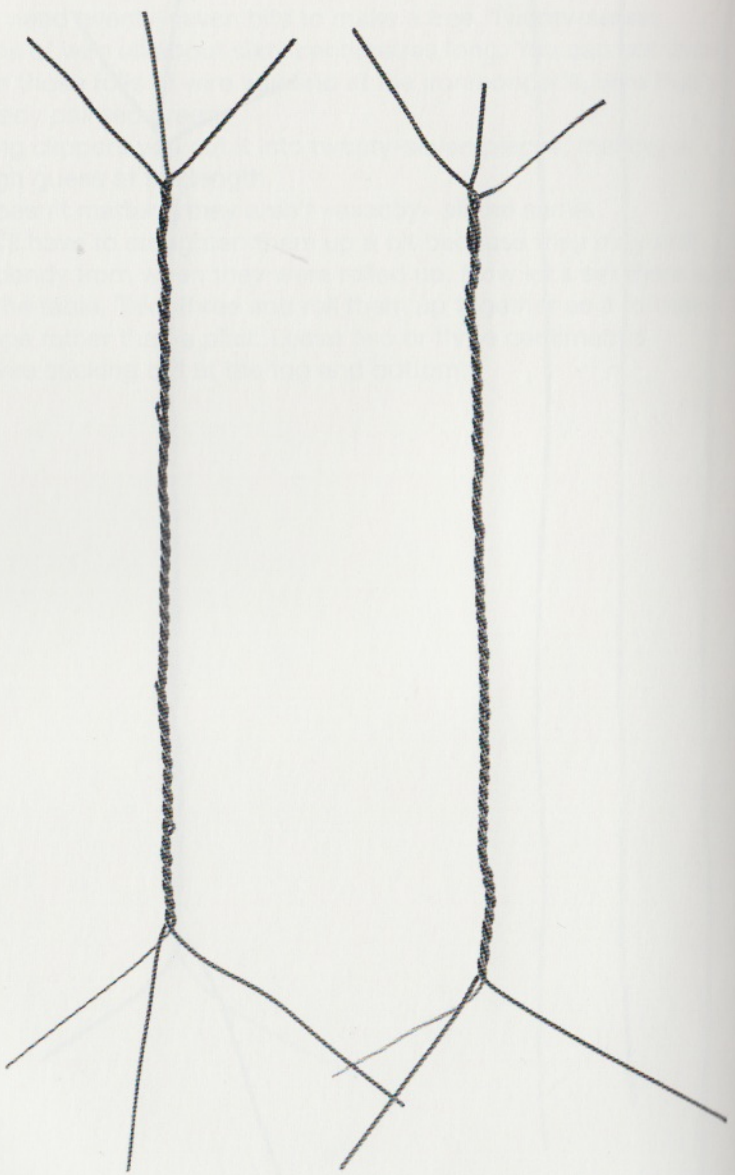
Let's open the pattern up like a fan again and here's a big tree we can tape to the wall. Children will be invited to draw everything that comes into their heads about trees and the inhabitants of the trees. They will do their drawings, cut them out and stick them onto the tree: leaves, flowers, fruit, birds, nests, squirrels, ants, assorted insects, a cat! etc.

The same tree made tearing the paper instead of cutting it. The tear can be made to look like bark and the result is a tree that looks more like real ones that aren't cut out with scissors. You can use coloured paper rather than white. Packing paper, the brown type is ideal. You can of course stick more bits of paper on too to get a bigger tree that reaches right up to the roof, and so on.

Up till now we have drawn and cut out trees that we can define as flat. But we can also make models of trees you can walk round. Not just flat trees but three dimensional ones, with volume.

The principle is the same as before: to design branch in a different way. Here's how: you take some wire (the soft bendy sort).
You need twenty-seven bits to make a tree. Twenty-seven strips of wire all about sixty centimetres long. You can cut them from those rolls of wire you find at the ironmonger's, wire that's already painted green.
Using clippers you cut it into twenty-seven pieces, making a rough guess at the length.
It doesn't matter if they aren't «exactly» all the same.
You'll have to straighten them up a bit because they may still be bendy from when they were rolled up. Now let's set them out on the table. Take three and roll them up together as if to make a rope rather than a plait. Leave two or three centimetres of wire sticking out at the top and bottom.



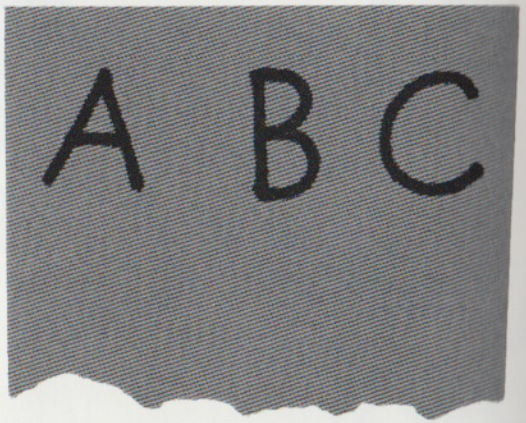


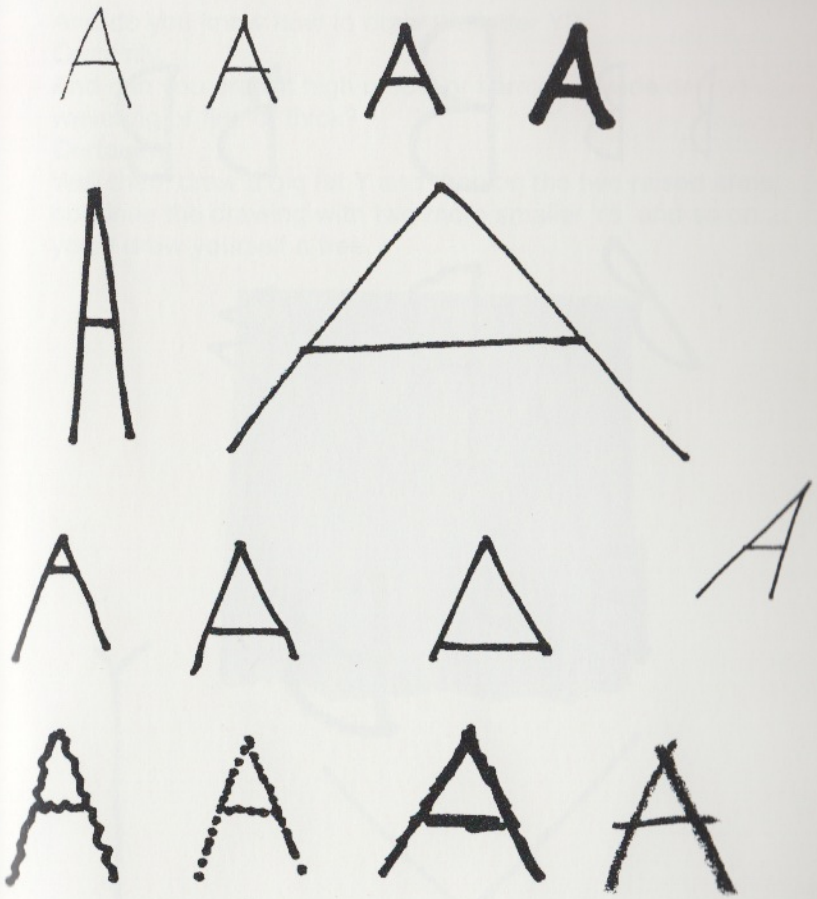
Make three of these things like this, then wind them round each other, again leaving two or three centimetres from each sprig.

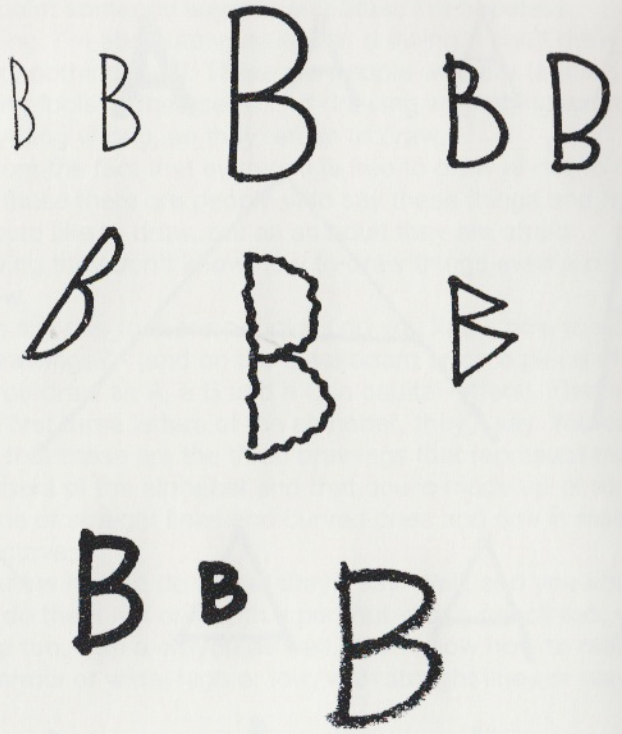
Using the wires left on the table we are now going to make two more of these slender trees and then wind them together again in the same way and we'll get a tree with roots that stands up on its own.

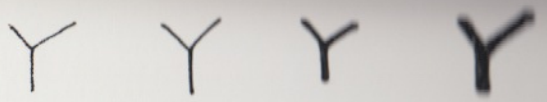
The wire bends easily so we can shape it into any type of tree we want: the sort changed by constant wind, the weeping willow, the tree with branches that go in all directions, the one... we want.

At this point someone says: I can't draw, I'm hopeless at drawing. I'm absolutely useless at drawing, I can't draw anything, nothing at all. These are people who are terrified of making fools of themselves, of drawing something wrong or everything wrong, so they refuse to draw.
Apart from the fact that everyone is free to draw or not to draw, among these there are people who say these things and feel they would like to draw, but as an adult they are afraid of showing they don't know how to draw things even a child can draw.
You can say this to these people: - do you know how to do these drawings? - (and on the blackboard or on a piece of paper you draw an A, a B and a C in capital letters). These are just the first three letters of the alphabet, they'll say. You can answer that these are the three drawings that represent the first three letters of the alphabet and that one is made up of straight lines, one of straight lines and curved ones and one is made up only of curves.
Well, I know how to do those, they'll say. Well, and you know how to do them not only with a pen but with a pencil too, with a felt-tip too, with a crayon as well... you know how to make them narrow or wide, high or low, with straight lines or wavering lines...
Of course, we know how to do those.

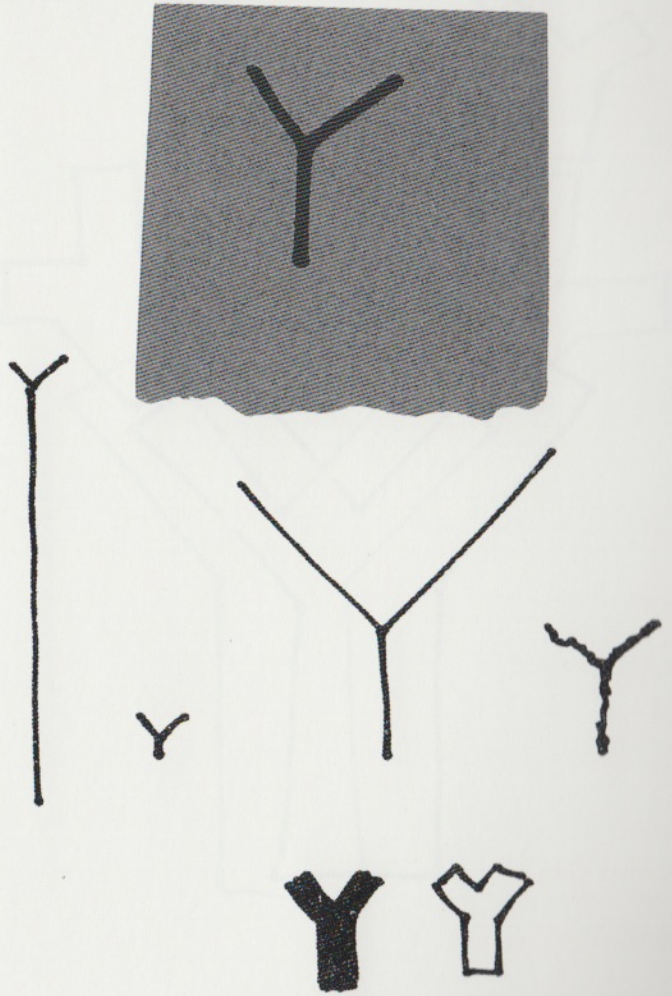


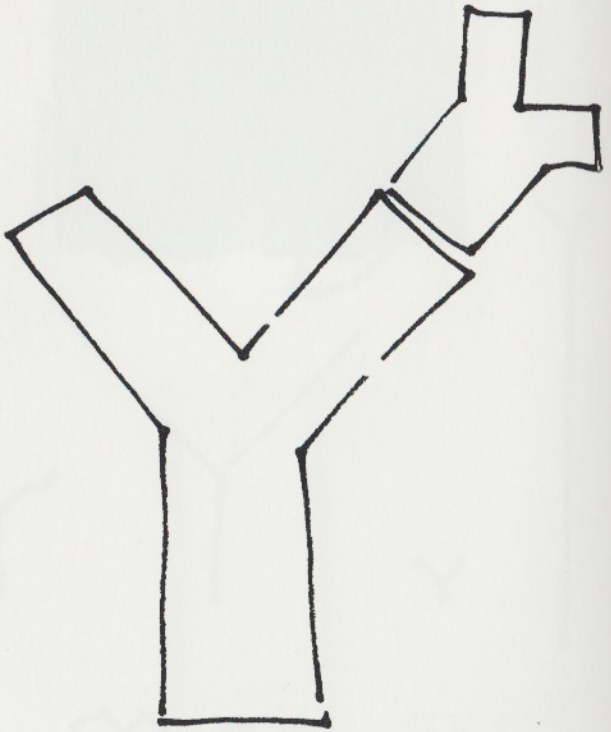


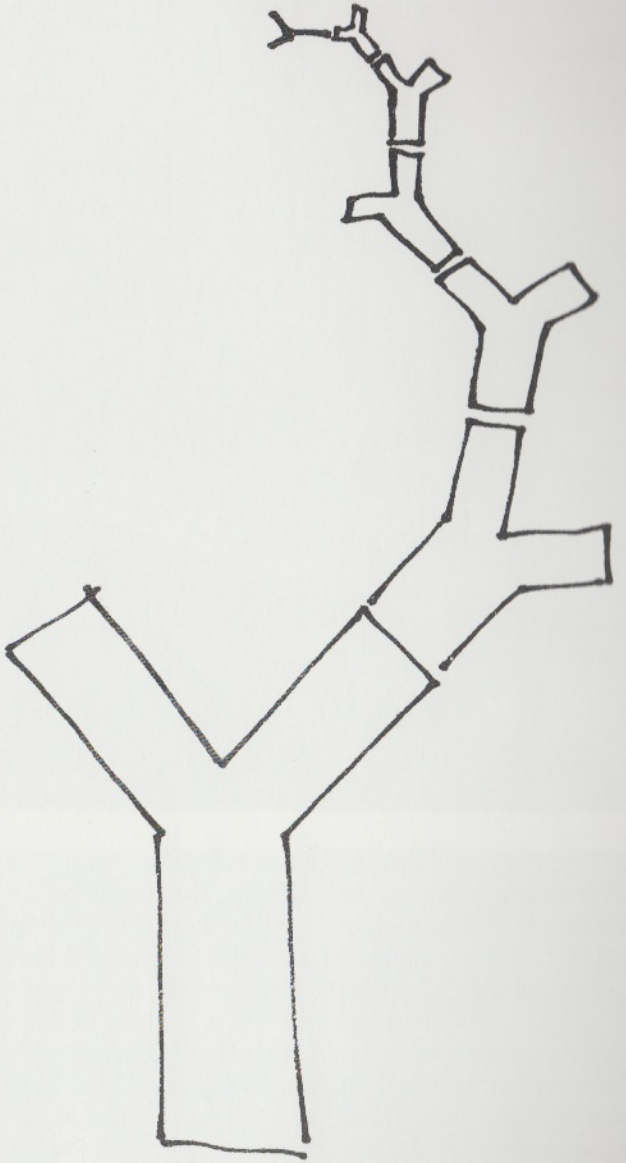




And do you know how to draw the letter Y?
Certainly.
And can you draw it high or low or narrow or wide or wavering or fine or thick?
Certainly.
Well then, draw a big fat Y and then on the two raised arms continue the drawing with two more smaller Ys and so on ... you'll draw yourself a tree.







the branch that follows is always slender than the one before it

A big tree built on a paved square in Mantua with a hundred or so children, teachers and parents. The tree is built with big sheets of packing paper, cutting the sheet in half lengthwise, and then half the half... until you've got strips of paper two centimetres long. All these strips are stuck on with scotch tape and the tree expands and invades a good part of the square (where there are no vehicles). Then the same children who built the tree and others too, will draw on other pieces of paper everything they think there can be either on, around or under the tree, they'll cut out their drawings and stick them onto the trunk, branches and roots.
In the end everyone will pick the tree up off the ground and will throw it all up in the air.

The model is destroyed but the rule remains.
The rule says: the branch that follows is always slenderer than the one before it.

Perfection, says an old oriental proverb, is beautiful but stupid: you have to understand it but break it. Now that you know how to draw a tree, as I think you do, there's no need to slavishly follow what I've shown you; once you know the rule, you can draw the tree of your choice, completely different from the ones you've seen in this book.
You can draw them with a pencil, a pen, a felt-tip, a paintbrush, crayons, chalk, a piece of brick, charcoal, your fingers, powders, chocolate, a shaving brush or a broom. You can make them out of paper, stiff card, corrugated board, packing paper, wire mesh, plastic, non-plastic, papier-mâché, wire, brass, aluminium, string, spaghetti, cloth, whatever you want.
And then, above all, teach others how to do it.