CHAPTER 3

Spatial Characteristics of Plants

The spatial characteristics of plants are those that contribute to the space structure of the landscape. They include habit, crown shape, foliage density and speed of growth, and *en masse* they determine the spatial composition of the planted environment.

Spatial Functions of Plants in the Human Landscape

When we are designing spaces for people, the size of plants relative to the dimensions of the human figure is critical. Simply to distinguish areas on a plan by canopy height amounts to an important design stage, because it is height that determines much of the spatial framework and controls vision, movement and physical experience.

Danish landscape architect Preben Jakobsen identified the most useful size categories for the designer as ground level, up to knee height, knee to waist height and below or above eye level (Jakobsen, 1977). The kind of plants that fall within these ranges are as follows:

Canopy height	Plant type
Ground level	Mown grasses and other turf plants, ground-hugging and carpeting herbaceous plants and shrubs.
Below knee height	Prostrate and dwarf shrubs, sub-shrubs, low-growing herbaceous plants.
Knee–waist height	Small shrubs and medium growing herbaceous plants.
Waist–eye level	Medium shrubs and tall growing herbaceous plants.
Above eye level	Tall shrubs and trees.

When it comes to actual dimensions, these heights will, of course, vary for different people. For adults, this variation will be only marginal and would rarely affect our choice of species. For children of different ages and for people in wheelchairs, however, the height difference would be significant, and we must take this into account and allow for their different spatial experience.

Let us consider the design potential of each canopy level in turn.

Ground-level Planting (Carpeting Plants)

This lowest growing vegetation forms a foliage canopy very close to ground level, and often not more than a few centimetres thick. Plants include grasses and other

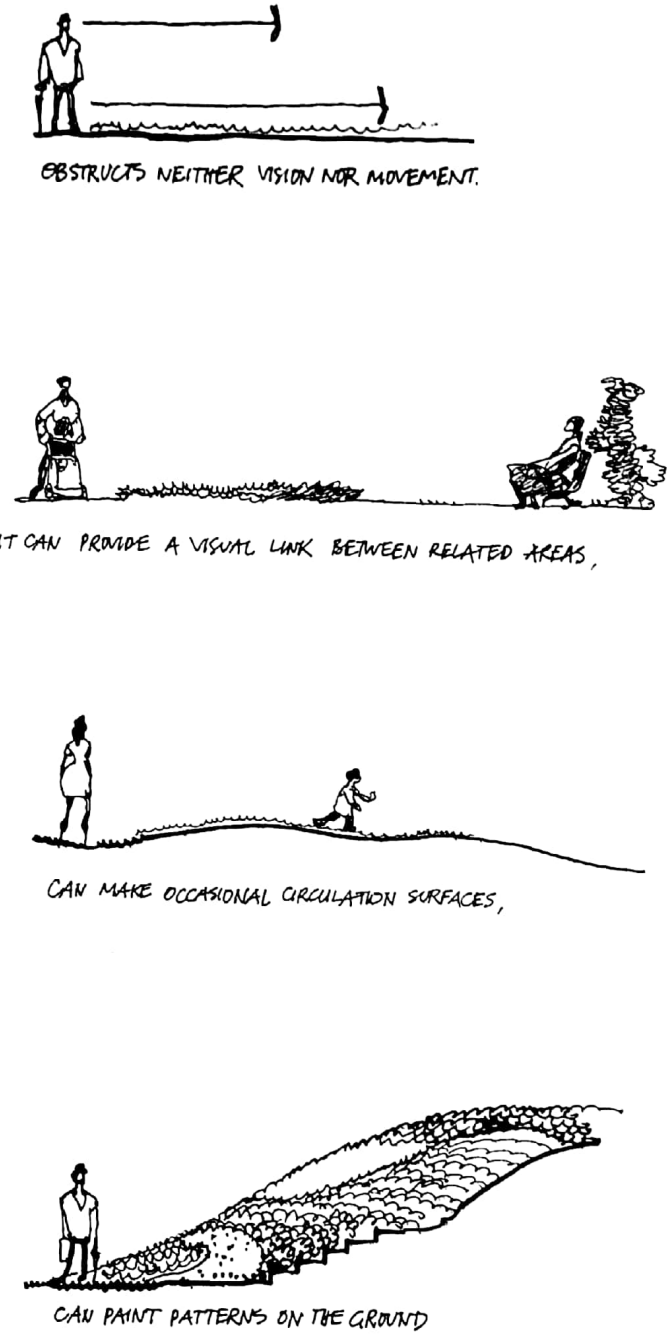


Figure 3.1 Ground-level planting (carpeting plants).

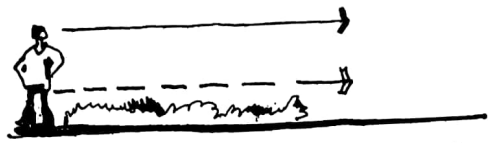
turf species when mown or grazed, absolutely prostrate shrubs (e.g. *Juniperus* 'Bar Harbour', *Thymus serlyllum lanuginosus, Rubus* x *barkeri*) and creeping herbaceous plants (e.g. *Lysimachia nummularia, Scleranthus biflorus, Pratia angulata*). Its primary spatial role is as a 'floor' that allows both free vision and movement. This enables it to perform a number of roles:

- On even, firm ground carpeting plants can provide a pedestrian circulation surface, although less hard-wearing than a pavement. The most wear tolerant species include many of the turf grasses that, when grazed or mown regularly, form surfaces suitable for relaxing, walking, play, sport, cycling and occasional vehicles. This durability accounts for much of the value and popularity of lawns, meadows and other grasslands in both public and private landscape.
- A uniform carpet of mown grass or ground-hugging, smooth-textured groundcover can be used to enhance the visual effect of ground modelling by closely following the contours. Species include prostrate chamomile (*Chamaemelum nobile* 'Treneague') or piripiri (*Acaena* sp.). Breaks of slope can be emphasized by a change to a groundcover of contrasting foliage.
- Ground level vegetation can be used to make two-dimensional patterns. Carpets of foliage, used alone or combined with boulders, gravel and paving materials, form a tapestry of colour, texture and pattern across the ground surface.

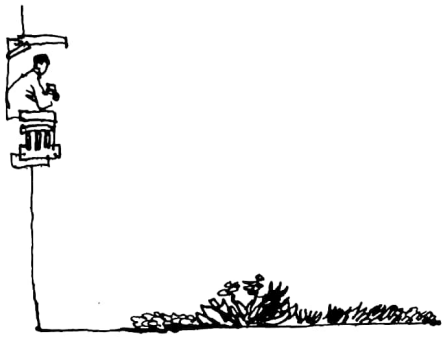
Shrubs and Herbaceous Plants Below Knee Height (Low Planting)

Shrubs and herbaceous plants that form a higher canopy but still below knee height have further possibilities in spatial design. Many of them come within the category of 'groundcover', that is, species that are well adapted to the local conditions and competitive enough to exclude most of the unwanted, self-colonizing 'weed' plants. In addition to this labour-saving benefit, low planting has the spatial role of allowing freedom of vision while defining an edge and deterring (though not preventing) movement.

- Low planting can, when used by itself, form a visual platform or ground plane like carpeting plants.
- It can be combined with taller herbaceous species, shrubs or trees growing up through it. This situation is like a foundation or wash in painting, or a 'ground' against which the 'figure' is to be seen. In this way, low planting can give a common ground or platform that unifies other planting and elements in a composition.
- Many prostrate species that form low groundcover will trail down walls and banks and form hanging curtains (prostrate rosemaries – *Rosmarinus officinalis* – are a classic example). Trailers and climbers can be planted to form a continuous mantle of foliage over vertical and horizontal surfaces. Foliage will cascade down banks and walls and flow over flatter ground, masking the angles between vertical, horizontal and inclined planes. By clothing new and old alike, climbers can give a sense of belonging and maturity to new structures or earthworks that have been inserted in an established landscape.
- Low planting has an essential role at the edges between hard and soft landscape and between soft landscape areas of differing uses. Tall shrubs



ALLOWS UNINTERRUPTED VISION BUT DETERS MOVEMENT



CAN FORM A CARPET OF PATTERNS VIEWED FROM ABOVE,

CAN FORM A CARPET OF FOLIAGE BELOW TALLER PLANTS,

Figure 3.2a Planting below knee height (low planting).

CAN EDGE TALLER, SPREADING SHRUBS

CLIMBING SPECIES ON A SUPPORT CAN FORM AN EFFECTIVE BARRIER, AND

CAN LINK HORIZONTAL AND VERTICAL PLANES

Figure 3.2b Knee to eye level planting.

need room to spread laterally without encroaching on circulation space. Low planting can provide a groundcover over which the taller species extend freely without the need for frequent cutting back or shaping. If this groundcover spreads over pavement or grass some incidental or natural 'pruning' will result from trampling. Where traffic is light, occasional trimming is needed.

Knee to Eye Level Planting (Medium Height Planting)

Planting that grows to between knee height and eye level can have a similar design role to a low wall, fence or rail. It becomes a barrier to movement and can be used to limit access but it leaves views open and makes little difference to sunlight. This opens up a number of spatial uses for medium-height planting.

- It can separate areas for safety reasons: for example, keeping people or vehicles away from steep slopes, water or from each other.
- It can be used to acknowledge and emphasize desire lines or pathways where visual enclosure is not wanted.
- It can be used to maintain a distance between people and buildings and other private areas, in this way giving privacy while not growing above window sill level and reducing light.
- It can define a building curtilage or domain, in a similar way to a low wall, fence or hedge, but less formally.
- A mass of medium foliage fringing a building or other structure can visually anchor it to the ground and link it to the surrounding landscape. This is particularly important when a building or other structure is introduced into a landscape characterized by generous existing vegetation.

Planting Above Eye Level (Tall Shrub/Small Tree Planting)

Shrubs and small trees with a canopy extending above eye level form a visual and physical barrier. So tall planting with a close knit canopy can, in a similar way to a wall or fence, separate, enclose, screen and shelter on a smaller scale than is possible with larger tree planting.

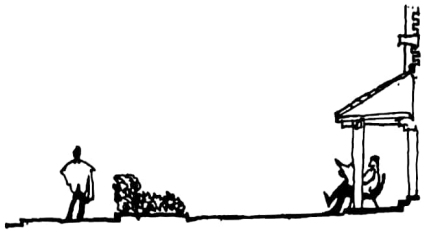
- In the human scale landscape of parks, gardens, courtyards, streets and playgrounds tall planting gives privacy and shelter and screens intrusions like car parking, service areas and refuse bins.
- Like a wall or fence, tall planting can make a backcloth to ornamental planting such as herbaceous borders and display beds. Clipped 'formal' hedges have traditionally played this role in gardens, but looser shrub planting can also be effective. Classic hedging plants include yew, *Taxus baccata*, beech, *Fagus sylvatica* and hornbeam, *Carpinus betulus* for tall hedges in northern Europe. Monterey cypress, *Cupressus macrocarpa*, and totara, *Podocarpus totara*, make fine clipped hedges in warmer climates.
- Because of its size, tall planting can play an accompanying role to buildings. Its visual mass is similar to small buildings so it can be used to balance areas of their masonry or cladding.
- An isolated pair of tall shrubs or a gap in mass planting creates a frame. It can frame a whole vista or attract attention to a focus or landmark. This kind of arrangement not only focuses attention, but also invites exploration. Like an arch or gateway, it suggests a different place to be discovered.
- When planted as individuals or small groups, choice tall shrubs have the size

PLANTING BETWEEN KNEE AND EYE LEVEL OBSTRUCTS MOVEMENT BUT ALLOWS VISION.

IT CAN SEPARATE PEDESTRIANS FROM HAZARDOUS OR SENSITIVE AREAS,

CAN EMPHASISE DIRECTION AND CIRCULATION,

Figure 3.3a Medium shrub planting.



CAN DEFINE TERRITORY,

CAN IMPROVE PRIVACY WITHIN BUILDINGS,

AND CAN PROVIDE A MINOR VISUAL FOCUS.

Figure 3.3b Medium shrub planting.

and presence to act as specimens and a feature or visual focus within a human scale landscape.

Tree Planting

The sizes of trees are of the same order of magnitude as buildings, roads, bridges and smaller industrial developments. Tree planting can therefore be used for screening, separating, sheltering, enclosing, accompanying and complementing these larger structures. When tree species grow freely to produce a clear main stem or bole with their canopies above head height they leave the space above the ground open except for the vertical pillars of their boles. This offers a quite different type of spatial element.

Mature heights of trees range from about 5 metres in species such as weeping pear (*Pyrus salicifolia* 'Pendula') and akeake (*Dodonaea viscosa*), to over 40 metres in European ash (*Fraxinus excelsior*), New Zealand kahikatea (*Dacrycarpus dacrydioides*), some conifers from the west coast of North America and many Australian eucalypts (*Eucalyptus* species, especially *E. regnans* the mountain ash). For design purposes it is helpful to divide trees into small: mature height 5–10 metres; medium: 10–20 metres; and tall: 20 metres.

- Small trees are of similar height or lower than the majority of buildings of two storeys, so their influence in the urban environment is mainly local to the spaces between buildings.
- Medium trees can create spaces that contain smaller buildings and therefore have a greater effect on the spatial structure of urban landscape.
- Tall trees are less common in urban areas because of the space they demand, although naturally tall growing species are often planted in streets and gardens only to be lopped or pruned once they begin to shade or dominate nearby buildings. The size of trees over about 20 metres enables them to form the part of the primary spatial structure of streets, squares and parks. In the rural landscape large trees create a large-scale framework.
- Medium and tall tree planting can play a crucial role in integrating massive industrial buildings, like power stations, into the surrounding landscape. Tree belts and plantations enveloping and extending outwards from such sites provide screening of near distance views. From greater distances, although they cannot hide structures on the scale of cooling towers or turbine houses they can visually anchor them to their supporting landscape and screen the lower level ancillary development, temporary buildings and car parks. This is a vital landscape role because the low-level clutter is often the most disturbing part of large-scale industry.
- The ability of trees to screen and obscure views from further away than shrub planting can be made use of to manipulate views as the observer moves through the landscape. Carefully located gaps in planting open up vistas or frame a focus at just the right moment. Like a window or an archway, a frame of branches or foliage directs attention and focuses the mind on what is beyond it.
- A single specimen or small group of trees, on the other hand, itself acts as a focus. Being an isolated object, it occupies a small area in our field of vision and our eye tends to rest on it. A tree with a distinctive feature such as autumn colour or picturesque habit will make a particularly notable focus. Large tree specimens or groups have this effect at some distance and so provide foci and landmarks in the larger-scale rural landscape.
- When single specimens or small groups of trees accompany buildings the

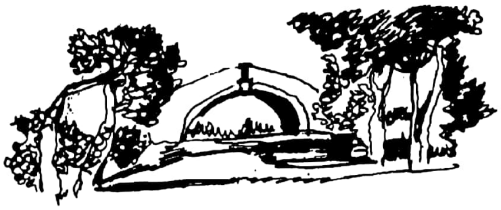
PLANTING TALLER THAN EYE LEVEL FORMS BOTH A PHYSICAL AND VISUAL BARRIER.

IT CAN GIVE PRIVACY AND SHELTER,

CAN PROVIDE A BACKCLOTH FOR DISPLAY PLANTING,

Figure 3.4a Tall shrub planting.

CAN ACCOMPANY SMALLER BUILDINGS,



CAN FRAME A VISTA OR LANDMARK,

AND CAN MAKE A SPECIMEN OR VISUAL FOCUS.

Figure 3.4b Tall shrub planting.

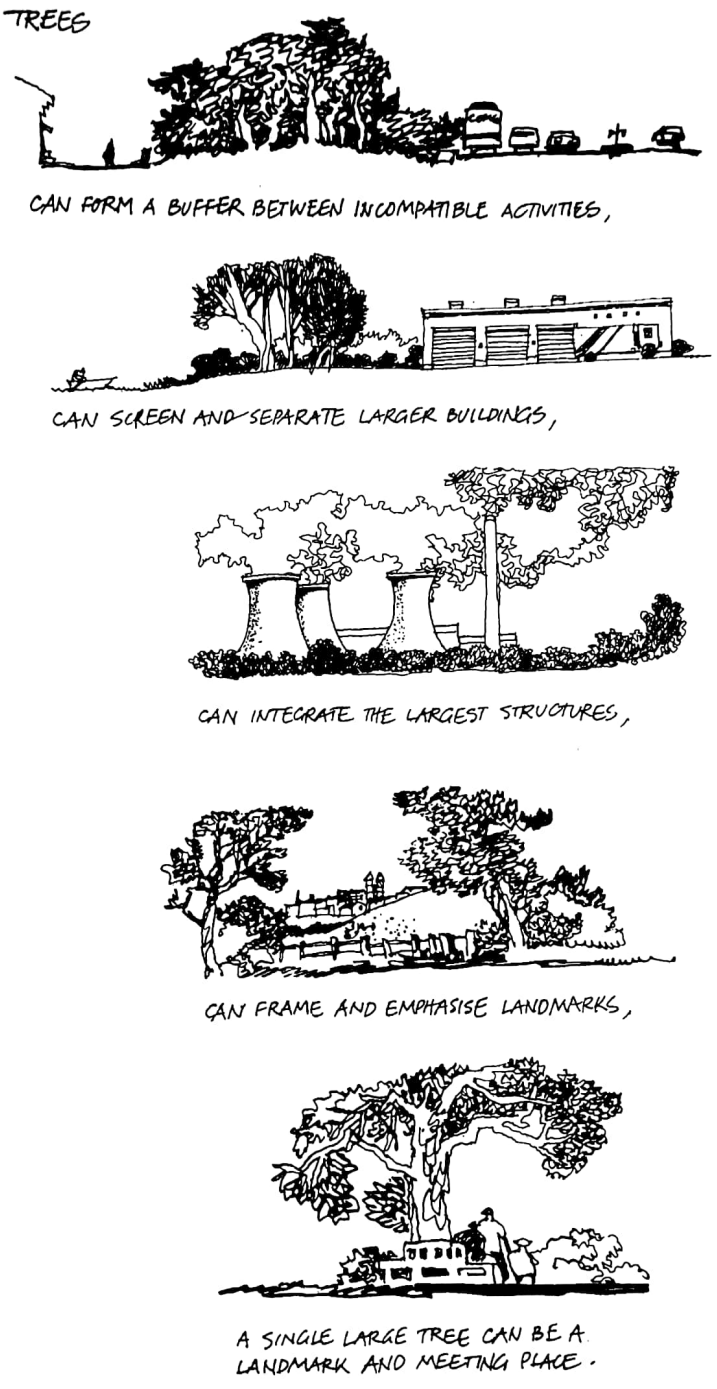
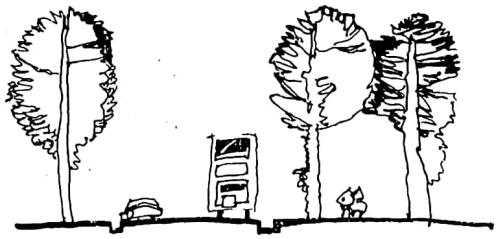


Figure 3.5a Trees.

TREES CAN COMPLEMENT BUILDING FORM

CAN INTEGRATE UNRELATED BUILDING STYLES,



CAN GIVE VERTICAL CONTAINMENT TO ROUTEWAYS.

Figure 3.5b Trees.

TREE CLUMPS AND WOODLANDS CAN EMPHASISE TOPOGRAPHY,

OR DISGUISE INSENSITIVE EARTHWORKS

AND CAN CREATE A DISTINCTIVE WOODLAND ENVIRONMENT WITHIN THEIR CANOPY.

Figure 3.5c Trees.

relationship between the form of the tree and of the building can be interesting. Humphrey Repton formulated a rule, in the picturesque tradition, prescribing which tree forms best accompanied different architectural styles. He recommended that buildings in the classical style with broad, stable proportions and shallow roof angles, be accompanied by the rising lines and upright forms of fastigiate trees such as spruces or firs. Conversely, the rising pinnacles and steep pitched roofs of the Victorian Gothic Revival would be complemented by stable rounded or horizontal spreading trees such as cedar of Lebanon, English oak or chestnuts.

- A further architectural role of tree planting might be the linking of varied building styles. A simple, regular line of one species can provide uniform frontage or a free-standing counterpoint to an architectural façade. Its continuity can bind together different building styles so that the architectural variety adds interest within a unifying green framework.

We have seen how the height and habit of plants determine many of their spatial functions. The control of vision and circulation is fundamental to spatial design. How we combine plants to create spaces of various characters and for various purposes provides the subject of the next chapter.