WHY GREEN TURNS BROWN

(Environmental Horticulture—The Urban Planting Tool)

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An idea is born—any idea—and if it is good we are apt to support it enthusiastically. And so it was with the recent national beautification crusade. We foresaw no problems as we visualized our cities and freeway banks transformed from sterile, depressing, polluted areas into vistas of beautiful trees and flowering shrubs. We anticipated immediate relief from outdoor walls and floors of concrete. It was a tremendous idea and it still is!

The beautification era was phase one—a period of trial. A rude awakening followed: we had so much to learn! How many ten year old plantings have survived to match the beauty of the original landscape drawings colored with lush green areas which were bought and paid for? If the financial losses on all the green that turned brown were spelled out nation-wide, the tax payers would revolt.

In phase two we found “beautification” succeeded by “environment”—a definite step ahead. An even stronger need for planting our cities and freeways became apparent. For example, Plants, People and the Environmental Quality, published by the U.S. Department of Interior, National Parks Division and the American Society of Landscape Architects Foundation, vividly portrays the many desirable purposes plants can serve in providing environmental control and improvement. This publication introduces itself as a beginning in environmental design; as such, it is a promising step ahead in environmentally practical landscape design. Also available are dozens of scientific research publications explaining how trees and soil capacity can control pollution.

But these efforts do not spell Mission Accomplished! Both phase one and two are primarily efforts to prove the value of a plant’s role in servicing our lives, whether it be aesthetics or practicality. But unfortunately, the drawing board does not guarantee the life of the plant. The basic problem of why green turns brown has been bypassed! The disastrous failures of many of our plantings have been like watching spectacular waves crash down a wall: we are appalled by the insurmountable maintenance costs and the failure of the green to grow. To color the urban environment with a green that stays green is our current challenge.

For a common case history, we can use a Seattle expressway planting, conceived by drawing board landscape architects and completed with a planting of 4,000 trees at a cost of $500,000, three years ago. Over half of those trees now are dead and have had to be replaced at a stepped-up cost. Everybody loses: the taxpayers are out a substantial sum; the nursery industry, already plagued by a critical shortage of plants, has to account for replacement trees; everybody is out three years’ growth and beauty. Why does this happen? Who is responsible when green turns brown? It is time to define the problem, explore the factors that create it, and find ways to prevent its occurrence.

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All this points to a supplementary need to provide realistic maintenance costs, to determine which plant species can survive unnatural conditions of growth, and serve a practical need. Environmental horticulture is the principal solution to this problem.

Horticultural encyclopedias give us the conditions under which a plant grows in its native habitat as well as its habit of growth, but there is no publication telling us how a plant will respond to the urban environment, or the plant's adaptability to the many differing combinations of environmental factors. This information comes only from the horticulturists' observation, experience, and research. Since no two locations are environmentally identical, no such general publication is possible.

Background of an Unsuccessful Design and Plant List

Whether maintenance and horticultural problems are given consideration first or last in the planning stages determines ultimate success or failure. An unfortunate precedent has been established in that major problems are considered last and least. Designs submitted by a landscape architect represent his concept of a ten to twenty year old, established planting; once the design is accepted, his responsibility ends. The selection of designs by councils or commissions has
A sorry solution to a critical problem. The pines for the downtown freeway maze were healthy when planted—all three times. The plant specifications originated with a renowned landscape architect. Horticultural advice is required. Photos by Don Normark.

A well-graded bank, a good design, and the wrong plants. A fungus disease has destroyed the original planting (few remaining plants at top of bank now are infected) and spreading junipers were replaced with a resistant variety.

been based on developmental costs and landscape design, with little or no consideration given to survival potential of the plant material or to maintenance costs. The responsibility for development is then delegated within an agency or department.

It may take four years from the drawing board before there is evidence of success or failure. Perhaps this is why some landscape architects regard five years as the urban life expectancy of a plant. This concept is costly, serving neither the intended purpose of a mature planting, nor justifying the investment.

More often than not, the decision-making bodies do not concern themselves with maintenance budgets or whether such budgets are realistic. The maintenance department inherits not only the finished landscape planting, but also the criticism should the landscape become shabby. Those plants that cannot survive the conditions of the site are repeatedly replaced, and this is a costly cycle. And those that need excessive maintenance soon present a sorry sight. The situation is ridiculous.

When plant material is chosen for its ability to survive the site and within a predetermined maintenance budget, it remains green, and does not turn brown. Priority must be given to maintenance and environmental horticultural consultation in the initial planning stage. This is the role of environmental horticulture. The landscape architect must have plant tolerance and plant maintenance facts at hand before he develops his landscape design. Does the projected maintenance budget permit extensive lawn care or should a ground cover be used with practical pathways to accommodate the traffic? He must know which trees, shrubs and ground covers are environmentally suited to a particular site and what their maintenance demands are.

**Typical Factors That Influence Plant Survival**

What factors does the horticulturist take into consideration? Of course all plants are affected to some degree by various kinds of pollution. But other factors also influence the success of a planting:

Funnelled wind caused by large buildings dehydrates plant foliage. For example, rhododendrons are pollution resistant but will suffer from this unnatural dehydration. The direction of prevailing winds may also make a difference, or the site may have poor air circulation and become a stagnant air pocket.

Time and amount of sun must have an affect on plants. If the planting site is exposed to exhaust fumes and full sun during heavy traffic hours, it might need doubly tolerant plant material because the sun factor intensifies the pollution factors.

Intensity of sun reflection (or radiation) from neighboring concrete walls,
streets, and automobiles is a potent hazard to plant life. The effect of existing night lighting in the vicinity is another variable that influences survival.

When root systems are trafficked by pedestrians and animals, the soil becomes impacted, denying the plants the loose, friable soil they need to absorb air and water. Artificial watering and fertilizing are proving less and less adequate for a plant combating pollution. Ground covers or structural means of protecting the root system areas, or both, often are recommended.

Pouring soil over and around existing “spaghettied” underground utilities gives inadequate room for the plant’s root development. Yet this is commonly done and represents a prime cause of street tree mortality. It should be remembered that some species have root systems that may break through concrete building foundations, underground utility structures, and sidewalks. Mistakes are costly. Specifications should include adequate drainage for existing hardpan or plant containers. This is a crucial necessity for areas subject to heavy rains. Root rot is slow but spells certain doom to plants given the “bathtub” treatment.

There are still more factors to be considered:

Plant materials vary in their soil requirements and standard soil specifications are often minimal.

Plants vary in their resistance to decay caused by wounds from broken branches. Accept vandalism as a fact of urban life.

Mortality is not always caused directly by pollution. A plant with a characteristic susceptibility to disease or blight will be further weakened by pollution. Such plants are best avoided for plantings in urban areas. Many species need expert pruning, spraying, and fertilizing and the hundreds of experts needed in every city are just not available. It is best to avoid these high maintenance plants, too.

If the lower branches of trees must be stripped for traffic clearance, many ornamentals have to be eliminated because they need to keep their lower branches until maturity for strong trunk and bark growth. Those that can tolerate stripping would fare much better if the exposed trunks were protected by loose wrappings or by other means, at least until plants are well established.

The environmental horticulturist considers all of these factors and more in his recommendations. He wants the plants in his design to grow! The horticulturist knows plant adaptability and has access to current findings on pollution resistant material. Substantial research is underway in seeking and hybridizing pollution resistant strains. The landscape architect may find his choices limited. Before urban conditions were so adverse to plant life, the architect could select simply to accommodate his design. No longer—the situation is reversed! Surely it is better to design from a limited selection of plants to assure a growing green. Each site is environmentally individual and studying its specific environmental factors before a plant selection is made can be the critical point.

In an effort to provide this pertinent information, the A.H.S. has undertaken a nationwide plant performance survey. Amateur horticulturists (our amateur gardeners) and professional horticulturists are supplying data on regional location, specific site (freeway, industrial area, street, park, etc.) and condition (doing well, fairy, or poorly). The resultant computerized manual will serve as a valuable guide. We will know which plants are holding up best and where. This survey program is a valuable contribution from the volunteer participants. The local horticulturist can complement this with his knowledge of the plants’ adaptability to the other existing conditions. A sample form listing the essential conditions to be analyzed on each planting site is another useful reference. Both of these are available upon request from the A.H.S. Office.

**Environmental Design and Environmental Horticulture Interdependence**

Environmental landscape design now recognizes the need for plants to serve a variety of needs on the urban scene; our job is to add environmental horticulture to give these plants a fighting chance. A plant in the city is a plant in captivity.
A Seattle traffic triangle, once a weedy trash catcher, now a point of beauty. Trees are Norway maples, the under-planting is the 'Otto Luyken' cherry-laurel. The maintenance bill is $300.00 annually, a bargain for adjacent homeowners and a public school.

Photo by Dale A. Brenden.

As in a zoo or an aquarium, success depends on whether the basic conditions for survival are provided. Any plant growing in an unnatural urban environment needs a friend—the horticulturist who is concerned with the plant’s source of life and its environmental tolerance in order that the plant can do the job we ask of it. Otherwise, landscape designs merely add to our high living costs without providing any benefits. A little research into the financial statements of any city or state relative to the costs of planting developments and their annual maintenance costs will verify this. The increases in maintenance are staggering. We could have had many more landscape plantings, and all of them successful, for far less than the costs of the known failures.

For the same reasons we must be wary of dramatic planting programs based solely on cost of installation. Demand both a maintenance program and an established source of funds; if there is no specific commitment, vote no!

Fortunately, most of the nation’s eminent landscape architectural firms now use environmental horticulture and consistently seek horticultural assistance from local sources. The “new breed” of landscape architecture students is especially encouraging because these students are making an issue of the need for horticultural implementation.

Environmental design needs environmental horticulture to succeed. To quote Russell Page: The Education of a Gardener

"Successful landscape architects have learned to abide by an established rule: the landscape architect and the horticulturist must work together in recognition of each other’s talent, because these are two wide fields of knowledge and a man’s lifetime is not enough for him to reach the limits of either. One without the other will usually result in dismal failure."

And Fletcher Steele: Gardens and People

"Throughout history when masters of various professions have worked together and helped each other, much beauty has crowned their efforts. But when artists are touchy about their independence and compromise only after their quarrels, the results may be tidy but certainly dull."
Introducing Environmental Horticulture and Design to Public Agencies

This brings us to phase three: priority consideration of horticultural knowledge and recognition of maintenance costs by public agencies. Public agencies should not be held responsible for horticultural expertise. As an amateur horticulturist you have an opportunity to promote action; you are a citizen and a taxpayer, and are knowledgeable about plants. Your voice will be listened to by governmental bodies. If you take the initiative and if you represent a local group or organization, your impact is even stronger.

As a start, you might notice local public planting developments that are in poor condition or that require constant replacement. Any citizen has the right to request the installation and annual maintenance cost figures for a public planting. You might find annual maintenance is one-fourth of the original development cost. No budget should tolerate re-investing the original cost every four or five years. Small wonder the green turns brown!

From there you must go to the top whether it be the Mayor or the Governor. Nothing is accomplished in going to various governmental departments for each is subject to decisions handed on from above and no department has the authority to alter these decisions. The original plans are locked up as they are distributed to each successive department for implementation. Nor will the Mayor, the Governor, members of the City Council, Park Boards, Engineering or Urban Planning Departments be interested in a summation of environmental horticultural factors. But they are interested in costs. This is your area of attack: costs are out of line, inadequate maintenance budgets are expensive, and both can be remedied. The Mayor or Governor can open doors by requesting department heads, collectively if possible, to give consideration to these suggestions. Such occasions can do much to clear the air. Department heads may be unaware that landscape architecture is a design profession and is not a horticultural profession, unaware that the architect should welcome the addition of environmental horticultural information, and unaware that this alone would remedy much of the maintenance problem.

A steeply tilted triangle planted to Oxydendrum arboreum and Canadian Hemlock, with Raphiolepis ovata as a ground cover. A $300.00 annual maintenance budget suffices as the planting requires no spraying, no fertilizing and little litter picking.

Photo by Dale A. Brenden.
Above. The labels in the Operation Triangles plantings are a real asset. They easily educate the interested amateur gardener.

Above right. The walk-through triangle becomes a pocket park where benches make waiting for the bus a pleasure. The trees are Washington thorn and the groundcover is Viburnum davidii.
Photos by Dale A. Brenden.

If the agency is receptive, a volunteer Horticultural Advisory Committee may be permitted to prove its value on a demonstration site. This committee studies the existing environmental factors of the site and should be able to assist the landscape architect in choosing plant material that would thrive and require minimum maintenance. Here is the time to determine a realistic maintenance budget. Maintenance departments welcome any effort to bring them into the original planning stages.

Volunteers on this Horticultural Advisory Committee can be drawn from experienced amateur and professional horticulturists alike. Educational institutions, Arboreta and Botanical Gardens constantly seek opportunities to provide civic assistance; their staffs will serve in areas such as soil assessment as well as horticulture. Don’t ever forget that the capable amateur has had considerable experience in growing plants. He knows each plant’s “cup of tea.”

Local gardening groups can initiate a planting project by coordinating their efforts with public agencies, whether city, county or state. To do this may require accepting a small share of the overall project costs. This is commonly referred to as “seed money” and confirms serious intent. The group can be responsible for researching the environmental factors of the proposed site, work with the agency’s landscape architect in arriving at suitable plant material for his design, and include prime consideration of a realistic maintenance budget. No prima donna posies allowed!

Operation Triangles Proves the Point

Speaking from experience: Seattle’s “Operation Triangles,” with its professional and amateur volunteer Horticultural Advisory Board, was initiated by the Chamber of Commerce, and introduced the idea of landscaping 700 small traffic triangles that were created by traffic thoroughfares and criss-cross freeway lanes. This project was carried out in a coordinated effort with our City Urban Planning Department. The program has been successful and is accepted by the city. Today we are developing these triangles as rapidly as financing permits. The city assumes the cost of development over and above the “seed money” and the maintenance.
The Operation Triangles Committee solicits the interest and seed money from neighbors near the triangle; this consolidates community interest. The Horticultural Advisory Board studies the site and makes recommendations to the City landscape architectural department on suitable plant material. All this has not been easy, but the results are strongly providing evidence of success. The triangles cost from $10,000 to $15,000 each, average 5,000 sq. feet, and require $1,000 seed money. Annual maintenance for the first two or three years averages from $500 to $1,000 each, and $300 to $500 annually thereafter. Some of the neighborhoods have become so enthusiastic they have "seeded" additional nearby triangles, and plan to finance extensions of the triangle plant material to local boulevards or business sections.

Long before this, in 1959 the Seattle Garden Club knocked on our City doors, as well as those of the Army Corps of Engineers, with a proposal for a demonstration planting along the Lake Washington Ship Canal. We seeded $4,000. The demonstration was so successful that we selected another site on the banks of the Canal and repeated the story. Then came a third section. As the culmination of our efforts in arousing public interest and support, the Army Corps of Engineers now has underway an eight million dollar development of its property along the Canal; the Seattle Garden Club Horticultural Committee serves as an acting partner. Without that initial interest in a $4,000 demonstration planting, would this attention to the beautification of the eight-mile Ship Canal ever have occurred? Little acorns of enterprise—yes, if environmentally sound, they grow.

Another example is related to our new freeway plantings of six or seven years ago. Armed with facts, our interview with Governor Daniel J. Evans was effective. At that time, the State Highway Department had the responsibility for freeway planting developments; they began with a string of costly, ineffective and busy little gardens. Quoting Russell Page was particularly effective:

"If the speed limit is 60 miles an hour, or a one-minute view of a distance of one mile, the planting should not consist of more than the continual use of three plant species. Even if the speed limit is only thirty miles an hour and a one minute view of half a mile, it can be even more satisfactory to view the same planting for a period of two minutes."

A metropolitan triangle planted to Photinia fraseri. Traffic visibility requires a planting not more than three feet high, so the Photinia is sheared twice annually. The dense, twiggy growth hides litter and discourages trespassers.

Photo by Dahl A. Brenden
The State Highway Department is now on a horticultural/maintenance appreciation "beam," staffed with environmentally concerned horticulturists and landscape architects; our freeway plantings are more aesthetically appealing and much less costly. This, too, was brought about by pushing the maintenance consideration and plant failure to the forefront.

Once a responsive interest from governmental authorities is aroused, not a second should be lost in suggesting a demonstration to prove the point. The authorities can open the doors to the project manager, who in turn can allocate personnel to aid the demonstration project.

Another tactic is to organize a seminar, inviting key representatives of urban planning, park, landscape, engineering and maintenance departments to meet for an open discussion on the practical advantages of horticultural and maintenance considerations before final planning. Such seminars could even surface duplications within different departments, each unaware of the existence of the other.

It may be possible to review a current landscape development during the planning stage. If the environmental factors and existing site conditions suggest the plants are not suitable to the site, submit an alternate list. In doing this, attempts to conform to the landscape architect's design are important; it is basically negative to inform a landscape architect after his plans are completed that the plants are unsuitable. He is an artist, can misunderstand, and may resent interference. Also, it is more difficult to find environmentally tolerant plants to fit shapes already defined than it is for the landscape architect to work from an appropriate plant list to begin with. Granted, it can be a challenge if the shapes and textures of suitable plant material for the site severely limit the design. Yet consideration at this time will determine whether the ultimate result is to be green or brown!

Every effort will not be crowned with success. For example, every bit of horticultural evidence we could present in opposition to a landscape architect's proposal to convert an abandoned industrial site to a City park fell on deaf ears. A fifty year old gas works on a twenty acre site, saturated to China with tar,
benzene, and oil soaked soil, was envisioned by the architect as retaining some of the structures, surrounded by trees, shrubs and lawns, and including a garden of native plants. This design was awarded an original one million dollar contract by the City. Despite all of the facts, digging began; immediately and predictably, a seething mass of oil was released. The landscape development plan has now reached a 1975 projected cost of over four million dollars and includes removal of a substantial amount (35,000 cubic yards) of the existing polluted soil, elimination of all plants except for a stand of trees in the parking lot, and surrounds the industrial forms with three plots of turf only. By 1975 this “park,” composed of approximately five acres of lawn, could easily cost five million dollars (four million above the original contract) and by 1978, the remaining questionable soil conditions could even eliminate the lawn. This is to say nothing of the future annual high maintenance costs of lawn, or continual turf replacement.

A current success is our dealings with Lawrence Halprin & Associates; this firm is designing a park to cover a freeway in the City center. The first section was horticulturally reviewed after design completion; several substitute plant species were suggested and were readily accepted. For the succeeding section, and at the request of the firm, a plant list was submitted before the landscape planning. “This saved immeasurable time and cost.”

There is no point in venturing forth on a mission to any public agency on a complaint platform. This route is circular: from the maintenance department to the engineering or city planning department to the landscape department and back to the maintenance department, finding no one who can answer to any responsibility.

In summary, the cause of costly public planting failures is two-fold: unsuitable plants for the conditions of a specific location, followed by excessive maintenance costs. The solution is simple: solve these problems before hand. Every plant is motivated; it’s going to try its best to grow. The horticulturist is the doctor and must prescribe every horticultural compensation he can to build strong, healthy specimens. His tool is environmental horticulture. This keeps the green from turning brown, whether it be plants or currency! ✝