

The American Nursery Industry: A Look Fifty Years into the Future[®]

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INTRODUCTION

Fifty years ago gasoline was \$0.35 a gallon and the minimum wage was \$1.25. A 40-h week at minimum wage earned a take home pay of about \$45.00. Many people aspired to make \$15,000 per year. A new car was between \$1,500 and \$2,000. Fast forward to today, the minimum wage is around \$8, a new car costs around \$25,000, and many people aspire to make \$50,000 per year.

Back in the day, container stock became a staple 50 years ago and the containers of choice were two types: 1-gal food cans, which were cheap and plentiful, and 5-gal egg cans or nut cans from India that were dipped in tar to retard rusting. Nursery flats were either made of wood or heavy gauge zinc. Plastics were rarely used. Fertilizer came in two forms: either a quick-acting field-grade fertilizer with obvious dangers to container plants due to burning, or very limited organic nutrition in the form of dried animal manure. Potting soils were made from sedge peats, sawdust, and other locally available organic waste products.

CHANGE STARTED TO CREEP IN: THE FORMATION OF THE IPPS

In addition to those basic ways of life both for individuals as well as the nursery industry — change was coming. What affected us most was the formation of the International Plant Propagators' Society. It was started by the great James Wells, who was President in 1951. The IPPS has progressed steadily ever since. With a great deal of work and diligence, let us hope that another 50 years are still in the offering for the IPPS. The IPPS help to forge and focus the nursery industry towards a much greater level of cooperation, as well as fostering new developments and a vastly improved communication among members.

Glass greenhouses, traditionally used for floriculture crops, found new uses as propagation houses for woody plants, especially with the advent of mist systems for the rooting of cuttings. The old Nearing frames and cold frames found other uses, but were quickly abandoned for rooting of cuttings in favor of the newer, improved rooting techniques. Container culture became more standardized as nurseries began to emulate one another. This standardization was critical because it allowed for greater consumer acceptance of our products. It also had the positive affect of opening a market for suppliers to offer a universal product that was useable by all nurseries and not limited by tailor-made high cost items. Without standardization, the suppliers to the nursery trade would have ignored the industry, since the old system was too hard to service. Uniformity of needs and wants resulted in an increased emphasis on products that had a broader appeal.

The IPPS also fostered increased university participation, which in turn lead to an awareness of the needs of the nursery trade and a subsequent increase in research by professors and graduate students — directed to solve complex production issues. As a result of this, liquid fertilizers began to make an appearance in the

mid-1960s followed later in the decade with the use of controlled-release fertilizers. Back then, we all had a steep learning curve to keep pace with such developments.

Uniformity of soils, containers, and fertilizers lead to a consistency in plants — which lead to a greater potential for marketing superior plants. Consumers came to expect a standard grade or form, such as the common usage of generic terms such as 1-gal and 5-gal, stemming from the old days of using metal food containers. This had nothing to do with the plant parse, but more to do with the container and how it was sold. Such changes, once started, progressed quickly. Fast forward 50 years: gasoline in recent years is around \$4 per gallon, containers are made of plastic, and we have progressed from 1-gal to greater than 60-gal containers, and all sizes in between.

Flats and trays are made of plastic, and there is considerable cross-over technologies from all facets of horticulture — so that the annual growers affect perennial growers who then influence woody plant growers. However, the heavy use of fuels for equipment and heat, the use of plastics for overwintering as a non-reusable throw-away technology and the massive use of plastic pots as an eventual throw-away product has contributed to our global carbon addiction.

CARBON ADDICTION AND HEAT SOURCES

Cheap sources of hydrocarbons to facilitate our industry have lead us to an irrational use of products that we take for granted, and ones that we eventually throw away. Fifty years from now much of what we assume is here to stay will be gone, and we should start making adjustments now to anticipate the loss of most of the materials we commonly use. If we start to embrace the change that is coming and develop sound renewable systems to compensate we will progress into the future with ease. An obvious place to start looking are heat and energy systems.

Heat systems of the future will make use of several different technologies such as solar, air and hot water systems, solar-generated electric systems, and above all waste heat systems that make use of cast-off and residual materials, much of which currently is buried to dispose of it. We will also have to make use of farmed energy supplies. Costa Rica and Panama are home to a unique tree, *Brunellia costaricensis*, which has freshly flowing sap that is flammable. The local natives in the jungles use it as a fuel for flame torches. Such plants could be improved and utilized on farms to produce fuels. Thomas Edison took a long hard look at species of *Solidago* (goldenrod), some of which grow to 3 m (10 ft) or more, because of their high latex content. *Hevea brasiliensis* (the rubber tree of commerce) has been forgotten in place of rubber produced from petroleum. In fifty years, we may not have sufficient petroleum to produce rubber. These plants and many others could well come to the forefront once again. A whole new industry will form to develop and produce renewable fuels from natural sources.

SUSTAINABILITY

A key word these days is sustainable — and when directed to the nursery industry it means the development of systems that are not ultimately on a one-way track to a landfill. Sustainable means that nurseries will have to retool their physical plant and operations to make a closed system that provides their needs and at the same time allows for the continued export of consumer materials. Technologies will have to be developed to accommodate new sources of materials that can be converted to potting soils and energy supplies.

Nurseries will move beyond cell phone towers as cash cows, and adaptations will be made towards greater use of combined space to make use of solar, wind, and bio-mass production. In some cases there will be in-house utilization of these products and perhaps some surplus to sell off-site. Soil mixes will change from fossilized peat moss to the use of self-generated organic matter and sedge peats (oddly something that was in vogue 50 years ago), but done with more efficiency and effectiveness in the coming 50 years. Water systems will be completely closed and reusable as many are today, and it is the water system recycling and usage that will serve as the model for these other systems.

CHANGING WHAT WE GROW AND SELL

For many nurseries the product mix we feel so strongly about will change. Either through a change in consumer demands, but more importantly there will be a change in the availability of raw materials to produce that product which will limit or eliminate some plants from profitable production. An example of what can happen is the affect that high fuel costs for heat is having by increasing the costs of grafting small container plants, in some cases the cost increase has precluded the nursery from further grafting operations. Hopefully, 50 years from now transportation limitations based on the high costs of fossil fuels will be eliminated; but if the nursery industry is still dependant on fossil fuels, subsequent costs might very well eliminate the long-distance hauling of finished plants. Even with a resolution to the transportation problem, there will be an increased emphasis on local or regional plant production as opposed to the current cross-country shipping that is practiced by growers on the U.S.A. West Coast. A locally driven nursery economy might also dictate a change in plant varieties and push a marketing selection process towards specific plants, with a loss of other plants. Of course as with all markets, a shortage of “x” or “y” plant will lead to a cost escalation of those plants. This will be a double-edged sword, since some nurseries will lose out not having these varieties in their inventory, while others will capitalize on the induced shortages.

Fifty years ago there were many operations that grew carnations, roses, and other cut flower crops, even well into the late 1970s. But those operations today are gone, falling victim to high energy costs for heat. Old rose production houses and carnations production houses are littered all over the U.S.A. as relics of a bygone era. Today, labor costs take some of the largest bites out of nursery production costs; however, 50 years from now, energy will be the largest nursery production cost. The labor work force will shrink as more automation and intelligent robotics are utilized.

During the latter half of the 20th century, more than 50% of the combined populations of the U.S.A. and Canada lived within a 805 km (500 radial miles) of New York City. But as we approach the 2nd decade of the 21st century, population dynamics now show the most rapidly growing state in the Union is well away from New York. Indeed, the exodus is south to Florida and the surrounding U.S.A. South Eastern Atlantic and Gulf Coast States. In 50 years a higher percentage of the population lives below the Mason-Dixon line. What is driving this migration: quite simply — it is energy costs. It is cheaper to live in the deep South than it is in the energy consuming Northern U.S.A. This trend will foster a new set of nursery products, and to pursue this — nurseries will leave the north and relocate in the Southern U.S.A., especially since transportation costs will alter costly long-distance shipping .

GLOBAL WARMING AND THE CHANGE IT BRINGS

As a practical matter global warming is a reality, and it too will drive plant production patterns distinctly. Plants such as *Rhododendron catawbiense* (Catawba rhododendron) may well disappear from the radar screen and might be replaced by *Fuchsia magellanica* (fuchsia). We might see the development of more cold-hardy citrus and other plants that have both a cold tolerance to some levels and an increased heat tolerance. Plants from what is now the lower South will move up to the Mid-Atlantic States. The population shift from the North to the Southern U.S. will bring a nostalgia for what was once familiar — so some plants may undergo a breeding or selection shift towards accomplishing the goals of greater heat tolerance, as well as maintaining a connection to the past, such as lilacs (*Syringa vulgaris*) 'Lavender Lady', 'Blue Skies', and 'White Angel' from Southern California.

Global warming will also foster a legion of new pests, which might exacerbate existing pests, and will present a new set of problems to nurseries as well as allowing the introduction of new pests into new environments. We are just now beginning to see the impact of pests such as emerald ash borer, bacterial leaf scorch in oaks, Asian long-horned beetles, and sudden oak death. These pests will undoubtedly prosper from global warming as will a host of pests we have not had to deal with. Some pests such as Japanese beetles are held in check somewhat by below zero temperatures in the Northern states. However, when these low maximum temperatures are no longer reached, Japanese Beetles will have every opportunity to prosper. Pests such as Emerald Ash Borers, which entered the US via wooden pallets from China, and Japanese stilt grass (*Mycrosetegia* sp.), which came in as packing material from Asia — illustrate how easy it is for pests to enter our environment undetected, until they become problematic. With the advent of even more trans-global transportation links and increased movement of people the advent of more pests will certainly occur.

CONSUMER SELECTION PRESSURE FOR PLANTS

Climate is not the only factor that will drive change in the next five decades. Consumers will change their focus, and there will be a shift from the whole garden experience to that of a much more narrow focus. There will be more emphasis on "throw-away" plants. Consumers will shift to buying plants that look good for awhile and when they do not hold up the plants will be tossed in favor of something more attractive. In association to this will be a change from the traditional garden center to the fast food version of plant selling: the box store. Actually the process will go beyond the box store and will infiltrate new venues such as discount stores and supermarkets. In addition to annuals and showy flowering plants such as dwarf roses and poinsettias, throw-away plants will also encompass some flowering shrubs and hardy perennials. Just recently, one mid-sized perennial grower has signed a contract with Whole Foods Market® to distribute perennials with good flowering characteristics.

Container gardens will become more prominent and plants to satisfy that demand will become a norm. Gardening will be a quick and entertaining activity and less of a chore. The consumer will not want to spray, weed, or otherwise do something that will increase their work load.

Tough, low-maintenance plants will become the standard. For those willing to adapt, this will be a new market opportunity.

SO WHAT ABOUT B&B TREES?

Will balled and burlapped (B&B) trees become a thing of the past? In 50 years, probably so. The specialized labor force to produce B&B trees is rapidly disappearing and it will only get worse. Larger trees take up a large amount of production space and will cease to be cost effective. There are few if any new B&B nurseries being formed now. The high cost of real estate cannot be offset by the production of B&B trees. The consumer does not want to bother with such labor intensive upkeep at the home level, which will cause a further decline in B&B tree sales. The labor pool within the U.S.A. will continue to shrink away from the agricultural/ horticultural industries, and the high cost of shipping will be the death knell for the B&B tree market .

There will be increased emphasis on pot-in-pot culture and in regular container culture of trees, with the possible exception of exceedingly large trees which generally occupy a separate market niche than that of smaller B&B trees. A most important facet of this production shift from B&B trees to container trees is the adaptability of container tree operations to more nimbly adapt to consumer demands and changes of preferences. B&B tree nurseries cannot do this, and so will lose out in the long run.

FERTILIZERS THAT WERE NOT YOUR GRANDFATHER'S

Much of what we take for granted as always being there, will quite simply not be there — at least not in the form that we currently recognize. Fertilizers are but one example. In 2002, ammonium sulfate cost \$200 per ton, but by 2009 the price rose to \$800 per ton and continues to increase. Unless they are derived from natural organic materials, most increase in price. Nurseries will have to develop new strategies to capitalize on renewable resources of fertilizers since products derived from fossil fuels, such as ammonium sulfate, will be cost-prohibitive. Fertilization practices based on nonrenewable products and methods are not sustainable and will disappear. Practices based on renewable products such as soybean, peanuts, and other nitrogen fixing legume-derived fertilizers will become the new benchmark.

NEW PLANT INTRODUCTIONS

What can we expect with respect to new plant introductions within the next 50 years? The consumers will demand more showy and colorful annuals and tropical perennials. Plant diversity available through nurseries will increase to meet the needs of the small scale gardens. Tropicals will continue to advance and fill much of the market demand for “Fast Paced Plants.” Cold hardy perennials will have a place in the future, but to a lesser extent than today. The perennials of the future will have to be bred to adapt to a production process that pushes them from seed or cutting to blooming size in a matter of months — not years as it takes now. For consumers, perennials will become hardy annuals.

“Fast-Paced Plants” will mean fast-paced nurseries, just-in-time deliveries and the servicing of more local markets. The selection pressure to find new varieties to fill the new market niches will mean an increased demand for plant breeders and development. There will be genetic engineering for low-volume crops such as roses and trees and shrubs so that they can meet specialized demands. Chances are that due to increased environmental awareness and the reluctance of the consumer to devote large amounts of time to garden maintenance, much of the pesticides that

we know today will not be available. Plants will have to be bred and developed to be more self-sufficient, in other words — “bullet proof.” Emphasis will be on bigger and showier blooms, greater durability in the home or office environment, greater disease resistance, and more tolerance to environmental pressures.

LOCALLY GROWN RAW MATERIALS — WHAT IS THAT?

Other innovations in the future will be in the development of locally grown raw materials such as the trend nowadays towards raising pine trees for raw materials for potting soils. Biofertilizers, such as mycorrhiza, could be extensively used and become part of the horticulture/agriculture process. Fixed structures may once again become part of the nursery environment for overwintering as opposed to plastic-film-covered hoop houses with the associated throw-away mentality. Biocontrol agents for weeds such as using species of *Brassica* as alleopathic agents to kill weed seedlings will be a key component for nurseries.

To meet the challenges of the future, we will have to have some critical tools. We will need high-tech field-experienced *whole plant biologists*. We will need plant breeders with imagination and foresight to see beyond just a pretty flower. We will need bioengineers to develop new forms of raw materials, and horticulturists and nursery specialists to make use of these raw materials. Raw material production will become a new horticulture activity on its own.

Finally, to paraphrase Oliver Wendell Holmes: “We do not quit working or playing because we grow old, rather we grow old because we quit working and playing.”