Liriodendron tulipifera.
Melia azadarach and sub-variety unbraculiformis.
Parkinsonia aculeata.
Vitex agnus-castus.

TROPICAL TREES FOR SOUTHERN FLORIDA AND IN PROTECTED LOCALITIES.

Adenanthera pavonina.
Albizzia lebbek and other species.
Andira inermis and jamaicensis.
Bauhinias alba, krugii, purpurea, triandra, and others.
Bischofia javanica.
Bombax miliaricium.
Brownea spp.
Butea frondosa.
Caesalpinia sappan and others.
Carolinea princeps.
Cassia florida, fistula, and others.
Colvillea racemosa.
Dalbergia sissoo.
Delonix regia.
Eriodendron anfractuosum.
Eucalyptus robusta, ficifolia and perhaps others.
Gliricidia maculata.
Grevillea robusta, hillii and others.
Heterophragma adenophyllum.
Jacaranda mimosaefolia.

Ormosia dasycarpa.
Oroxyllum indicum.
Paritium elatum.
Peltophorum ferrugineum.
Pithecolobium dulce.
Saraca indica.
Schizolobium excelsum.
Spathodea campanulata.

Most of these in the tropical list are evergreen or nearly so and adapted to the tropics generally. Some kinds are able to withstand more frost than others, of which Grevillea robusta, Bauhinia purpurea and alba, Bischofia javanica, Dalbergia sissoo, Eucalyptus robusta and Jacaranda mimosaefolia, are prominent examples and are grown well up into the middle portion of peninsular Florida. The more hardy trees recommended for north Florida may be used quite generally all over our state down to extreme south Florida, with few exceptions.

In all this subject of avenue trees it must be remembered that proper pruning and growing must be followed to make a permanent success; do not plant with the notion that "nature will do the rest," for she usually does, with advantage neither to the tree nor to the street.

THE GROUPING AND CARE OF ORNAMENTALS

John Schnabel
GARDENER, FLORIDA EXPERIMENT STATION

Mr. President, Ladies and Gentlemen:

Any home can be vastly improved in attractiveness and value by the proper planting and grouping of ornamentals. In no section of our great country are the possibilities for such improvement more
marked than in our own state, with its wonderful climate and wide choice of subtropical plants, both native and introduced. No matter how small the estate, or how commonplace its surroundings may be, it can be made both attractive to the passer-by and homelike to the owner.

The first consideration in planning such an improvement is the soil. There are many plants whose natural habit of growth is in swampy places that can be planted on sandy soils if proper care and cultivation are given. On the other hand, no one builds a home on a place too low and swampy to be drained. As a rule the soils of this state require considerable fertilizer, especially when the plants are first started. While there is considerable latitude, the choice of plants adapted to certain conditions must be borne in mind, and this choice must be governed somewhat by conditions.

PREPARATION OF SOIL

In preparing the soil, it must be spaded or plowed very deeply, and a lot of well-rotted barnyard manure should be worked in. Where the soil is dry and sandy, muck and clay or other decayed vegetable matter should be added and well incorporated into the soil. This should be at least 18 inches deep or for trees and deep-rooted plants, still deeper. If hardpan is near the surface, it should be well broken up, and the beds may be raised in order to secure proper drainage. Cow manure and stable manure, the latter thoroughly rotted, are the best materials to use if obtainable. Unrotted stable manure is liable to heat and burn out the roots. If sufficient cow or stable manure cannot be obtained, a liberal application of muck that has been well decomposed should be made. Commercial fertilizer will be found indispensable. Cottonseed meal is among the best materials. Potash and phosphoric acid will not be needed so much as in groves and for field crops. Bone meal will give fine lasting results. Certain soils may require liming, but it must be borne in mind that some plants do not do so well with lime. As a rule, the more slowly available fertilizers should be used for shrubs and trees, and quickly available for herbaceous planting.

Special care must be given to the soil preparation for foreign or introduced plants. Our native plants are more used to the condition they find here.

The first essential in improving the home grounds, no matter how the location is to be treated, is a good lawn, and the ground must be properly graded for this. Without a green lawn, no matter how much care is given to the ornamentals, the premises will always have a bare appearance, and even the best ornamentals will not show off to advantage. With a good lawn for a foundation, a few plants may be made to give most ornamental effects, and such a place would be more attractive than a large number of plants on bare sand. No picture is complete without a background.

As a rule, plants should be chosen of a size to correspond with the extent of the grounds and to harmonize with the architecture of the home. Too heavy a planting around a house will tend to make it damp and gloomy and impart a "shut-in" feeling, especially during the rainy season, when a thorough circulation of air is necessary for health and comfort.
GENERAL ARRANGEMENT OF GROUNDS.

The color of the house, barns, and all out-houses should be such as to harmonize with the general surroundings and the vegetation. For instance, a large and imposing mansion on an elevation and standing out by itself, may be most imposing if painted white; a smaller house or barn surrounded or imbedded in shrubbery would give a much better effect if painted gray or brown. In other words, the effect sought should be to strike the observer, whether trained in landscape gardening or not, as natural, harmonious and beautiful.

By the observance of a few simple rules an effect may be produced equal or often superior to that produced by professional landscape gardening. The professional gardener too frequently falls into the habit of following a stereotyped plan with nothing original in it. There may be too much monotony in his plans.

GROUPING OF ORNAMENTALS.

Larger trees may be used for the backgrounds in extensive grounds, medium-sized plants should be chosen for medium-sized areas. In town homes, and on adjoining lots, co-operation between the owners may produce harmonious effects, with much better results than individual efforts; and the general effects of large areas may be produced by proper co-operative planning and planting.

On large lawns specimens of medium-sized and large trees may be planted singly, but this should not be done on small areas, where smaller growing plants must be chosen. Where single specimens are planted by themselves they should have a proper background of shrubbery to set them off. The worst fault with much of our planting in Florida is overcrowding and an attempt to have every tree or shrub possible on a home ground the size of a city lot.

With a large house set back from the highway, the arrangement should be such that from whatever direction the approach is made one may have a view of the lawn and house with appropriate groupings of shrubbery. The view from the house should be unobstructed. Vistas should be open from every point of view.

CHOICE OF VARIETIES FOR ORNAMENTAL PLANTING.

In selecting the following list I have confined myself chiefly to those plants with which I have had personal experience, and others that I have had opportunity to observe. My remarks will apply more especially to the central and northern parts of the state. The plantings for the southern parts of the state have been so ably presented by others.

Among the native trees I will mention the following:

Oaks—Both the live oak (Quercus virginiana) and the water oak (Quercus nigra) are very ornamental and form excellent backgrounds to large areas, as well as good shade trees. I would select trees not over three inches in diameter. All branches should be pruned back to the main trunk, and this cut off at a height of ten or twelve feet. The trees should be selected from those not surrounded by too thick a growth, and from a soil that is not too wet. The root system should be well
formed, and any injured roots be pruned off. The trees should be set at the same depth at which they naturally grew. The best time of the year for transplanting is from late fall to the middle of February. Select the water oak for quick growth. The live oak is a rather slow growing tree but lives to a grand old age.

Among the maples the red maple (*Acer rubrum*) is a very ornamental tree, but is subject to borers. These can be killed out with carbolineum. The same precautions should be observed in transplanting maples as were mentioned with oaks. They may be planted in either wet or dry places. They grow fairly rapidly.

The sweet gum (*Liquidambar styraciflua*) can be used in wet as well as dry places. It is good for fine single specimens as well as for grouping. It is rather a fast-growing tree.

The magnolia (*Magnolia grandiflora*) is one of our most beautiful native trees. It is rather difficult to transplant except when very young, and may be either grown from seed or secured from nurseries. It grows slowly, but makes one of our grandest specimens. It should be planted out as a single specimen and not used as an avenue tree.

The swamp bay (*Persea pubescens*) and the upland bay (*P. borbonia*) are fine trees for large grounds. They are somewhat difficult to transplant successfully.

Among the larger introduced trees the sycamore (*Platanus occidentalis*) is a fast-growing deciduous tree of good shape, and can be used to advantage on large grounds.

The tulip tree (*Liriodendron tulipifera*) is a fine shaped deciduous tree with tulip-shaped flowers. It is not a very tall growing tree, but forms a luxuriant crown. It is of fairly rapid growth.

The mulberry (*Morus*) is a handsome tree, and useful in supplying food for birds. There are many varieties. They should be obtained from a nursery, as the native varieties are not good.

Of the palms, the cabbage palmetto (*Sabal palmetto*) from my own experience is difficult to get started on high, dry land, but on lower moist soil this can perhaps be more successfully done. In the higher and drier regions it is best to grow the palmettos from seed, although they are very slow growing. Large specimens can be obtained from nurseries in tubs, and may be transplanted more successfully. We have tried many times to get them to grow on the Experiment Station grounds without success.

The canary date (*Phoenix canariensis*) is, in my opinion, one of the best ornamental palms that we have. They are best grown from seeds, or they can be bought from nurseries. The wood date (*Phoenix sylvestris*) is also a fine palm of a bluish-green color, but it is not much advertised, and is difficult to secure.

The George Washington palm (*Washingtonia robusta*) is quite hardy in the central part of the state, and is very ornamental with large fan-shaped leaves. It may be used on large or small areas to great advantage.

GROUPING AND BORDER PLANTS

Many plants that grow naturally to a large size may often be kept down to a medium size to advantage by proper pruning. Some of the varieties, therefore,
that are classified under this heading might also have been placed among the larger trees. The cherry laurel \(\text{Laurocerasus Caroliniana}\) is a native of this state, and one of the best plants for ornamental purposes. It can be used for screening for out-buildings, and is also very ornamental as single specimens and in groups. It may be pruned to any desired shape. It blooms in early spring with clusters of white flowers, and retains its foliage the year round. It should be pruned twice a year to make the growth more compact. It is suitable for extensive grounds as well as small areas. It should be transplanted during the winter months. It has a tendency to produce suckers from the roots, which should be removed.

The holly \(\text{Ilex opaca}\) is another of our best ornamental native plants which can be used under almost any conditions. It does not require pruning to the extent that the cherry laurel does. It makes very ornamental single specimens as well as small groups. Through the fall and early winter, when covered with its bright red berries and glossy leaves, which are not shed, none of our native plants show off to better advantage; and it should be placed with this in view. On removing from the woods it should be severely pruned and defoliated. Then planted in a nursery for a year. Larger specimens should be cut back to the main trunk and the root system should be carefully preserved. There are other varieties of \(\text{Ilex}\), as \(\text{Ilex vomitoria}\), and \(\text{Ilex cassine}\), that are natives here, which also may be used as ornamentals.

The American olive \(\text{Osmanthus Americanus}\) is a good native plant. It blooms in the spring with clusters of small white flowers and is evergreen. The remarks made in regard to transplanting the holly will apply also to this plant.

The wax myrtle \(\text{Myrica cerifera}\) is especially valuable in spots inclined to be wet and swampy. They should be well pruned back before transplanted in the spring.

The dogwood \(\text{Cornus florida}\) is a well-known native plant. It is best transplanted in December or January. It is subject to borers, but these may be kept under control by going over the trees twice a year and killing the worms with a small wire inserted in the holes in the trunk and painted with carbolineum. This is the only remedy I have found to be successful.

The red bud or Judas tree \(\text{Cercis canadensis}\) I consider one of the best of our native ornamentals. It may be used as a background or in groups. I have found it one of the easiest to transplant, and it requires but little care.

Some of our native hawthorns \(\text{Crataegus}\), of which there are many varieties, are very ornamental, especially in mixed groupings.

Among the introduced medium plants should be mentioned the camphor tree, a well-known plant suitable for single specimens, but not for avenues. Transplanting is best done in early spring, and the plants should be defoliated.

The Japanese varnish tree \(\text{Sterculia plantanifolia}\) is a fine deciduous tree for winter effects on account of its bright green bark. It can be procured from nurseries.
The soap-berry tree (*Sapindus saponaria*) and the tallow tree (*Sapium sebiferum*) are good for large and mixed groupings as well as single plants. The leaves are shed in the fall.

The *Pittosporum tobira* is a very handsome plant. I have seen very fine specimens of this in this state. It is good for grouping.

A somewhat neglected ornamental plant is the loquat (*Eriobotrya Japonica*) or Japanese plum. It is suitable for single specimens on lawns with a proper background. It sometimes produces a good crop of delicious fruit.

The *Camellia Japonica* is a very slow-growing plant. It blooms during winter and early spring.

Among the azaleas the A. indica should be treated like the camellia. There is a native variety, the white flowering honeysuckle (*A. viscosa*) that is fine for low shrubbery borders. It grows best in damp places. On higher places it must be well watered or it will die out.

Another handsome native shrub that is much neglected, found on high hammock land, that goes well in groups and massing with other plants is the French mulberry (*Callicarpa Americana*).

The *Abelia grandiflora* is a handsome shrub which bears a mass of white flowers throughout the summer. The *Duranta plumieri*, golden dew-drop, is also very ornamental with clusters of yellow berries in the winter.

The pomegranate can be used on large grounds, but it is only suitable for groupings and backgrounds. The banana shrub magnolia is highly ornamental when grouped with plants which hold their leaves the year round. There are a few varieties of *Jasminum* (*grandiflorum Sambac* and *humile*) that can be grouped with the above-mentioned plants. The *Plumbago capensis* is a fine low-growing plant for borders. By grouping specimens of the above-mentioned varieties one can secure a succession of bloom the year round.

The crepe myrtle (*Lagerstroemia Indica*) comes in many varieties of color. They can be used in mixed groupings as well as for screenings. The light pink variety is useful as a low-growing plant, while the darker varieties tend to make larger shrubs. They will be found much more satisfactory when treated as shrubs than when trained into tree forms. The white and the light pink varieties are especially attractive in mass groupings and in hedge rows.

There are many evergreens that should be included in the list. Among the native varieties is the pencil cedar (*Juniperus Barbadensis*) which is found on high hammock land. It is best transplanted when it first begins to show new growth. It will not grow well unless a sufficient root system is preserved, and it must be kept continually moistened. If the roots once dry off they will not grow. It is very suitable for grouping with other evergreens or as single specimens, and may be used for avenue treatment. It can be shaped as desired by proper pruning. The white cedar (*Chamaecyparis thyoides*) is another native evergreen with good qualities. It should be treated like the above.

Of the introduced varieties of evergreens I will mention the Japanese juniper
(Chamaecyparis pisifera plumosa) one of the handsomest evergreens. It is suitable for single specimens or for groupings. This is my favorite variety for this section of the state. A low-growing, trailing evergreen, useful for borders, angles or corners or on rockeries, is the Juniperus sabina prostrata.

There are a number of varieties of arborvitae or thuya; tall, medium and low-growing, including the Rosedale arborvitae. They are very fine for grouping at corners of buildings. The Cupressus sempervirens makes fine single specimens on a lawn. All evergreens and conifers should be transplanted with a ball of soil around the roots, if possible, and these must not be allowed to dry out. They must be watered for the first year. They should be set out in well-drained places, as they will not do well on wet places.

Some of the bamboos are hardy in this section, as Bambusa argentea striata, B. argentea arundinaria falcata, and A. M. These are fine for backgrounds or for side plantings in groups.

In general, in planting, close contact of roots and soil is essential. The soil should not be kept wet, but always moist. Most plants, especially trees and evergreens, are often planted too deep. As a rule these should not be planted deeper than they were where they grew. The soil should be sprinkled in all around the roots. After the hole is full a slight ridge can be made around the tree and this basin filled with water. In planting large groups I would tramp the soil around the plant with the heel of the shoe, but not so firmly as to break the roots.

In pruning, care should be taken that all broken roots are removed. Trees or shrubs should be pruned to a good shape and all dead growth removed. Some plants require and stand more pruning than others. Some evergreens require little or no pruning. After planting, for the first year especially, the plants should be well cultivated and watered during dry seasons.

In all things experience is the best teacher, and one should not be discouraged if things do not grow as desired at first.

LANDSCAPE GARDENING IN FLORIDA

Karl A. Haltenhoff

Mr. President, Ladies and Gentlemen:

The art of landscape gardening is still in its infancy in Florida. The material is there for the production of effects which shall have all the romance and mystery that only a tropical jungle possesses. Attention is to be called to some of the possibilities of genuine landscape work with the indigenous growth of the state itself. The grandeur of mountain scenery is lacking, but the dense forests or rolling lands, the numerous lakes and rivers, the abundant evergreen trees, the palmettos which are characterized by a grace and stateliness rarely equalled, furnish material which can be combined in picture of