Transplanting

Put plants in their permanent positions after careful planning, which should include details of their placement and design within a pleasing, integrated landscape. Also carefully prepare the site beforehand.

Move plants into the garden from one- to five-gallon containers; larger sizes may not move successfully nor adjust to their new home as quickly. Follow this sequence of steps after you've dug one exploratory hole and filled it with water to check for prompt drainage:

1. Mark the site in the garden careftllly, taking into account the position of neighboring shrubs and other plantings. If you're planting under a tree, check that the hole you dig won't disturb already established tree roots.

2. Measure the depth of the container, then dig a hole equally deep. Extra depth may be needed where drainage is poor. The diameter of the hole should be twice that of the container.

3. Place a one- to two-inch layer of potting soil or friable loam in the bottom of the hole, and work it in to your garden soil. Where drainage is a problem because of heavy soil, increase the bottom layer to several inches of fine gravel below the potting soil. At the same time, mix the soil you've removed from the hole with a good measure of potting soil.

4. Rap the container sharply against a hard surface and slip out the plant's root ball. The soil should be slightly moist (but not soggy) to aid this process. Inspect the root ball carefully for roots wound around the outside of the ball, and loosen or prune off the worst offenders. Minimize exposure of the root ball to dry air; if you must leave it temporarily, wrap it in wet moss or with a soggy burlap bag.

5. When all is ready, place your new plant on its layer of potting soil in the prepared hole. Now you can carefully back fill around the root ball with the ammended soil from the hole. Tamp soil carefully around and into the roots without applying excessive pressure. (Too much pressure will destroy delicate feeder roots and compact the soil, thereby eliminating all breathing pores.) Make sure soil completely surrounds all parts of the root system to prevent drying air pockets. Fill in soil to one or two inches from the top of the hole. If you've positioned your plant properly, soil should extend to just below the top of the root crown.

6. Water immediately and thoroughly, until water fills the hole to the rim. Note how swiftly the water disappears into the soil; you may need to flood the hole more than once for complete penetration of water if your soil is dry or porous. Try digging with your finger to determine how deepy the water has soaked. By contrast if water sits for several minutes before soaking in, you've got a major drainage problem and need to start over.

7. Now it's a good idea to do some judicious tip pruning, especially of new growth. New growth is extra vulnerable to drying out and wilting. Roots need to recover from the shock and damage of transplanting before the plant can resume normal growth. Plants should not be transplanted while flowering or fruiting. If they are in this condition, remove all flowers, flower buds, or fruits, or the plant will continue putting its energy into their development instead of healing and developing new roots.

8. New plants may need temporary shading if the air is warm- When air is exceptionally cold or there are overnight frosts, protect shrubs by heavy mulching around the base (at the root crown) or by protective enclosures, since they're vulnerable until well established.

9. For the first few months, check carefully for adequate soil moisture around roots. New growth signals that roots have recovered, and at that point watering becomes less critical. Nonetheless deep, fully established roots take time; new plants benefit even in summer from occasiona12 deep watering.

Mitigating Microclimates' Effects

[n addition to an understanding of broad climatic requirements, you need a strong familiarity with the concept of the microclimate, and with the characteristics of the microclimates in your own garden. Most gardens of ordinary size contain these pockets, which differ in temperature, moisture, and sunniness as compared to other parts of the garden. Some of the most dramatic differences are in temperature, at both ends of its range.

Here are some factors in microclimates by which to recognize them or mitigate their effects:

* South and west sides of buildings retain heat best winter; they also receive the greatest heat in summer.

* Conversely, north and east sides of buildings are coldest in winter; they remain •cooler in summer.

* Overhangs, patios, and other extensions from buildings help protect from frost damage and sun-uner heat.

* Low valleys, gulches, and ravines collect cold air in winter; cold air drains from high places into low, where it settles.

* Deciduous trees allow sun to come through in winter whereas evergreen trees create shade all year.

* The denser the foliage and branch pattern of trees, the heavier the shade they create.

* Tall trees with high limbs (the lower limbs missing) create high shade, allowing the sun to reach what's underneath when its angle is near the horizon.

* Plants that are under trees gain some protection from frost, as compared to those fully exposed.

* Ponds create cooling local microclimates in summer and may help mediate winter chill.

* Shade can shift patterns according to season and time of day to greatly varying effects.

* The color of the soil or of mulch or other dressing helps determine the temperature of the soil surface; dark soils absorb heat and can become unbearably hot in filll sun.

* Soils in shade dry out much less rapidly than those in full sun. Allow for the fact that the trees creating the shade do have thirsty roots.

* Shallowly rooted trees create much drier conditions for plants than deeply rooted trees.

* Mulched surfaces lose moisture much less rapidly than fully exposed soils.

Pruning

Pruning encourages the development of side branches from dormant buds below the point of the cut stem. Pruning may be used to achieve the following results:

* Remove dead stems and branches that would otherwise create a fire hazard and eyesore. Dead branches often occur below living branches and are brittle and leafless.

* Encourage bushier shape or more branching in a horizontal direction.

* Create multiple trunks where one formerly existed. (In order to do this effectively, you need to prune the main trunk early in the shrub's life.)

* Remove the previous year's growth to encourage a new framework of branches. This is often necessary with woody vines such as wild grapes and vine honeysuckle, and with such subshrubs as Matilija poppy. Old growth simply gets in the way of the new, so that new growth is not as vigorous or healthy as it otherwise would be.

* Encourage more primary growth. This is often especially effective in cases where flowers appear on new growth rather than old. Keep careful notes on where flowers are initiated for each kind of shrub—on new growth only, old growth only, or both.

* Reshape. Sometimes drastic pruning can serve as a sort of surgery (for example, on an overly tall, spindly shrub creating a dense, rounded crown).

* Maintain formal shapes by frequent pruning, such as those for closely spaced hedges.

* Open up the framework of the shrub. Too great denseness, especially toward the middle of the shrub where little light penetrates, results in a maze of ugly overlapping, unhealthy branches. Opening the middle and interior creates a spacious, airy feel, improves overall health and vigor, and is visually pleasing. This is particularly important if you want to display the beautiful bark colors and textures of such dramatic shrubs as manzanitas, ironwood, and red shanks. (The exception to- openness being an• advantage is with hedges and barrier plantings.)

Ordinary lopping shears should work for 80 percent Of pruning chores; if branches are so thick they can't be removed this way, the shrub has been neglected much too long. Pruning saws will take care of very thick trunks and branches.

The degree and frequency of pruning needed vary according to the kind of shrub and time of year. Generally, it's easier to shape a shrub during its dormant period--in summer for many chaparral shrubs and in winter for many deciduous shrubs--but watch closely for fungal infections in cuts made during sieges of wet weather.

Finally, remember that shrubs may lose their ability to regenerate if you prune too far back on old growth; usually you can determine if this vulnerability exists by noting whether buds are still visible. For example, junipers keep dormant buds for a few years, then lose them and the ability to resprout. Pruning back too far on such shrubs causes slow death of the branch, or sometimes the entire plant. In general, the faster-growing shrubs can be pruned harder and more completely than the slower-growing kinds.

Management of Soil and Water

No other factors are so important to successful culture of plants than soil and water. Probably more plants have been killed by improper management of these two factors than from all other factors combined. Yet despite these failures, the basics of soil and watering are straightforward: soils should be loose, friable, well draining, and amended with organic materials; watering should temporarily saturate soil to its full depth, then be repeated only when the upper surface is thoroughly dry. If these rules are adhered to, few problems result for the majority of plants. Of course, there are always exceptional plants whose roots need to be in constantly moist soil, but even then some movement of water is necessary to maintain health.

Soils that never drain and are finely textured with few pores are to be avoided. If you have soil such as heavy clay with an underlying hardpan, you must either improve the soil in some way or water with extreme caution. It is always best to change the soil condition to a more favorable one than to try to compensate by not watering much. Let's look at these two factors in more detail.

Soils

The ideal garden soil is one whose texture (due to the pores between soil particles) is loose and crumbly, but not so coarse or porous that water moves right through. Sandy soils are too coarse and have major problems with proper water retention; clay or adobe soils are too fine and have little pore space for the needed oxygen exchange between roots and air. They also drain too slowly. The ideal soil is therefore a loam with intermediate properties. Another consideration is that the upper topsoil layer have some organic material in it. This allows better pore structure while helping retain water, and adds minor amounts of needed minerals.

In California you are likely to have either a sand- or clay-type soil. In some ways, sandy soils are the most difficult: although they drain well, they dry out rapidly and are hard to rewet after drying. Also, most sandy soils are low in organic matter. Consequently, the only effective way to improve sandy soils is to add lots of vegetable matter--a compost pile is a handy source, or use peat moss, leaf mold, or shredded bark.

One caution should be observed with regard to adding organic matter: some types of leaves and twigs break down to create an uncommonly high acidity (especially pine and other conifer needles). These are best used for plants whose original habitats have acid soil (for example, rhododendrons, azaleas, and huckleberries from redwood forests). Homemade compost, if properly heated, should be relatively safe in this respect. Many available books detail the ways to make a workable compost pile.

Strangely enough, the way to improve a clay soil as well is to add lots of organic matter. You can also add sand or various other amendments such as perlite or vermiculite, but the quantities needed and the general loss of them through the soil makes this costly and wasteful. Adding organic matter year after year finally results in an airy, crumbly soil.

For both sandy and clay soils, there is another solution that is swift and effective: build your garden with good soil on top of the original soil. This has two advantages: it raises the overall level of soil to give improved drainage, since the beds are now raised, and it introduces soil whose structure is better suited to plant growth right from the start. For this method, consider three factors:

I. Raised beds help only with smaller shrubs; large shmbs, of a height greater than four feet or so, have more deeply delving roots that require more than a foot of amended soil.

2. Mixing the new and old soils at their interface, so there is a gradual transition from old to new, prevents water from accumulating or running off there.

3. The depth of a new soil layer that will allow plenty of root room is a minimum of about a foot.

The ideal way to utilize this concept is to create raised beds bordered by wood planks or rocks so that the bed is totally independent of the original soil cover.

For tmly large shrubs, the best solution is to plant on a slope. Provide ample room around the original root ball for amended soil, work it partly into the native soil, and exercise great care not to overwater.

One final alternative to the poor-soil syndrome is to garden in containers. If you have a deck or lawn around which to place planters, this may be the ideal solution. You can fill containers with the best possible soil--a potting mix that has already been sterilized. As in raised beds, truly large shrubs may not always lend themselves to container culture, although many can be trained in the manner of bonsai by periodic careftll clipping of the root ball, removal of extra branches, and application of balanced fertilizer. It is beyond the scope of this book to go into bonsai techniques; there are many other books on the subject.

Questions frequently raised about soil for natives are:

* Do plants require special soils when they have grown on unusual soils in nature (for example, serpentine)?

* How often do they need fertilizer?

The answer to the first question is a resounding "no." Plants grow naturally on special soils--dolomite, limestone, serpentine, lava--not because they need those soils but because they avoid competition there, since these soils provide unfavorable growing conditions for the majority of plants. Some kinds also grow on these special soils only in stunted form; in this case, the stunted quality disappears when they're moved to ordinary fertile soils. With serpentine shnrbs in particular, experiments have shown that many actually perform better when planted in ordinary garden soil, as long as they don't have to compete with other plants.

Two additional factors in the performance of shrubs from special soil are drainage and soil pH. Plants from rocky soils need sharp drainage; shrubs from acid soils seldom grow well in neutral or alkaline soils. Litmus paper can be used to geta rough idea of pH conditions. Remember that soils from conifer forests and, in general, from damp cool climates are acid, and soils from hot desert areas range toward alkalinity. Lime (calcium carbonate) will sweeten an acid soil; pine duff and leaching help to correct alkalinity. The process of leaching involves passing water through the soil to remove excessive salts; it would be successful only where drainage is excellent.

With respect to fertilizer, the general rule is not to worry about it. Few natives are used to highly rich soils. Thus, for most species, a light fertilizing is all that is needed for ordinary growth, and that is sometimes unnecessary. In general, soils low in organic matter and sandy soils need nutrient supplements more than other soils. Also in general, woodland plants may need extra fertilizing because of hungry nearby tree roots. Excess fertilizer is likely to be harmftll to most plants, particularly fertilizers rich in nitrogen, since this makes growth unnaturally prolific. When plants grow faster or for longer periods without rest than they would in nature, their growth may become spindly or they may burn themselves out, thus shortening their usual life span. The best fertilizers are those with slow release of nutrients:

for containerized plants, Osmacote; for bedded plants, an organic source such as manure that has been well rotted beforehand. Garden conditions may shorten natives' life cycles through their nutrient richness; one does not need to compound this by adding rich fertilizers. However, when seedlings or newly rooted cuttings are just starting out, it is beneficial to boost vigorous new growth with a dressing of Osmacote pellets.

Mulches for Soil

One final word about soils is a word much in favor today: mulch. Mulches are top dressings of soil other than the soil itself; they vary almost as widely as do soils. The several sound reasons for mulching are as follows:

* Most mulches gradually release trace nutrients to the top soil.

* Most mulches gradually break down into smaller bits of organic matter, which help improve upper soil texture and maintain crumbliness.

* Mulches often improve the appearance of beds, giving them a tidier look.

* Mulches smother and suppress growth of weed seedlings.

* Mulches help retain soil moisture so that much less water is lost.

The last two reasons are perhaps the most important and persuasive. Mulches are applied everywhere but on the plants, thus keeping weedpulling chores low. And because a mulch helps cover vulnerable top soil, loose particles are not carried away by winds, nor are they dried rapidly by heat and winds as they otherwise would be. In gardens where water is minimized to begin with, mulches make extra summer water even less necessary.

What materials can be used for mulching? The list is a long one, and even inorganic materials are used (though they are less desirable). Here are some possibilities:

* black plastic (strictly for keeping weeds down; does not amend soils)

* ordinary leaf duff or mold (Pine and other conifer needles help create acid soils)

* compost (please--well rotted only)

* grass trimmings

* cocoa hulls

* pressings from grapes

* coarsely ground bark (again, conifer bark helps maintain acidity)

* pea gravel

The thicker the mulch, the more effective it is for reducing evaporation and weeds. But remember, mulch that is to have benefit beyond Just inhibiting weeds must be coarse enough to allow plenty of air channels, to keep oxygen flowing into the soil for healthy roots.

Watering

If your soil is loose and friable and your drainage good, sufficient watering is much easier to gauge. Remember, the advantage of many natives is that they seldom need to be watered. Their cycles are geared to the climate you live in--namely late-fall/winter/spring rains and a dry period in summer and early fall. But note that there are many important exceptions to this rule. Here are the outstanding ones:

* All seedlings and cuttings need constant moisture.

* Most natives, even if planted during the rainy season, need some summer water their first year to establish deep roots.

* Many plants 100k better if they receive occasional, thorough summer water.

* Plants from bog and wet meadow margins must have summer water.

* Plants from the higher mountains need summer water.

* Plants from redwood forests and other coastal forests need some summer water.

* Plants planted in sandy soils may require some summer water.

* Plants from coastal simations need summer water when planted inland.

The biggest worry about watering in summer (other than that extra time is needed to do so) is that some plants are actually killed this way.

Water molds and other soil fungi (such as oak root fungus) grow rapidly when conditions are both wet and warm, in summer. They grow so slowly or poorly in winter that wetness is seldom a problem. The only way to learn about which plants are sensitive to these fungi is through trial. Many chaparral shrubs are sensitive, as are native oaks. Any native oak in your garden may be weakly infected with this fungus pathogen, which may then pass from the oak roots to adjacent roots of shrubs, so extreme caution is needed.

A few rules about how water is applied will help assure success:

* Water in the early morning, if possible. Evening watering may encourage mildew; watering during the warm hours of the day promotes leaf burn and wastes water through evaporation.

* Water thoroughly. Each situation differs in time required for a thorough soaking, but remember it is always better to water thoroughly a few times than to water skimpily many times. Water needs to penetrate to the bottom layers of soil in order to encourage roots to reach deep. Deeply penetrating roots carry the plant over dry periods much better than shallow roots. In general, sandy soils need to be watered longer than loams; clay soils require the shortest time. You can determine how thoroughly the soil is wetted by digging down into it.

* The frequency of watering should depend upon soil type, the original environment of the plant (as outlined above), the amount of organic material in the soil, the angle of slope, and the season. Remember that organic matter helps retain water, making frequent watering less necessary. The steeper the slope, the more poorly it retains water. And, of course, on hot summer days soils dry much faster than they do on cool winter days. Another condition to watch for is wind: wind can evaporate water from leaf surfaces just as rapidly as hot sun.

* It is best to apply water as a slow seepage, with a soaker hose or from emitters of a drip system. Drip systems work well where large shrubs form a foundation or barrier-type planting, or where single shrubs stand apart from smaller plants. There are sophisticated computerized timer systems that unify drip systems for the entire garden.