Plant With Nature[1]

Readers of the works of the late Louis Bromfield will remember that in his series of books about his experience in farming at Malabar he repeatedly stressed farming with nature rather than against nature. Mr. Bromfield was a man who came to agriculture late in life, became tremendously excited by it and in some ways could almost be characterized as an agricultural mystic.

Many of the theories that he embraced with such passion did not withstand the proof of careful objective testing in the field. However, his basic reverence for nature resulted in attempts to adjust agricultural practices to conform to the natural way in which the soil or plant behaves, and these attempts have not received the serious attention that they deserve.

Scientifically trained agriculturists in particular are put off by the intemperate enthusiasm and broad generalizations that characterize much of his agricultural writing. Still the basic kernel of his thinking is valid. It is cheaper, more efficient and more profitable to farm with nature. It is at best an uphill struggle to try to farm in a way which violates natural ecological principles.

Nurserymen are agriculturists too, even those who do nothing but landscape planting and do not own an acre of land in field production. Frequently they are dealing with plant material that is infinitely more exacting in its ecological requirements than the traditional farm crops. Most of these crops have, during the thousands of years they have been cultivated, become wholly artificial creations completely dependent upon man's plowed fields for existence and unable to survive in the wild. No matter what part of the industry in which a nurseryman is engaged, his profits and, indeed, his very survival are dependent upon how well the plants he produces or sells survive and grow.

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Natural Cycle of Growth

Young men studying at horticultural schools often wonder why they are required to learn so much "theory," when they are really interested in the "practical" parts of an education, how to do those operations that obviously and quickly relate to a dollar earned. They resent the seemingly dull theoretical parts of plant physiology and ecology and the apparently "obvious" facts describing the natural cycle of plant growth.

Yet in our temperate zone, in which most of the world's nursery operations are conducted, the seasons alternate between a period of active growth in the spring and summer and a period of dormancy deepening in the fall to almost complete quiescence in the winter. Complex biochemical changes take place within the plant as it goes through these recurrent cycles.

To ignore these natural phenomena in the very practical operations of propagation and transplanting is to court disaster in some operations or at best to do things the hard way with the resulting increased costs and diminished results. Consequently approaching with an eager and open mind these "theoretical" questions as to how a plant behaves and why it does so has a most practical application after all.

Propagating with Nature

For countless years, gardeners idly observed that many kinds of flowers bloomed only at a certain time in the year, and no amount of irrigation or fertilizing would induce them to depart from this pattern. Eventually curious minds began to wonder why this was so, and these investigations led Garner and Allard to formulate the principle in 1920 that such plants behaved this way in response to variations in the length of the daylight at different times in the growing season. This discovery and its refinements have been of the greatest practical value to the florist industry.

The photoperiodic response of woody plants is less dramatic than that of many herbaceous plants, but it is there, and adjusting propagating schedules to it will greatly improve results. Indeed, some plants, like certain deciduous azaleas and the so-called French hybrid lilacs, are virtually impossible to root except during their spring cycle of growth, which coincides with the longest days of the year.

Transplanting Nature's Way

During the early spring, just when woody plants are breaking into growth, is the best time to transplant in the nursery

or to plant on a landscape job. However, the ideal part of this best time is of very short duration, often a mere couple of weeks. It is of course impossible to compress enough work into this brief period to support a business for the remaining majority of the year.

Therefore it is important to separate trees for example, into groups composed of those which are easy, fairly easy and difficult to transplant. Fortunes have been lost in the landscape contracting business through ignorance or willfulness in insisting on planting the "difficult" trees at the wrong time of the year.

Two particularly cranky trees are the willow oak (*Quercus phellos*) and the tulip tree (*Liriodendron tulipifera*). The tulip tree, a member of the magnolia family, has, like magnolias, fleshy roots, which are slow to regenerate. If transplanted in the late fall or winter, the severed roots will decay back from the cut ends until the next cycle of growth in the spring, and heavy losses will result.

Move at Optimum Time

In one well-known landscape contract that featured hundreds of large-caliper tulip trees, they were a total loss, and the contractor was bankrupted by the job. By delaying the execution of this job and working with nature by moving these trees at the optimum time in the spring just as growth was commencing, 100 percent survival could have been achieved, and a handsome profit would have replaced the disaster.

The willow oak is very difficult for a quite different reason. It is both thin-barked and extremely twiggy. If moved in the late fall or winter when no root regeneration can occur, the trees simply dry out and perish. If moved in the spring just before or just as new growth is beginning, there is no chance for drying out to proceed very far because new root growth occurs immediately and supplies water to the branches. Thus knowledge of the idiosyncrasies of certain difficult trees and the implications of their growth cycles is of the utmost importance in scheduling nursery operations and landscape contracting.

Ecological Requirements

Nurserymen and landscape architects often do not pay sufficient attention to the ecological requirements of the plants commonly used in landscape planting and thus attempt to fight nature rather than work with her. Such a course is fraught with disappointment. Either the plants die outright, with costly losses to the contractor, or else they merely survive in a sickly

condition which disappoints the owner who expected a beautiful planting and thus cast doubts on the ability of the designer.

Many ornamental plants are adaptable to a great variety of growing conditions, and there is usually one in which they look exactly "right." Others, however, have exacting ecological requirements which cannot be ignored. Although they will not thrive in all sites even though they are perfectly hardy in that climatic zone, they are very useful precisely because of their special requirements.

With the science of ecology at its present developed state, it should not be possible to find the flagrant violations of nature still to be seen in a few landscape plantings. But there they are — the bed of shrunken rhododendrons baking on the south face of a big building, the creeping junipers battling it out with phomopsis blight as a ground cover in the shade of big trees, or the yellow-brown mass of pachysandra struggling to survive on a dry, sunny bank.

The Happy Reverse

At the other end of the spectrum, the happy reverse is to be seen, designed by an architect or landscape consultant with an instinctive "feel" for plant requirements. His are the results of planting with nature — the lush foliaged *Rhododendron maximum* on the sheltered north face of the building, the mass planting of thriving yuccas on the "impossible" dry knoll or the thicket of myrica on the highway bank where salt spray is a problem each winter. On such a job, establishing the plant material is easy, and the results are lasting and beautiful.

Solving Poor Drainage

Next to neglect in watering during the first season after planting, more losses on landscape jobs result from poor drainage than any other cause. Every elementary botanical textbook says that roots require water and oxygen for survival and growth. Both landscape designers and landscape contractors far more often consider supplying water than air.

The reason that drainage is such a problem on so many landscape sites is that the soil has been so frightfully abused during the construction of the buildings or of the facility itself. Bulldozers, trucks and the feet of the workmen themselves cross and recross the area to be planted, often in wet, muddy weather, until not a vestige of granular soil structure remains. Unless generous planting pits are excavated and filled with good soil and under-drainage is supplied (see fig. 6a), neither plant survival nor subsequent growth will be satisfactory.

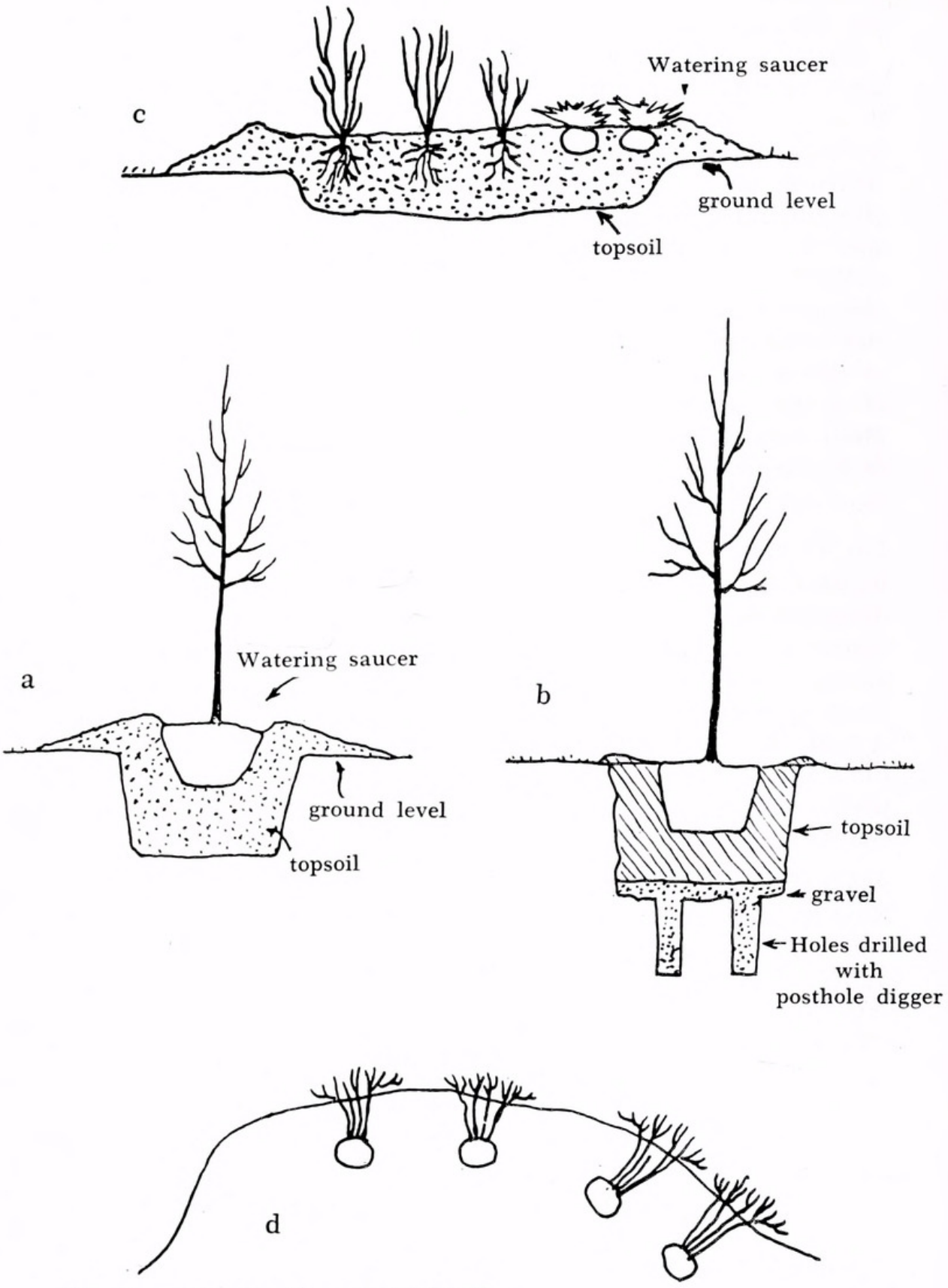

Fig. 6: a. Planting in compacted soil.
b. Planting trees in wet areas.
c. Planting shrubs in wet areas.
d. Sand dune planting. For seashore: Rosa rugosa, Prunus maritima, Myrica pensylvanica, Elaeagnus umbellata, *etc.*

Of still greater challenge to the landscape contractor is the low, wet planting site with little opportunity to install underdrainage. Here also nature points the way to a solution, which can be observed in any young maple swamp on really wet ground. The trees will be observed each to be growing on a small projection of soil. The seeds which gave rise to each surviving tree germinated originally on tussocks or other soil projections above the surrounding wet soil. Later when the trees grew older they gradually extended their roots downward and outward into the surrounding soil and successfully invaded and utilized it for growing substrate.

This natural method can be used with great success in landscape planting under similar conditions. Beds of shrubs or the soil balls of shade and ornamental trees can be placed partially raised above the grade level (see figs. 6b,c). As in planting at grade level, a saucer-shaped depression must be provided for watering during the first growing season after planting. It goes without saying that species adapted to wet soils must be used for landscaping such sites.

Such a partially raised planting will look somewhat peculiar for the first couple of years after planting, but in a surprisingly short period of time the soil of the mounds seems to settle down or level out. Before very long the slight raise which remains from the little hill necessary to establish the planting will be a quite unnoticeable feature of the whole planting.

Planting in Sand

Nature also points the way to an intelligent observer in the problem of establishing successfully a planting in extremely sandy porous soils such as found in many areas at the seashore.

Wherever a beach plum or another seaside shrub has been uncovered by a shift in the sand dunes or big excavation, the stem of the plant will be found to be enormously long, extending far down for many yards into the sand to where permanent moisture is to be found.

When one plants under such sandy conditions the root mass should be set several times deeper than would be normal (see fig. 6d). Often leggy plants which would be unacceptable for regular landscaping can be used for sand dune planting with fine results.

Human Predation

A real problem exists in trying to establish and maintain landscape plantings in areas of heavy pedestrian traffic and dense

occupancy, such as municipal building grounds and public housing projects. Here also observation of how nature solves these problems is of value to the landscape architect. In desert areas or steppes where woody plant life is hard pressed to survive and animal browsing is a severe adverse factor, successful woody plants are spiny and thorny to ward off potential destroyers.

The landscape designer must adopt the same solution for plantings of shrubs and small trees so susceptible to vandalism. Where a hedge of Japanese holly will not survive a single growing season, a hedge of *Berberis julianae* will grow on to a ripe old age. Where a flowering crab apple or cherry will be torn to pieces the first time it blooms, a Washington or cockspur hawthorn will be perfectly secure and provide a fine display of flowers and colorful fruits each year. Where a birch would soon lose all its bark, a thorny honey locust will grow untouched to maturity.

In all aspects of the challenging and infinitely rewarding nursery profession, intelligent observation and comprehension of nature's way indicate the easy way and the profitable way to perform nursery and landscape operations. When does a seed ripen? Usually that is the time to sow it. Does it pass through the digestive tracts of birds before it falls to the ground? Then it should be cleaned of pulp before it is sown. Does a plant occur on moist northern exposures in the wild? That is the location it will do best in on the landscape planting.

Is the plant a xerophyte under natural conditions? Here is the solution for that dry, sun-baked location. Does a plant thrive at the salt-lashed seashore? It is a possibility for northern highway planting. Is a very desirable tree very difficult to transplant? Landscape planting schedules should be juggled if possible to permit transplanting it at the limited optimal planting time, or else it should be dug and heeled in under special care so the shock of the move has been overcome before it goes to the landscape site.

Landscape and nursery transplanting is an unnatural phenomenon for any plant, and it is easiest and safest when natural considerations are working for, rather than against, the nurseryman.

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