Desert Plants

A quarterly journal devoted to broadening knowledge of plants indigenous or adaptable to arid and sub-arid regions, to studying the growth thereof and to encouraging an appreciation of these as valued components of the landscape.

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Arid Land Plant Resource Impact—Betterment of the Quality of Life for Desert Dwellers: Results of a 60-year Public-Private Partnership in Environmental Horticulture and Conservation in Central Arizona

In telling about his fascination with plants, William Boyce Thompson liked to shock people by talking about a glass half filled with water. We have often heard how the pessimist describes such a glass as "half empty" and the optimist as "half full." But Colonel Thompson went far beyond the optimist to become a true visionary. Characteristically through life he analyzed the things which touched him, studying them down to the tips of their grass-roots and extrapolating concepts phoenix-like from a firm foundation to new limits which only his own mental reservations imposed. He described the same glass as seen by the pessimist and the optimist as being twice full! Thompson's glass was crammed to its complete capacity with the two common but precious substances—air and water—which are the only ingredients which living plants need to make sugar in their mysterious recipe of photosynthesis.

Thompson delighted in telling how each botanical species on Earth consisted of thousands of individual plants, each of which was a specialized factory after the fashion of its species. We are very familiar with the chain-store concept—Safeway, Circle-K, J. C. Penney, to mention a few. Thompson saw each plant species as a chain store. For example, each plant of Agave sisalana did what every good green plant should—combining air and water to make sugar. But then it went further and did what every good Sisal Agave should—converting the basic sugar of photosynthesis into fibres which humans used to make cords, nets and ropes. Whereas ancient humans learned to weave sisal fibres into sandals, skirts and other utilitarian items, later generations trained in colleges discovered that the Sisal Agave produced cortico-steroid precursors—starter chemicals which human ingenuity engineered to make cortisone, a synthetic product easily obtained as a by-product of the sisal industry.

Important in this example is that each plant of Agave sisalana operates like one of our modern franchise operations—sticking to a proven recipe for success in producing a specialized product. Grow this Agave in Mexico, Africa, Australia or Arizona and it will consistently produce the same fibres and steroid precursors. Thompson saw the plant kingdom as a whole series of chain factories providing not only the goods of human commerce—the goods which we buy and sell, which we seek out, which we stockpile, which are the raw materials for factories, which merchants distribute, with which we feed and clothe ourselves, with which we cure our illnesses, with which carpenters make our homes, but much more. Thompson saw plants as providing innumerable other goods, good things in our lives at all levels of tangibility—the song of a bird perched in a tree, the sweet perfume of a flower, the silence of a leaf falling in the forest, the oxygen in the air we breathe, the exquisite perfection of an orchid, the shade of a tree, the privacy afforded by a hedge. Thompson was truly in love with plants and he understood them as only a very special person could. Part of a conversation he once had with the Director of the Arboretum he founded in Arizona is appropriate here: "... I have no church religion. I don't believe a lot of things others seem to believe, but I have a religion. In these rocks, these trees, I see the work of a Supreme Being." Elsewhere he drifted off into a statement which reveals that he was at heart a very deep philosopher in the recognition of his deity: "All sciences meet at one focus. Call that God if you want."

Thompson was worried about the interface of humanity with the plant resources of the globe. As human population increased he clearly identified pressures which would negatively impact upon the system of nature in which plants were the jewelled movements of the all-encompassing machine of life. As a world traveller he was impressed by the many beneficial uses to which humans put plants, but he was dismayed at regions where population pressures had used up the firewood, destroyed the forests, polluted the lakes and rivers, in essence over-utilized precious resources and fouled the human habitat in the process. Would this happen throughout the earth? Or would humanity be intelligent enough to seek out its rough jewels, discover their values, face them, polish them, provide settings for them, engineer situations where their innate values could shine forth? Thompson decided to use his money and influence to try to change what he feared would become a dismal interface of man with a weakened, lessened, exhausted plant life of the future. His attack on the interface became four-pronged: 1) to increase per-acre agricultural production, thus decreasing the need for disturbing natural areas to make new farms; 2) to establish a Noah's Ark, so to speak, of species propagated from the wild and preserved in a garden situation; 3) to research wild species to determine values and possible uses in order to appreciate them; 4) to preserve wild plants in situ, i.e. in their own natural environment.

The Boyce Thompson Institute in New York was created to further the first prong of attack and it has been very successful in this regard through its studies of the inner workings of plants—their chemistries and physiologies. It has functioned as a research institute to develop agricultural chemicals, to develop innovative mechanisms for controlling plant pests while eliminating toxic effects on non-target organisms, to study air pollution, to attack problems of world hunger through studies of photosynthesis, and much more.

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In Arizona Thompson established his Arboretum to be a museum of living plants to help instill in humanity a deeper appreciation of plants. Where plants were commonplace in the eastern United States, Canada, the tropics and other places, he saw an element of disrespect—people took plants for granted. But in the deserts where many of Thompson’s copper mines occurred he talked with desert dwellers who respected plants and knew all too well that their very lives depended on them. Many of these old-timers remembered back to times when Anglos totally used up the resources of an area and moved on. By definition plants are less abundant in deserts. This makes their populations more vulnerable to extirpation.

The place in Arizona chosen by Thompson for his Arboretum was the old Pinal-Picketpost region where Queen Creek and Silver King Wash meet below the north face of Picketpost Mountain. As pointed out in a speech at the Arboretum’s dedication, this site had been severely denuded of its woody vegetation in the previous century by hordes of miners, teamsters, drifters, gamblers, the entire flotsam and jetsam of a rip-roaring western metropolis that included saloons, churches, bawdy houses and even a newspaper.

The area was peopled and de-peopled so quickly that records of land “ownership,” surveys and deeds, if any were actually made, would have predated the formal system established with Deed Book #1 at the county seat. If some early photographer had not captured an entire city with Picketpost Mountain in the background and if a preservation of preservation had not left us a sample of the newspaper, we would have little inkling of the enormity of human encroachment. Stumps of plants rotted away quickly, their species locally extirpated. Other species stump-sprouted and grew back after the circus moved on.

Doc Holliday’s girlfriend Bignose Kate lies in an unmarked Picketpost grave. History tells us that Doc himself gambled in saloons heated with cords of vanished Picketpost hardwoods, ate breakfast from a cookstove kindled with Picketpost shrubbery, and slept in a bedroom made snug by a fire which did its small part in making ghosts of the desert vegetation. But what really did the major job of denuding the landscape was the use of wood in the massive unending orgy that fired the furnaces to produce the steam power for the engines which operated the hoists in the mines and powered the mills which crushed the ore. Once the furnaces cooled the circus moved on.

Thompson wished his Arboretum to be a positive force dealing with arid land plant resources at local, regional, national and international levels. He believed that in a desert situation each species of plant stood out starkly against the background of every other as if a specimen in a museum display. He had marvelled for hours at a time as ever-new specimens of desert vegetation appeared as he walked about in the Sonoran Desert in Arizona. He wanted to make a display in the cut-over Picketpost region of every different desert plant. What had been ravished would be enriched much beyond its original exquisiteness.

At the local level, Thompson wanted to atone for the ecological sins of the early Anglo intrusion in the region. At the regional level, he wanted to benefit Southwestern desert dwellers by helping them better exploit arid land plant resources to more fully enrich their lives. At the national level he wanted to create a museum of living plants that might spread the contagion of his own joy and understanding of plant life. At the international level he wanted to share the results of his Arboretum—the seeds, the research, the writings—with arid countries and scientists around the world.

Thompson had no misconception that he could himself alter the course of the world, the country, the region, or even permanently the local scene. But his Arboretum was to be a self-perpetuating entity with the relentless compounding, evolving and perfecting that only time can produce. Thompson could do only so much himself. But some day, some time, a school class visiting his Arboretum might have a student who would be inspired to become another Luther Burbank—or perhaps some yet unheard of genetic engineer. Some day an Arboretum scientist might make a discovery so basic and important as to impact on plant life in general, or even human life!

Although Thompson was flesh and blood, he intended his child, the Arboretum, to be immortal. If it did not make a breakthrough one year, it might the next, or 30 years later, or even 300 years later for that matter! Now in 1988 the Boyce Thompson Southwestern Arboretum is 65 years old from conception. It is about to dedicate new buildings which represent the first phase of a 1.2 million dollar entry complex through which many millions of persons will pass over the next few decades. Audiovisual devices will better tell the Arboretum story to the public and orient the visitor.

About 60 of the Arboretum’s 65 years of existence have represented a public-private partnership of ever growing dimensions. Thompson realized that to be a self-perpetuating entity the Arboretum would have to be dedicated to the public with no possibility for private gain. The State of Arizona would be asked to grant it a charter as a non-profit corporation which, like a government agency, would be immune from taxation. At the time, no such provision occurred in Arizona law. Few people today know that the Arboretum was the first organization to form under the state’s Non-Profit Corporation Act. This historic act of the Arizona Legislature was drawn up by the Arboretum’s attorney and introduced into the Legislature by Governor G. W. P. Hunt. The rationale was that such a pro-bono-publico corporation would fill a need that could otherwise have been provided by a government agency which, as part of the government, would have paid no tax but would have consumed money appropriated from tax funds. Although the proposed non-profit creature would be granted the immunity from taxation that a bona fide government agency would have enjoyed, the new creature would provide its own funding, thus relieving citizens of a potential tax burden. The widow who would have paid one penny in tax if the Arboretum were also taxed a penny would now pay two pennies to make up for the penny lost by not taxing the non-profit creature. But hopefully the new creature would make it unnecessary for her to pay the third penny which would have been required had the state itself undertaken to develop an Arboretum. This in itself represents one level of public-private partnership.

A second level derives from the agreement between the Arboretum and the U.S. Forest Service whereby the Arboretum has fenced off a large tract of the north slope of Picketpost Mountain and Arnett Canyon to study the natural plant communities and to allow plant succession and revegetation to occur. This is in the process of being upgraded to a Research Natural Area [RNA] which would be the official research site for the vegetation type in the Forest Service’s own classification. The Arboretum would continue to monitor the area and act as gatekeeper and facilitator for scientists conducting studies.

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A further aspect of public-private partnership evolved during the decade of the 1970's when Arizona State Parks was added to make a tripartite administrative organization. State Parks provides a Park Supervisor and one additional employee at this time. In doings of the two agencies, Parks employees stationed at the Arboretum function also as adjunct employees of the University and in turn University employees at the Arboretum function also as adjunct employees of State Parks. The Arboretum is officially a State Park and also an extension of the University of Arizona, although all land, buildings, and physical facilities are owned by the non-profit corporation. Agreements specify that the tripartite arrangement does not constitute a joint venture and that the three parties involved in the cooperative management remain the three separate entities as they existed before the agreement.

A fourth participant, closely interdigitated with the University of Arizona, but technically separate, is the University of Arizona Foundation, organized as a non-profit corporation. Within it is the operating unit designated as "Friends of the Arboretum" which is a membership and fund-raising organization which provides volunteer services for the Arboretum and serves as a conduit for donations from the public and from corporations. The complex organization of the Arboretum has produced a flexibility that has been very fruitful in furthering the goals of the parties involved.

Let us review a dozen of the programs and accomplishments of the Arboretum. 1) It produced the rationale, phrasingology and impetus for the state's non-profit corporation act under which numerous pro-bono-publico organizations have since formed. 2) It produced a document which was adopted as the state's Native Plant Protection Act, designed to halt despoliation of the desert which was resulting from people digging cacti and other desert plants. 3) It produced the largest display garden of propagated arid land plants [not dug up in nature] in the world, in the process becoming the leader in propagation and establishment of desert plants. 4) It has made propagated desert plants available
testing for growth rate and planting exposure will be conducted before a final evaluation can be made.

Discussion

Over the past century, *Dalea* has been treated taxonomically, but until recently has been neglected horticulturally. This is surprising considering there are 166 species in the New World with many in Mexico where early European horticulturists frequently received plants from. With only seven species having been cultivated in southern Arizona since 1970, *Dalea* is still being neglected by many horticulturists. However, there is a variety of choices in regard to size, shape, habit, and flowering time. With increased awareness of water usage and changing attitudes towards more informal landscapes, the popularity of daleas as landscape plants may increase. Their fine textured foliage and bursts of flowers make the indigo bushes an ideal desert landscape plant for arid regions. The richness and diversity of the genus *Dalea* became especially apparent last September [1986] while on a collecting trip with nurseryman Ron Gass. Three different species with promising landscape potential were brought back. Perhaps one of these three daleas will become as firmly established in the nursery industry as *Dalea greggii* has become.

Literature Cited

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for sale to discourage illegal digging in the desert and to encourage landscaping use of plants which use less of our dwindling water reserves. This “propagated plant program,” which is one of the most popular features of the Arboretum to many visitors, pays state sales tax and underwrites the salaries of several Arboretum employees who also contribute materially to other Arboretum programs. 5) It has researched and cooperated with U. of A. research to discover new uses for desert plants. A good example is the now famous discovery of liquid wax in the seeds of the jojoba plant. Classic root studies and soil erosion control research pre-dated the U.S. Soil Conservation Service and contributed materially to the impetus for forming this government agency. These facts are prominently cited in the enabling document that placed the Arboretum on the National Register of Historic Places. 6) It has functioned as a plant introduction and testing station to select, cultivate and screen plant species from other arid regions which might be adaptable for growing in the southwestern United States. 7) It has provided educational programs whereby hundreds of school classes at all levels annually receive quality talks and tours relating to the desert and its resources, emphasizing the plants and their values both practical and aesthetic. 8) It has established a semi-technical journal *Desert Plants* which has a world-wide circulation and has become the leader in the subject of desert plant science. 9) It makes seeds and propagules of arid land plants available around the world by request and by publication of a seed exchange list available to researchers, educational institutions, government agencies and other pro-bono-publico organizations. 10) It provides a place for the quiet recreation of tranquility and retreat where vegetation provides the backdrop for thought and planning and where the less tangible “goods” are evident which Thompson valued as plant contributions to humanity. In this respect, bird-watching attracts a considerable percentage of the Arboretum’s visitors each year. 11) It has advocated setting aside of natural areas to preserve precious habitats. A good example [see Desert Plants 8: 50] was the impetus it provided for the original establishment of Saguaro National Monument. 12) Finally, it has tried to implement the all-encompassing plan of its founder to strengthen the interface between humanity and the plant kingdom. In this regard Thompson wanted the plant resources of the world to be more fully exploited. Exploitation in his dictionary did not have the negative connotation with which we have wrongly saddled it today. Exploitation to him consisted of bringing the forces of science and industry to bear on a resource so that it would yield the greatest value for humanity. He would have approved of using these forces to preserve endangered species and critical habitat as thoroughly as he would have approved of using them to promote genetic engineering of plants. The Arboretum’s twelfth accomplishment is really one for the future. Although the 60-year experiment has already produced some initial results, we expect that the real pay-off lies considerably down the road.

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