very marked increase of thickness and intensity of green color. For plants like the tomato, dosage with ultra-violet has produced normal or even increased flowering, but has absolutely stopped the setting of fruit. This is entirely in accord with the experience of growers who have repeatedly noted that in South Florida, as summer approaches, tomato plants cease to bear although they may grow and flower quite vigorously. From our observations on Miami sunshine we know that the intensity of ultra-violet in May is at least twice that of early January. The prevalence of thick leaves of tropic and subtropic plants is Nature's protection for the active cells of the leaves from the intense ultra-violet of tropic sunshine.

Although there seems to be no need of ultra-violet in the building of normal leaves, there is a definite part played in the building of fruit, and in the manufacturing of special materials by certain plants. Ordinary glass permits no ultra-violet to pass through to the plants in the common plant-house. Tomatoes grown under glass lack some of the firmness that they have when grown in open sun. More importantly, they distinctly lack vitamins; this means that one of the largest contributions which tomatoes make to the diet is lacking when they are grown under glass. Dr. Baly of Manchester, England, has produced sugar in the laboratory by the use of ultra-violet. Parisian scientists have grown strawberries with artificial ultra-violet. In both cases the product has been entirely satisfactory, but the sugar cost at least $100 an ounce, and the strawberries at least $5 apiece. The experiments show that ultra-violet plays a large part in these processes, but South Florida is producing sugar from solar ultra-violet at a cost of considerably less than one cent a pound, and all Florida is producing strawberries at a cost far below that to the Parisian scientists.

Florida, even in its northern part is considerably nearer the equator than other agricultural regions, and in this southern part is almost within the tropics. The intensity of our sunshine varies less during the year and day than in any other region of the United States. In the lower half of the state we are surrounded by the warm waters of the Gulf and Gulf Stream. During a majority of the day and year we have continuous breezes from the east over the whole state. Our rainfall is larger than that of most any of the agricultural regions of the country; our rainy season is in the summer months. In the consideration of every climatic factor we are placed under rather unique conditions. Surely this means that in order to make the most of our position we must learn to work with, and take advantage of these unique conditions. It places us under the responsibility of applying the horticultural and botanical knowledge from other parts of the country, first recognizing the uniqueness of our position and then developing the special technique required by those conditions. If we approach this job with open minds, open eyes, and willing hands, we can learn how to adapt the basic agricultural knowledge to subtropic conditions and thus be leaders in the work of the human race for this century: the making of the tropics fit for the white man.

LANDSCAPE MATERIAL INDIGENOUS TO TROPIC FLORIDA

K. Dahlberg, Division of Parks, Miami, Florida

We are all agreed, I hope, that landscape designing is an art, but few of us realize its magnitude. When we begin to explore its possibilities for expressing beauty—for transmitting ecstasy, as the most up-to-date definition has it—then we are forced to the conclusion that landscape designing is at least as great an art as architecture, and greater than both painting and sculpture. We also find that it is infinitely more difficult. For while the medium of those more thoroughly explored—and exploited—forms of art is static, the medium of landscape designing is highly dyna-
mic; it is alive and ever changing. When we express an idea in paint, or marble, or structural steel, our labor is finished when the job is done; but when we try to express an idea in growing plants our work has barely commenced when the planting is finished. It will take months, years, sometimes centuries of painstaking attention to detail, before the vision of the artist is fully realized.

When the average person thinks of landscaping, he thinks mostly in terms of color. If form is considered at all, it is only considered as it pertains to individual specimens. The idea of creating a beautiful picture, a symphony in living plants, rarely enters his mind. He wants a collection of plants that he likes, and he substitutes the striking, even the grotesque, for the beautiful, to an extent that we hardly realize. He does not know there is such a thing as texture in landscape material; and even his sense of color relation is hazy, or worse.

Only through an education in esthetics do we become aware that harmony in texture is quite as important as color harmony. The ever widening search for desirable landscape material, carried on by the leaders of the profession, resolves itself very largely into a search for new values, or better values, in texture. And here we, citizens and lovers of Tropic Florida, stumble onto a remarkable fact: right in our backyards, so to speak, there is a veritable treasure house full of material which in beauty, character and elegance, surpasses the best of the exotics we have been propagating. Having made this discovery, the Division of Parks of the City of Miami began to experiment with this material, and the results have surpassed our expectations. During the last couple of years we have brought some sixty or seventy wild species under cultivation, and we are constantly widening the field.

Of course, you have already guessed that I am now speaking of that plant association, almost entirely West Indian in character, which once covered the Florida Keys and the rim of that oolitic limestone saucer, the Everglades, from Palm Beach to Cape Sable, and around the Cape up to Fort Myers—in other words: Tropic Florida. For that is all there is of Tropic Florida. And it is fairly certain that up to a century ago most of this region was one vast primeval hammock.

But settlers brought axe and fire. And presently some utilitarian fanatic conceived a scheme to drain Tropic Florida's life-blood out of the Everglades, converting the most remarkable wild life sanctuary the world had ever seen into a desert waste of burning peat and charred quicksand or marl, in many places too thin to even hide the rock underneath. For such is the ultimate fate of the Everglades country under the present drainage system. Hammock after hammock, with the fertility that it took long, slow centuries to build up, has disappeared overnight, until there is now left just a few pitiful remnants of the former glory. Such a remnant is Matheson's Hammock, the first stop on the itinerary of our Friday morning motorcade. There you will see under natural conditions a good many of the species in which I now shall try to interest you.

For the sake of convenience we will divide our material into three classes: Beach species, Hammock species, and "Scrub" species. Mr. Murray, Ass't. Sup't. of Parks, will assist in picking out and passing along these specimens, which I collected in Brickell Hammock yesterday morning. Let us start with the Beach assemblage; to us Dadeans that is, perhaps, the most important one.

**1ST.—SALT-WATER ASSEMBLAGE**

**Trees or Tall Shrubs:**
- Avicennia nitida—Black Mangrove.
- Conocarpus erectus—Buttonwood.
- Laguncularia racemosa—White Mangrove. (Will grow on top of the dune almost as well as in the salt-water marsh).
- Rhizophora Mangle—Red Mangrove. (For marsh only).

**Large Shrubs:**
- Paritium tiliaceum—Seaside Mahoe. (Forms vast, low, tidal jungles).
- Coccolobis uvifera—Sea-grape. (Remarkably beautiful foliage).
- Torrubia longifolia—Blolly.

**Medium Shrubs:**
- Suriana maritima—Bay-cedar.
Vachellia farnesiana—Popinac. (Exquisitely fragrant).
Eugenia buxifolia—Spanish Stopper. (Very choice).
Casasia clusiaefolia—Seven-year Apple. (Bold, glossy foliage. Fragrant).
Sophora tomentosa—
Baccharis angustifolia—Sea-myrtle. (Very beautiful, but unfortunately very common).
Baccharis glomeruliflora—Salt-bush.

**Dwarf Shrubs:**
Chrysobalanus Icaco—Dwarf Cocoplum. (Very choice).
Tournefortia gnaphalioides—Sea-lavender. (Exquisite).
Lycium carolinianum—Box-thorn.
Borrichia frutescens—Sea-marigolds.
Borrichia arboreescens—Sea-marigolds.
Borrichia glabrescens—Sea-marigolds.

**Vines:**
Dalbergia Ecastophyllum—(Very rampant).
Rhabdadenia biflora—
Acanthocerus floridanus—Dildoe—(Reenforces the Guilandinas),
Mucuna urens—Sea-bean. (Very fine when in bloom).
Pharbitis cathartica — Morning-glory (Very lovely).
Calonyction Tuba, C. aculeatum—Moonvines.

**Palms:**
Thrinax Wendlandiana—Thatch-palm. (Elegant subject).
Serenoa repens—Saw-palmetto (The ash-gray form especially fine).
Sabal Palmetto—Cabbage-palm. (Needs no introduction).

**Herbaceous or Fleshy Perennials:**
Croton punctatum—(Silver-gray foliage).
Hymenocallis caribaea—Tall Spider-lily.
Uniola panisulata—Seaside Oats.
Ignota sp.—Blue Dune-grass (Conquers moving dunes).
Yucca aloefolia—Spanish Bayonet. (Wonderful subject, when in bloom).

Agave neglecta—Century-plant.
Agave rigid—Century-plant.
Agave decipiens—Century-plant.
Opuntia Dillenii—Prickly-pear.
Opuntia keyensis, et c.—Prickly-pear.
Harrisia Simpsoni—Prickly-apple.
Harrisia Brookei, et c.—Prickly-apple.
Commelina angustifolia—Dew-flower. (Lovely, but closes at noon).

**Ground-covers, more or less Shubby:**
Batis maritima—Saltwort.
Ambrosia hispida—Creeping Ragweed.
Sesuvium portulacastrum—Seaside Purslane.
Ernodea littoralis—

**Ground-covers, Herbaceous and Flowering:**
Ipomoea stolonifera—Dune Morning-glory.
Ipomoea Pes-caprae—Goatsfoot Morning-glory. (Quickest cover for sandfill).
Canevalia lineata—Jackbean.
Helianthus debilis—Beach Sunflower. (Charming).
Verbena maritima — Beach Verbena. (Very lovely).
Verbena maritima laciniata — Beach Verbena. (Very lovely).

**Tribulus cistoides—Cuban. Very fine).**
Crotalaria humilis—Creeping Crotalaria.
Philoxerus vermicularis—(Very fragrant).

2ND.—HAMMOCK ASSEMBLAGE

**Trees:**
Bursera Simaruba—Gumbo-limbo.
Simaruba glauca—Paradise-tree. (Stands shade. Very beautiful).
Swietenia Mahogani—Mahogany. (The King of the forest).
Bucida Buceras—Jucaro. (Mismnamed “Black Olive”).
Lysiloma bahamensis—Wild Tamarind. (Very fragrant).

Quercus virginiana — Live-oak. (Too well known to need an introduction).
Magnolia glauca—Sweet-bay. (Does well on swampy land).
Ichthyomethia piscipula—Jamaica Dogwood.
Sapindus Saponaria—Soapberry.
Exothea paniculata—Inkwood. (Likes shade).
Sideroxylum foetidissimun—Mastic.
Chrysophyllum olivaeforme—Satinleaf. (Stands shade. A jewel).
Krugiodendrum ferreum—Ironwood. (Very fine).
Tamala borbonia—Red-bay. (Does well on swampy land).
Misanthece triandra—(Almost extinct in the U. S. A.).
Mimusops emarginata—Wild Dilly.
Dipholis salicifolia—Bustic. (Very fine).
Eugenia confusa—Red Stopper. (Stands full shade. Very beautiful).
Anamomis Simpsoni—Simpson's Stopper. (Very fine).
Coccolobis laurifolia—Pigeon-plum.
Cordia Sebastena—Geiger-tree. (Very showy).
Exostema caribaeum—Princewood.
Celtis mississippiensis—Hackberry. (Deciduous, but very desirable as bird attraction).
Morus rubra—Red Mulberry. (Deciduous, but very desirable as bird attraction).
Pinus caribaea—Caribbean Pine. (One of the most beautiful of all pines).

Large Shrubs or Small Trees:
Citharexylum fruticosum—Fiddlewood. (Very fine shiny foliage. Fragrant).
Clusia rosea and C. flava—(Cuban. Reported from the Keys).
Reynosia septentrionalis—Darling Plum. (Very beautiful).
Ocotea catesbyana—Lancewood. (Stands shade well).
Canella winteriana—(Magnolia-like foliage).
Schoepfia chrysophylloides—Whitewood. (Likes shade).
Zanthoxylum coriaceum—Hercules' clubs.
Zanthoxylum Clava-Herculis—Hercules' clubs.
Zanthoxylum flavum—Satinwood.
Zanthoxylum Fagara—Wild Lime.
Drypetes lateriflora — Guiana Plum. (Likes shade).
Drypetes diversifolia—Whitewood.
Gymnanthes lucida—Crabwood. (Likes shade).
Enallagma latifolia—Black Calabash. (Stands shade. Wonderful foliage).
Eugenia axillaris — White Stopper. (Stands shade).
Calyptranthes pallens — Spicewood. (Stands shade).
Chrysobalanus pellocarpus—Tall Cocoplum.
Amyris elemifera—Torchwood. (Stands shade).
Ilex Krugiana—Krug's Holly.†
Ilex Cassine—Dahoon Holly.*
Annona glabra—Pond-apple.*

Medium Shrubs:
Picramnia pentandra — Bitter-bush. (Likes shade).
Pithecolobium guadalupense — Monkey's Earrings.
Pithecolobium Unguis-cati—Monkey's Earrings.
Guaiacum sanctum—Lignum Vitae. (Stands shade. A dream when in bloom).
Eugenia rhombea—Stopper.
Anamomis dierana—Naked Stopper.
Anamomis bahamensis—Bahama Stopper.
Calyptranthes Zuzygium—Myrtle of the River

Small Shrubs:
Tetrasygia bicolor—(Very fine when in bloom).
Byrsonima lucida—Locustberry.
Psychotria undata—Wild Coffees.†
Psychotria bahamensis—Wild Coffees.†
Randia aculeata—
Solanum bahamense—(Bird attraction).
Morinda Roioc—Yellow-root.
Callicarpa americana—French Mulberry. (Bird attraction).
Hypericum aspalathoides — St. John's-wort. (Very fine. Probably requires acid soil).

Ground-covers, Shubby:
Chiococca pinetorum—Creeping Snowberry.
Rhacoma Crossopetalum—Ground-holly.
Geobalanus oblongifolius—Gopher-apples.
Geobalanus incanus—Gopher-apples.
Chionanthus pygmaea—Pygmy Fringe-tree.

(*Do well in swamp.)
(†Likes shade).
Ceanothus serpyllifolius—Thyme-leaved Jersey-tea.
Ceanothus microphyllus—Small-leaved Jersey-tea.
Dentoceras myriophylla—(Choice and rare).
(The last four probably require acid soil).

Vines:
Gouania lupuloides—Chowstick. (Stands shade).
Cissus sicyoides—Water Liana.
Echites—Ramshorn Milkweed.
Exogonium microdactylum—Red Morning-glory.
Jacquemontia pentantha—(Very lovely).
Chiococca racemosa—Snowberry. (Likes shade).
Hippocrates volubilis—Monkey-vine.
Pisonia aculeata—Pull-and-haul-back. (Burglar-proof hedge).
Smilax Beyrichii—Sweet-briar. (Very fragrant).
Smilax spp.—Briars. (Blend well with Pisonia).
Lasiacis divaricata—Climbing Bamboo. (Likes shade).

Ground-covers, Herbaceous:
Indigofera leptosepala—Creeping Wild Indigo.
Crotalaria pumila—Rattleboxes.
Crotalaria rotundifolia—Rattleboxes.
Dichondra carolinensis—(Likes moisture and some shade).
Peperomia obtusifolia—(Stands full shade).
Melobium triflorum—Tick-trefoil.

Perennials:
Asclepias tuberosa, A. decumbens—Milkweeds.
Asclepias humistrata, A. lancelata—Milkweeds.
Asclepias Rolfsii—Milkweeds.
Aster adnatus, A. squarrosus—Michaelmas-daisies.
Aster carolinianus, A. laevis — Michaelmas-daisies.
Arctomelea herbacea, A. sp.—Leadworts.
Baptisia Leonti—False Indigos.
Baptisia spp.—False Indigos.
Bletia purpurea—Grass-pink.
Boltonia diffusa—Michaelmas-daisy.
Berlandiera subacaulis—Florida Dandelion.
Canna flaccida—Indian Shot.
Carduus pinetorum—Thistles.
Carduus spinosissimus—Thistles.

Chamaecrista brachiata—Partridge-pea. (Yellow-sensitive pea).
Commelina hanjil—a—Dew-flower.
Cracca spp.—Vetches.
Chrysothemis gigantea—Golden Asters.
Chrysothemis graminifolia—Golden Asters.
Crinium americanum—Swamp-lily.
Cuthbertia graminea—Pink Spiderwort.
Diechromena latifolia—Whitebracted Sedge.
Erythrina herbaeacea—Coral-bean.
Gerardia linearifolia—
Helenium elongatus—Sunflowers.
Helenium undulata—Sunflowers.
Helianthus corticaria—Sneezeworts.
Helenium temuifolium—Sneezeworts.
Habenaria quinquiesca—Orchids.
Habenella Garberi—Orchids.
Heliotropium horizontale—Yellow Heliotropes.
Heliotropium Leavenworthii—Yellow Heliotropes.
Hibiscus Moschutos—Rosemalloows.*
Hibiscus coccineus—Rosemalloows.*
Hibiscus grandiflorus—Rosemalloows.*
Hymenocallis humilis—Spider-lilies.
Hymenocallis Pahneri, H. rotata—Spider-lilies.
Ibidium cernuum—Ladies-tresses.
Indigofera caroliniana—Wild Indigos.
Indigofera tinctoria—Wild Indigos.
Iris hexagona—Sword-lilies.
Iris savarnarum—Sword-lilies.
Iris versicolor, etc.—Sword-lilies.
Liatris gracilis—Blazing-stars. (Very fine).
Liatris temuifolius—Blazing-stars. (Very fine).
Lilium catesbyi—Catesby’s Lily. (Acid soil).
Limodorum pinetorum, L. Simpsonii, etc.—Grass-pinks. (Lovely).
Lobelia glandulosa—
Lupinus diffusus—Lupines. (Acid sand).
Lupinus villosus—Lupines. (Acid sand).
Monarda punctata—Horsemint.
Nemastylis coelestina—
Pentstemon nuttallii—Beard-tongues.
Pentstemon anstralis—Beard-tongues.
Pentstemon latifolius—Beard-tongues.
Petalostemon Forry—Prairie-flower.
Phlox amoenae, P. Hertii, P. floridana—
Pinguicula lutae—Butterworts. (Acid soil).
Pinguicula elatior—Butterworts. (Acid soil).

(*Tall and care, but showy.)
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Pychothymus rigidus—Pennyroyal. (Acid soil).

Piriquita tomentosa—

Polygal a grandiflora, P. cumulicola—Milkworts.

Rhexia Alifan us, R. cubensis—Meadow-beauties.

Rhexia Nashii—Meadow-beauties.

Rudbeckia mollis, R. glabra—Black-eyed Susans.

Rudbeckia floridana, R. foliosa—Black-eyed Susans.

Ruellia humilis—

Ruellia ciliosa—

Ruellia parviflora—

Scutellaria arenicola—Scullcap.

Salvia coccinea—Sages.

Salvia lyrata, S. azurea—Sages.

Sisyrinchium graminoides, S. corymbosum—Blue-eyed grasses. (Lovely).

Sisyrinchium xerophyllum, S. longifolium—Blue-eyed grasses. (Lovely).

Solidago Chapmanii—Goldenrods.

Sarracenia Drummondii—Pitcher-plants. (Acid soil).

Sarracenia flava—Pitcher-plants. (Acid soil).

Teucrium Nashii—Nash's Germander.

Tradescantia reflexa—Spiderwort.

Trilisa odoratissima—Southern Hound's tongues.

Trilisa paniculata—Southern Hound's tongues.

Viola spp.—Violets.

Vernonia altissima—Ironweeds.

Vernonia angustifolia—Ironweeds.

Vernonia Blodgetti—Ironweeds.

Viorna Baldwini—Pine-hyacinth. (Very fine).

Yucca filamentosa—Bear-grass.

Zephyranthes Atamosco—Fairy-lilies.*

Zephyranthes roseus (Cuban)—Fairy-lilies.*

Zephyranthes Simpsonii—Fairy-lilies.*

One more plant association exists in Tropic Florida. This is known as the “Scrub.” It is more northern in character, and inhabits acid soil, such as we often find in dunes and “flatwoods” from the Miami city limits northward.

To this association really belong some few acidophilous plants already mentioned. Among its outstanding representatives are the following:

(*As beautiful as Crocus).

3RD.—“SCRUB” ASSEMBLAGE

Trees:

Pinus clausa—Scrub-pine.

Quercus myrtifolia—Scrub-oaks.

Quercus Chapmanii—Scrub-oaks.

Quercus pumila, etc.—Scrub-oaks.

Bumelia tenax—Silver Buckthorn. (Very fine).

Ceratiola ericoides—Florida Rosemary. (Very fine).

Pieris nitida—Fetterbush.

Asimina obovata, A. spp.—Papaws.

Befaria racemosa—Tarflower.

Garberia fruticosa—

Cerothamnus ceriferus—Dwarf Wax-myrtle.

Ground-covers, Shrubby:

Quercus minima—Pygmy Oak.

Gaylussacia dumosa—Gopher-berry.

Vaccinium nitidum—Huckleberries.

Vaccinium myrsinitis—Huckleberries.

(Very beautiful).

Most of the Beach species also succeed farther inland, so we simply add them to our Hammock assemblage. It is different with the “Scrub” species. Very few, if any, of these will adapt themselves to alkaline soil, while quite a few of the Hammock species will adapt themselves to acid soil. Much work will be required before we are able to state definitely what each species will do on each type of soil.

One thing however, is certain: This list of mostly new material, added to the pick of what is already commercially obtainable, would give us such a range in both color and texture—such a gamut of chords, such a variety of scales to choose from for our compositions—as probably no other region could produce. Where, for instance, could we find such a natural Beach assemblage as this: A sea of lavender Beach-verbena, flecked with fragrant, golden Lantana, splashed with radiant pools of Beach-sunflower, spotted with islands of Seaside Purslane, veined with Goatsfoot Morning-glory, and jaspe with creeping Crotalaria. Into this sea jut jagged cliffs of dull-green Bay-cedar, fantastic wave-sculptured capes of horizon-gray Beach-heliotrope, smooth, undulating coasts of dark-green
Beach-cocoplum, and ragged headlands of Blue Dune-grass, backed by a mountain-range of dense, massive Buttonwoods, against which the snow-white bloom of a group of large Spanish Bayonets resembles nothing as much as a flock of dazzling glaciers. Where else could we find such an assemblage ready at hand, growing wild, just where it is wanted? Yet how many such pictures have not been ruthlessly wiped out with mattock and fire? Why are the majority of our “developers” so blind to beauty that we replace the second e in their title with an i?

With such a treasure-trove of choice material to draw on, it is hard to explain the remarkable poverty of our nurseries, and the consequent tawdry sameness of the general run of our gardens. I have here named more than one hundred species of indigenous herbaceous perennials, yet who has ever seen a fair perennial border in Tropic Florida? True, a few of these plants require acid soil, and as a rule they are not quite as easy to grow as acalyphas and erots; but were only fifty per cent of the enumerated species available, by adding these to the best material now in use we should be able to landscape attractively, permanently, and economically, every beach, every subdivision, every airport, every school, every street, and every home—not to mention every park, and every play-ground—in Tropic Florida.

Could we then also manage to get rid of those cigarette and match-scattering huns, who are responsible for nearly all of the fires that make our wild lands look like charcoal-yards, what a country this would be to live in.

THE CULTURE OF TERRESTRIAL ORCHIDS

T. A. Fannell, Homestead

The subject of my talk, orchids, covers so large a field that I must, of necessity, select some division of the family for my discussion tonight. Therefore, I will discuss briefly some of the most promising terrestrial or ground orchids that can be grown in South Florida Gardens.

Ground orchids possess one great advantage over their brothers the epiphytic or tree orchids as they are as a rule easily grown by ordinary cultural methods. Their requirements vary with the species but as a group they are no more particular than are lilies, amaryllis or many other commonly grown garden plants. In general they like a rich, open, well drained soil and plenty of moisture.

Some of the most beautiful and showy of all the orchids belong in this group. We have grown successfully here several species each of the following genera: Phaius, Cymbidium, Cypripedium, Selenipedium, Calanthe, Spathoglottis, Bletia, Lissyochilus, Arundina, Peristeria, and Sobralia.

The beautiful species of Phaius are tall, handsome plants with dark green plicate leaves and stately spikes of large, attractive flowers. Nearly all of the twenty species make themselves thoroughly at home here. They are easily grown and reasonably priced, though rather scarce at present. Phaius tankervilleae (P. Grandifolius) is the best known species and is altogether a very charming garden plant. The sepals and petals are dark bronze in color on the front and light gray on their backs while the lip is deep purple. The flowers are from three to four inches in diameter and are borne, twelve to fifty of them, on erect spikes sometimes as much as four feet tall.

Then the Cymbidiums—probably the best of all the terrestrial orchids. Their numerous species and hybrids offer a wonderful selection of flower size, color and form. They are obtainable in colors from light green through the yellows and browns to white and rose. The blossoms are usually large, very graceful and generally borne on tall, arching, multibloomed spikes. They are shade lovers and delight in plenty of moisture at all times but must not be allowed to become waterlogged. Literally thousands of fine hybrids of this genus have been developed during the past years and though the plants are expensive they will be found to be a very distinct addition to any fine garden.