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INTERIOR LANDSCAPING[1]

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As a preface to my remarks pertaining to interior landscaping, permit me to attempt to explain my views as to some of the reasons why the use of interior plants is now the fastest growing facet of environmental horticulture. I most seriously suggest to you that man is inherently unhappy when in an environment in which there is an absence of plants and flowers.

Interior ecology

Inasmuch as most of our lives is now spent indoors, it seems to me we should be thinking very seriously of interior ecology, a realistic balance of nature grown and displayed in interiors, in our homes, our offices, and our public buildings. This is a problem that could and perhaps should arouse public concern. In the absence of plants and flowers in some of our interiors, we may be producing undesirable side effects that, if allowed to proceed unchecked, may result in the erosion of the psychological environment, the erosion of human life. I certainly have no desire to be a self-appointed ecologist who advocates a "back to nature" movement as the only solution. On the contrary, I feel we must improve and correct that which we have already created. We must add plants and flowers to all our interiors where barren or nearly so.

Is it not true that we are now rapidly retreating to a life of abstraction in which we are punishing the senses in denying the basic fundamentals of primal association? Mahatma Gandhi said that the real fast is that of continuous meagerness rather than complete abstinence. I suggest that some of the unrest in the impoverished areas of our American cities may be due to the lack of plants and flowers, never, of course, in complete absence but certainly a continuous meagerness. For the ages of primal association of plants and flowers, we have substituted an age of sensual bombardment. We have allowed the smells of partially burned hydrocarbons, dioxides, and other pollutants and we have denied the subtle aromas of plants and flowers and of the newly turned furrow.

Symbiotic relationship

It occurs to me there may also be a symbiotic relationship between fauna and flora. Do wild animals not breed in captivity because of the absence of a natural environment? Limited psychological research in human behavior seems to indicate a symbiotic relationship. At a Long Island Veteran's Hospital, certain mental patients were assigned simple garden and greenhouse projects as a means of therapy. Over a period of years, the physicians in charge firmly believed that there was medical evidence of therapeutic value. One doctor stated that not only do plants need the care of man to develop best, but also man required direct contact with plants to develop and retain a mental wholeness. This is truly a symbiotic relationship.

Let me present further medical evidence that we, as humans, are more content with in close association with plants. At the Dunlap Psychiatric Hospital, located on Ward's Island in the East River, New York City, certain basic research in human behavior has recently been completed. The experiment was rather simple in that X number of patients were exposed to a flowering chrysanthemum plant casually placed on each dining table at meal time. The check lot of patients had an identical environment, food, etc., ex-

[1] Presented at the ISA conference in Philadelphia, Pennsylvania in August of 1977.

cepting there were no plants on their tables. Copious data were taken at the highest scientific level. The results, over simplified, were that those patients with a flowering plant on their table: a) ate 11% more, b) spent 21% more time at the table, and c) conversed 33% more with their fellow patients. This was considered remarkable to the point of being a breakthrough in the psychiatric world because the average patient tended: a) not to eat, b) not to remain at the table, and c) not to converse with his fellow patients. Dr. John Talbott, in charge of this research and now at the Cornell Medical Center, New York, has or is about to present a paper on the subject to the American Psychiatric Association.

A few years ago, a new concept of office arrangement was initiated in West Germany. This concept, as a direct translation from the German "Burolandschaft," has now become accepted in American architectural and design circles as "Office Landscaping." Psychological and psychiatric research in employee attitudes in the planted office vs. that of employee attitudes in the traditional or unplanted office brought forth some interesting observations in human behavior. A majority of the employees in the planted office stated that they felt more content and in many instances could not explain why. Attitudes in the planted office seem to indicate individual and collective morale very much improved and absenteeism considerably down, just one more scrap of evidence that man is inherently more content in an environment in which plants play a major role in his daily routine.

In a recent issue of the Wall Street Journal there appeared an article headlined *Stylish Success* in which Mrs. Paige Rense, Editor of Architectural Digest, gave her considered opinion of the interior of a certain home. "A large 17th century Italian tapestry, Waterford crystal candelabra, an African carving, and a veritable forest of plants and flowers, all neatly arranged." Her verdict: "The house passes muster." I use this article to point up the importance of plants and flowers, ranking in correctness of interior design with Waterford crystal and a 17th century Italian tapestry.

I recall as a boy the slogan of the American Association of Nurserymen, "It is not a home until it is planted." The slogan has long since been dropped mostly because of lack of its need. Nearly every home is now planted. I suggest in 1977, the adoption by some organization of the same slogan now to read, "It is not a home until it is planted — inside." In residential interiors, consider a house tree for each room.

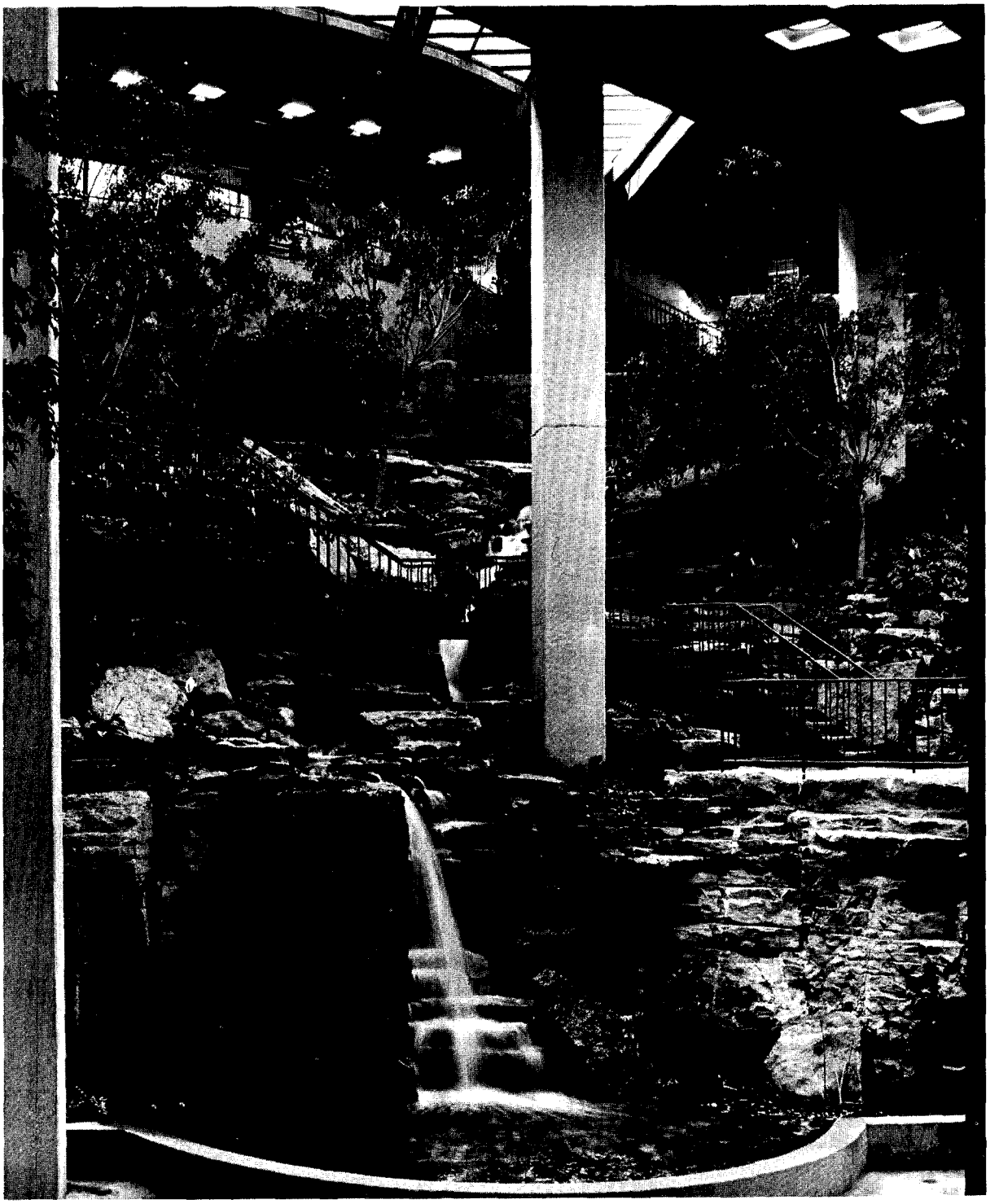
As a boy, born and raised on a farm, I knew the bay of the fox, I knew the call of the whip-poor-will, I knew the inspiration of nature's foliage and flowers. It all seems lost now in our man-made cities. Perhaps not all. We can't bring back the fox and the whip-poor-will, but we can bring back the inspiration of nature's beauty. We can move it indoors in the form of interior plantings! During the past ten or 15 years, the new components of flowers and foliage has been added to the interior design of most new public and office buildings.

Exactly when and where it all started is not known, excepting that the ruins of Pompeii indicate the use of interior plants 2000 years ago. In more modern times our grandmothers enjoyed plants in their homes and were very successful in their culture, probably due more than anything else to the fact that homes were heated by means of stoves, with a resultant fairly high indoor relative humidity. The Celts, from whom many of us are descendants, had a culture in which trees played a most important role. Was this not primal association? Many plants which were either not generally known or not readily obtainable 50 years ago make up the varieties generally used today.

Turning from the philosophy and history of their use in interior design, certain basic principles apply to the installation and selection of interior plantings and special attention should be given to the following factors.

Selection of plants

Today's interior plantings are, in most instances, made up of varieties of tropical and semi-tropical plants and trees. However, there is an ever growing desire on the part of many owners and some architects and interior designers too, if possible, use a few temperate zone plants and trees. In tropicals, generally



Crown Center Hotel — Kansas City

speaking, we would not hesitate to at least try any outdoor landscape tree or plant of the Miami area in our indoor plantings if there is enough light intensity and enough room. Lately we have found that tropical fruit trees, not only the orange and lemon but also varieties such as guava, mango, and loquat, live well in interior conditions. Where the light intensity is over 1,500 footcandles they will flower and if of sufficient age will bear fruit.

Containers

Generally speaking, interior plantings fall into one of two categories, that of office landscaping or interior gardens. In office landscaping, plants are nearly always in individual containers. The typical contemporary planter is either ceramic or fiberglass, ranging in diameter of 8 to 48 inches with a few exceptions up to 120 inches.

Contemporary planters made for interior use have no drainage holes, as would the old fashioned container, thus eliminating the danger of water damage to carpets. Therefore, built-in drainage is necessary. When the plant is removed from the container in which it was grown and planted directly into a contemporary planter, 3 or 4" of crushed stone or gravel are placed in the bottom of the planter, on top of which is placed a fiberglass wool soil separator and above this the medium in which the plant is to grow. We much prefer the metal or plastic container (usually the metal or plastic can in which the plant or tree has been grown) to serve as an inner planter. The space between the bottom of the inner planter and the inside bottom of the planter, which amounts to 4 or 5", serves as a reservoir for excess water which drains from the soil ball.

This reservoir of drain-off water can become dangerous to the plant when too high or when salts build up to too high a level. The only present method of measuring the amount of drainage water in the bottom of the container is by attaching a plastic or metal tube about 1/2" in diameter to the inner vertical wall of the planter, such tube going to within 1/2" of the bottom. Then, by the dip-stick method, the amount of water in the container can be determined in the same manner that you measure the oil in the crank case of your car.

Automatic watering is now only a short time away in such containers. Along with automatic watering, of course, will come automatic feeding and insect control by means of systemics.

Some designers no longer consider it good taste to let the soil show. Many very fine ground covers are available such as small-leaf, slow-growing plants, riverworn pebbles (ranging in size from 1/2 to 2" in diameter), tree bark chips, etc.

One very fine ground cover is live sheet moss gathered from the woods. If it's alive when obtained, and if kept moist, it will continue living for quite a long time. It is generally considered not only poor taste, but sometimes detrimental to the plants, to use such ground covers as granulated limestone chips or peat moss.

Light intensity

There seems to be a general misconception that an indoor plant should last forever. Under indoor conditions the average plant or tree may last for many years or if general conditions, especially the light factor, are not good, may only last for months. Without question, the most important factor in the success of indoor plants is sufficient light intensity. Generally speaking, the addition of artificial light, florescent or incandescent or a combination, is necessary when there is less than 150 footcandles of natural light.

Recently, when called in by an architect for advice during the planning stage, I asked for one thing only, an electrical outlet near each plant location. With the proper intensity and quality of light, it is possible to grow most any tropical plant, even to flower some plants. At any rate, all interior plants should last longer than they do now.

Many growers are now refining their operations Poor results in present indoor plantings are many times due to improperly conditioned plants used at the time of installation. At the present time, practically all plants and trees used in interiors are grown in Florida or California. Some are grown with only one goal in mind and that is to grow a plant or tree to a given size in the least possible time to insure a maximum profit to the grower. There is nothing wrong with this when plants and trees are used in local exterior lan-

dscape plantings, but all is wrong when used in interior plantings. Plants and trees grown in full sunlight (8,000 to 12,000 footcandles) and a few days later placed in an interior in which the intensity of light is not over 150 footcandles are never satisfactory. Plants and trees grown in a relative humidity of 80 to 90% and a few days later placed in an interior environment during the winter months of perhaps 15 to 20% relative humidity are never satisfactory. Plants and trees grown where the natural rainfall and supplemental irrigation supply 150" of water per year and a few days later placed in an interior environment in which they are watered once every week or ten days are never satisfactory. Leaves turn yellow and fall off by the hundreds. Foliage dieback is common, branch dieback is also common.

Acclimatization

What is the answer? The solution is that of conditioning and acclimatizing these outdoor-grown plants and trees which are grown now primarily for outdoor subtropical landscape use, to an interior environment. Many Florida nurseries are now acclimatizing plants for interior use. As recently as eight years ago, none were. All of this is due, with thanks, to the excellent research accomplished by Dr. Conover at the University of Apopka. By acclimatization, I mean the gradual transition from a light intensity of 8,000 footcandles to perhaps 800 footcandles, from frequent rain and irrigation to once per week hand watering or automatic watering.

There is the matter of medium in which the plants are grown. In my opinion, they should all be transpotted into a larger size container and in a proper medium for interiors. I can forsee the day when architects and designers will specify that plants and trees be acclimatized to be certified for best survival in interior conditions.

The Ford Foundation plantings

The best known example of the use of temperate zone plants and trees in a large interior planting is that of the Ford Foundation in New York. These gardens were installed by us in 1967 and have been maintained by us ever since. The total area of the main garden is approximately 1/3 acre and was at the time of installation the largest indoor garden in the world. There are also terrace gardens on the third, fourth, and fifth floors. The building itself is 12 stories high and is glass-walled on two sides, the south and east. The roof is also glass.

Some of the trees and plants selected by the landscape architect consisted of temperate zone and southern temperate zone varieties such as *Magnolia grandiflora* (35-40' tall), *Cryptomeria japonica* (20' tall), *Camellia japonica, Azalea indica, Pieris japonica, Harpephyllum caffrum,* and *Pyrus kawakami.* Also included are topical and subtropical *Bougainvillea, Allamanda, Pittosporum,* and *Jacaranda acutifolia* (25-30' tall). The ground cover plants consisted originally of mondo grass, baby tears, *Zoysia tennifolia,* and certain ferns.

Actually, what we are attempting to do is to grow these southern temperate zone trees and plants in what amounts to a tropical or semitropical environment. The lowest temperature ever recorded in the gardens is 63 deg. F and this for probably not more than three or four hours. The relative humidity averages about 25% in the winter months but is higher during the rest of the year.

The amount of air pollution in this part of New York City is very high, the Consolidated Edison chimneys are only four blocks away. New York has, by far, the dirtiest air in the country. Because of taller buildings surrounding the Ford Foundation, the light intensity is poor. On a day of clear winter sunshine which would register 3,500 footcandles in the country, the footcandle reading inside the Ford Foundation Building taken in sunshine is not more than 2,000 footcandles. Thus, you can readily understand some of the difficulties involved. To add, there is no previous experience by anyone, anywhere in this field. Much good research is needed.

"Doomed to failure" cried many when we installed 40' tall *Magnolia grandiflora* trees in the Ford Foundation interior plantings. Their alarm was justified. Did not temperate zone trees need a yearly rest period of at least six weeks with the night temperature dropped below 45 deg. F.?

Ford Foundation — New York City

Today , ten years later, three-fourths of the magnolias are living, so are all of the camellias, and the lowest recorded temperature during that ten years was 63 deg. and that for only a few hours. The temperature shown on a recording thermometer is 70 degrees ±5 degrees the year round. The three *Cryptomeria japonica* planted in the highest light intensity in the gardens gradually deteriorated and eventually died within 18 months. So did *Pachysandra terminalis*. Why? Nobody can give the scientific answers. I repeat, much research is needed.

The interior landscape contractor

The interior planting specialist of today works very closely with the interior designer, architect, and landscape architect and has not only the ability to interpret the designer's every wish into practical plantings, artistically and functionally arranged, but to maintain these plantings on an unconditional plant replacement guarantee basis, thus eliminating all worries and the responsibility on the part of the owner. The interior planting specialist can also supply live plant and planter rentals, which include maintenance and an unconditional plant replacement guarantee. This service is increasing rapidly in popularity.

At the present time, interior plantings are installed and maintained either by specialists in this field or by florists, nurserymen or exterior landscape contractors. I am sure that the future of the interior planting business is excellent. I am not sure, however, whether it will go to the present outdoor landscape people and the outdoor nurserymen or whether it will continue as it is today in the hands of the interior planting specialists and the indoor florists.

There is much to be said for each segment of environmental horticulture. The present day nurseryman in the northern three quarters of our country does not know tropical varieties of plants and does not know the techniques of handling them. On the other hand, the indoor florist of today does not know temperate zone plants, to say nothing of understanding how to move a tree with a 9 or 10 ft. ball, or of speaking the language of the landscape architect. My guess would be that the future of this kind of business will be in the hands of the interior planting specialist in much the same manner that the sod and turf business of today is in the hands of the sod and turf specialist.

Indoor plants and trees are here to stay, especially in our city buildings, and these plantings are now represented in all stages from a small potted philodendron on the secretary's desk to the 40 ft. tall magnolia trees in the Ford Foundation building. Perhaps the last quarter of the 20th century will see a greater amount of plants in Manhattan than existed at the time when Peter Minuit purchased the island from the Indians for $24, and with most of these plants indoors.

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ABSTRACT

Peterson, G.W. and J.W. Riffle. 1976. **Protection of windbreaks from diseases.** p. 172-180. *In* Shelterbelts of the Great Plains. Proc. Symp. [Denver, Colo., Apr. 1976] Great Plains Agric. Counc. Publ. 78, 218 p.

In young windbreaks, diseases caused by root-infecting fungi, leaf-spotting fungi, and abiotic factors such as adverse sites are very important. As windbreaks mature, heart rots, diebacks, and stem-canker diseases become significant. In general, on poor sites diseases normally associated with young trees may appear in older trees. On good sites, diseases of older trees may appear in younger trees. Diseases commonly encountered in young and old windbreaks in the Great Plains are listed. In this paper, tree diseases will be considered with reference to parts of trees affected: stems and branches, roots, and foliage.