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ORNAMENTAL GARDENING IN FLORIDA

Radio Series - 1933-1934

By

The University of Florida Agricultural College,
Experiment Station and Extension Service
In cooperation with the
Florida Federation of Garden Clubs
Given over WCOA, WDAE, WJAX, WQAM, and WRUF

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Ornamental Gardening in Florida
Radio Series

Talk No. 1
September 13, 1933

THE VALUES OF THE GARDEN

Mrs. A. G. Cummer
Past President, Florida Federation of Garden Clubs

I am most confident that I but echo the sentiments of hundreds of those who are listening in when I express appreciation and gratitude to the Agricultural Experiment Station and the Agricultural College of the University of Florida for the opportunity again given us to glean information through this second series of Radio Garden Talks.

While I esteem greatly the compliment paid to me when I was asked to make these opening remarks, I speak as a mere enthusiast -- one who is happy over what she has learned and most hopeful as to what she will learn.

Probably no word of six letters -- save only the words Mother and Father -- can and does bring so much of help and satisfaction to mankind as does the word garden. It is a passport into foreign lands and whether or not we speak their tongue, we know that the French word "jardin," the Spanish "jardin," the German "garten," and the Italian "giardino" are, after all, but our "garden;" and understanding their peculiar language each flower brings to us a smile of joyful recognition, wherever we may meet it.

Believing that possibly the surest way to prove the underlying dominance of the garden in the lives of the human race today would be to give a condensed history of Gardening Art from its very beginning, I intend to follow that course of thought.

In Egypt, the very cradle of all human civilization, we find, resultant from the peculiar character of the soil and climate, an early and important development of garden cultivation. Indeed, all horticulture arose from their profit-making care of plants. The Egyptian demanded and obtained from his garden edible fruits, medicinal herbs, timber and shade. He valued first his trees, then his vineyards, vegetables, flowers, walks and water, all of which he enclosed within walls. Thus it was he who definitely established a material, commercial, spiritual and esthetic value to the garden and from those days down to the present that appraisal has held. This information comes to us authoritatively through the paintings found upon the walls of the tombs of kings and men of wealth; very often even the plans of their gardens were depicted there. From Egypt we learn, too, of the use mankind made, long before the days of Christ, of the fig, the olive, the sycamore tree and the date palm. We learn of the papyrus by means of which great funds of knowledge have been handed down to us, and of the beautiful lotus flower which, combined with the leaf of the acanthus, has served as one of the most dignified and artistic types of formal decoration.

The Babylonians and Syrians invented the hanging gardens.

To the Medes and Persians we particularly owe our appreciation of trees. As a matter of fact, when the Greeks invaded those countries they found marvelous parks, which were mentioned repeatedly in their literature. Zenophen even used the term "Paradise" to describe a Persian garden, and Lysander was enthusiastic not so much over the beauty of these parks as over the cleverness of the minds that designed and ordered them. Groves were often planted around tombs -- we know that years later the body of Our Savior was buried in the private garden of Arimathea.

We who take the Garden of Eden as the beginning of all things find that it is described as exactly like the oriental tree parks of Persia.

Jerusalem had its great gardens, which were located outside the city walls.

Of course, all gardeners know that religion was closely connected with gardening, and much has come down to us from that source. This is especially true as regards India, where they worshipped the trees. Each Buddha had a different species of tree as his sacred symbol. The following description of the location and plan of a Buddhist park would seem to comply absolutely with the requirements of our parks of today: "Not too near the town, and not too far away, well provided with entrances, easily reached by people who like to come, not too noisy by day, perfectly quiet by night, removed from disturbance and crowds, a place of retreat and lonely contemplation."

But we must hasten on in this brief summary of the garden's development. The Greeks left beautiful villa gardens as an inheritance to the Romans; the Bysantines brought oriental influence with its ornateness into general use; the Italians introduced the baroque style and definitely relegated fruit trees and vegetables to the kitchen gardens. They, like their immediate predecessors, the Bysantines, arranged the garden in terraces and demanded fine vistas and views. Roof gardens, which we look upon as a recent experiment, were thriving on the town roofs in the outskirts of old Rome. Truly, in the first centuries of Imperial Rome the art of gardening had reached a degree of perfection that has never been surpassed. Water was abundant and the fountains and cascades found in the gardens of Italy formed an inspiration for the landscape architects of many nations.

Spain tells its story in the wonderful gardens of the Alhambra and the Generalife: very extensive, very ornate, very full of sunshine, and with potted plants everywhere in evidence.

Then came the French influence in the time of the Renaissance. Perfection of formal planting developed. Beautiful fountains abounded. France followed the gardening ideas of the Italian artisans beyond the Alps and finally commanded the lead. Germany and Russia vied with each other in aspiring to surpass the efforts of the French, but neither of them ever succeeded, for certainly not the attempt of Frederic the Great in the Gardens of Sans Souci, nor that of Peter the Great at Peterhof, can compete with the perfection wrought by Louis XIV at Versailles.

England it was in reality which gave to us the type of garden that we so admire today. The broad expanse of lawns, the massing of shrubbery and the rock garden. Yet, though we have followed her example in so many lines, she still delights in one feature, comparatively unknown to us -- I allude to the topiary art.

America, it would seem, lost no time in humoring her innate love for the garden, since, young as we are, we may boast of early gardens near Salem, Massachusetts and Charleston, South Carolina, dating to the late 1600's.

But with this cursory outline, we must now leave the past and think of the present and the immediate future. Let us speak of our own state, Florida, and of what value a garden may be to her. Perhaps intuitively we first think of the esthetic and inspirational value of a garden. We should not do so, for, important as that phase is, the material and commercial service far outbalance it. Of course, the nearer we can live to Mother Earth the better for us physically and spiritually -- we all know that. We know, too, that nothing is of much more benefit to a city than well kept gardens and parks. Their influence and example are farther reaching than we who plan them realize. So, if ill health or other deterrent circumstances prevent you from participating in various and sundry civic activities, do not for one moment feel that you are not aiding your community to a marked degree when you give your own surroundings proper care and attention.

And now, another and a broader thought, -- namely, that we should try much more painstakingly than we do to make use of gardens in connection with each and every hotel in our state, whether it is located in the heart of the city or in the suburbs. There is no section too crowded or too costly in the Old World to influence the hotel owner, who caters to the best of the travelling public, to abandon a garden in connection with his hotel. If one may dine outside in the capitals of Europe, why not in lovely Florida?

We all know that C. W. Barron, the dean of financial editors, struck a true key when he affirmed that ours was a "Luxury State;" everything that we have, from our climate and beaches to our choice oranges, celery and early strawberries, are luxuries. We who live in the midst of these choice things hardly realize their values, but we should. Our climate and soil were here when Ponce de Leon arrived. The ordinary market basket is supplied; but the extraordinary basket is still not filled to overflowing. The time once was, before methods of transportation and communication were so well perfected as they now are, that almost each and every one of us had a kitchen garden. We lived much less expensively then; those days may be returning. If so, we residents of this "Luxury State" may deem ourselves doubly fortunate. We should appreciate, as Mr. Barron says, that "the way for Florida and particularly for South Florida, is to coin her sunshine and her soil into food, fruits and flowers for the great markets of the North." This is, of course, being done increasingly from year to year. But we must do more -- we must educate our customers to understand the enjoyment and the value of such things as the papayas, the improved mangoes, the avocado pears and our choice pineapples.

Indeed, we must carry on more exhaustive experiments in endeavoring to

find new tropical fruits adaptable to our climatic conditions and new crosses (such as our youngberry), realizing that much lies before us. Though the colossal genius of Thomas A. Edison may no longer serve us, some one may carry on his experiments, and we shall produce rubber right here in Florida. It does not seem impossible when we realize that such common plants as the oleander, goldenrod and flame vine have a rubber content.

Do you know that one narcissus farm in our state produced more bulbs than any other such farm in the United States? Could we perchance commercialize extensively our gerberas, nerines, watsonias and other plants?

Much truly is possible, when so prominent a botanist as the late Dr. L. H. Pammell, of Iowa State College, made the assertion that Florida has the most wonderful plant life of any state in the country.

And yet, however much I am persuaded of the healthful and commercial values of a garden, the fact remains in my mind that beyond the shadow of a doubt there still does and always will hover about our personal garden spot an inexpressible delight in its perfection, an indescribable charm in its color harmony, an untold joy in the ability to share its beauty with others, an indisputable privilege of weaving our own personality into its every detail, a never ending opportunity of serving our plant children with a kindness like unto that bestowed upon our human children, and lastly and predominantly a wonderful inspiration which is akin to the Divine when we have need of repose. Where, indeed, could we find more peace with the world, more courage to carry on, more hope for the outcome of tomorrow, than in that emotion which comes into our soul as we sit alone at twilight in a beautiful garden, pondering over our pages of the past, with their records of success and failure, and endeavoring to formulate an outline for the pages of the future, as we humbly say, "I shall lift up mine eyes unto the hills, from whence cometh my help."

H. H. Hume
9/5/33

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Ornamental Gardening in Florida
Radio Series

Talk No. 2
September 20, 1933

MINERALS IN RELATION TO PLANTS

Dr. L. W. Gaddum, Biochemist
Florida Agricultural Experiment Station

We all know that if a plant (or an animal, too, for that matter) is burned, there remains an ash which forms a very insignificant fraction of the original weight of the plant, say about 1%. In this ash is found, by chemical analysis, the so-called mineral constituents of the plant. In the gases arising from the burning process are found the carbon, hydrogen, oxygen and nitrogen of which the organic portion of the plant, such as sugars and proteins, is composed. This carbon, hydrogen, oxygen and nitrogen, together with the elements present in the ash, form the building-stones of which the complex compounds of the plant are built.

Now, it is clear that during the process of growth, these building stones must be supplied to the plant. The carbon is procured by the plant from the atmosphere in the form of carbon dioxide; the oxygen is available either in the atmosphere or in the water that the plant takes in. The hydrogen also can be obtained from the water. Consequently, these elements are usually available to the plant, while the supplying of nitrogen, as everyone knows, forms one of our fertilizer problems. The constituents of the ash, that is, the minerals, obviously must come from the soil. It is to these minerals that we call attention.

Some 20 or 30 years ago, scientists listed as mineral constituents of the soil necessary for plant growth the following chemical elements: calcium, magnesium, potassium, phosphorous, sulfur and iron. It is true that small amounts of copper, nickel and other metals had been reported as being normal constituents of plant ash, but no physiological significance was attached to these. In fact, copper, manganese, arsenic, boron, zinc and some others were considered toxic.

But science is never satisfied. Methods of chemical analysis were continually being improved, enabling the analist to detect smaller quantities of the mineral elements in the soil and in the plant ash. As a result of this improvement in technique, it soon became apparent that the previous classification into essential minerals and toxic minerals was inadequate.

The inadequacy of the older classification hinged on two points, (1) whether or not a given mineral exerted a toxic or a salutary effect depended in many cases on the amounts of the mineral present, so that even toxic elements might be beneficial in small amounts, and (2) the effect of a given mineral was not the same for all plants so that it became questionable whether one could write a list of essential elements for all plants.

Although copper, manganese and zinc were previously listed as toxic elements and were not included in the list of essential minerals, experimental work at the Kentucky Experiment Station about 1925 and 1926 showed that copper, manganese and zinc are essential in small amounts to the growth of many farm crops. Moreover, about 1927 work at the Everglades Branch of the Florida Experiment Station demonstrated the need of copper in small quantities for the growth of some 50 or 60 different crops on the peat soils of the Everglades.

That the effect of a given element is not the same on all plants is evident from work at the Rothamsted Experiment Station, in England. There it was shown that certain of the legume plants as broad beans, soy beans, and some clovers will not grow to maturity in the absence of boron, whereas some other plants as wheat, barley and rye grow readily to full maturity without a trace of boron.

Because of this inadequacy of the older concept, it became necessary to revise our notions of plant nutrition. In the preparation of plant diets, we must consider not only the traditional nitrogen-phosphorus-potash requirements, but also a balanced ration of essential minerals.

The most commonly occurring essential minerals are, of course, phosphorous, potash, calcium, magnesium, sulfur and iron. Available phosphorous stimulates root growth and consequently assists in ready development of small seedlings, while potash is essential for proper stem and leaf growth. Calcium is important in the transportation of starch within the plant, while magnesium is a constituent of chlorophyll, the green pigment necessary for the manufacture of the plant's organic foods. Sulfur is a constituent of plant proteins and the presence of iron is necessary for the formation of chlorophyll.

The less commonly occurring minerals such as copper, manganese, boron and zinc, because of the extremely small quantities involved, present problems of a peculiar nature. In the first place, there arises the question: for what are we going to use the plant? From some plants, fruit is wanted, as in citrus; from other plants we hope to secure seed, as in corn; in other plants foliage is sought, as in some ornamental plants. It is, of course, desirable to prepare for a particular plant a diet which will attain the result desired from that plant. Thus, a beautifully foliated orange tree would be ornamental, but if the fruit were made insipid to the point of being unsaleable, the tree could not pay for its board. Past experience with the use of minerals shows clearly that great caution must be exercised in the feeding of minerals to plants.

And yet it is our job to find the particular mineral diet which will correct abnormalities as they appear in our plants. The accumulated mass of experimental data on the role of minerals in plant nutrition suggests strongly that the minerals might have specific physiologic functions in the plant. Thus in central New York, lettuce which should yield

solid "heads" produced long leaves known as "rabbit ears;" the addition of copper in minute amounts corrected this trouble. In Florida, absence or deficiency of copper results in yellowing of foliage (called chlorosis) This abnormality may be corrected by the addition of a small amount of copper to the soil. As suggested by Thatcher, President of Massachusetts State College, we may soon recognize in plant nutrition certain factors designated by "anti-chlorosis" (or anti-yellowing) factor, or the "flowering factor."

A second major problem in the study of mineral nutrition of plants lies in the possible cumulative effect of minerals added to the soil. The continued application from year to year of such minerals as copper, manganese and zinc might result in such alteration of the nature of the soil as finally to destroy the fertility we seek. Or, on the other hand, by repeating small doses of copper or zinc on perennial plants, the mineral may accumulate in the plant to its detriment unless the plant can eliminate the mineral by defoliation, dropping of fruit, or some other means.

Attention is called to these two problems simply as a caution against a too ready use of mineral supplements to the soil, in particular the less commonly occurring minerals. The fact that addition of copper to the peat soils of the Everglades produces favorable response in a large number of crops is no criterion that the same dosage of copper on soils of different nature will react favorably to the growth of plants in general. The fundamental data pertaining to the effect of the minerals on the physiologic mechanism of the plant and on the character of the soil have not as yet been obtained.

The Florida Agricultural Experiment Station is now devoting considerable attention to this problem of mineral nutrition of plants. The physiologic effects of certain minerals on both horticultural and field crops, the effect of the mineral supplements on the soil, the relation of mineral supplements to animal husbandry problems, such as "salt-sick," and the development of a field practice in the use of mineral supplements are some of the problems engaging the attention of various departments of the station. From this coordinated attack on the problem there most certainly will emerge a better understanding of our Florida soils and a practicable technique for correcting some of our soil deficiencies.

Meanwhile, we need not worry unduly about any possible deficiency of the less common minerals in our ornamental gardens. The amounts of these less common minerals needed are so small that in many cases these amounts are supplied automatically in the muck, clay or fertilizer that may be used.

In the case of those minerals which are needed in appreciable amounts, such as calcium, potash and phosphorus, the effect on the plant is largely dependent upon the soil reaction.

To briefly summarize, there are two general classes of minerals, those that are commonly known and are needed in appreciable amounts and those that are needed in minute amounts. These less common ones, such as copper, manganese, zinc and others, are quite vital to plant growth. They are frequently supplied automatically in the soil, muck, fertilizer, etc. Where there is an actual deficiency of some of them, study of the special problem is necessary since these minerals react so differently on different soils and with different plants.

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Ornamental Gardening in Florida
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Talk No. 3
September 27, 1933

SOIL REACTION IN RELATION TO GARDENING

Dr. O. C. Bryan, Professor of Soils
and Agronomy, University of Florida
College of Agriculture

Soil reaction is one of the most deep seated factors affecting the growth of plants in general, and especially is this true for garden plants. For a gardener to ignore this factor may mean failure before he begins.

The term reaction simply means a soil condition which indicates that the soil is acid, neutral, or alkaline. It is measured in terms of pH values which gives the amount of active acid or alkali present. A neutral soil has a pH value of 7.0 while an acid soil has a pH value of less than 7.0 and an alkaline soil has a value of more than 7.0. Increasing the pH value above 7.0 means a direct increase in alkalinity. But the reverse is true with acids. A decrease in pH value from 7 to 1 means an increase in the amount of active acid present. Since the pH value is a logarithmic expression of the concentration of active acid, the value of pH_5 is ten times as acid as a pH of 6.0 and pH_4 is ten times as acid as pH_5. Other things being equal the greater the acidity of the soil the greater the loss of calcium, and other bases through leaching processes.

In humid climates the soil processes tend toward an acid reaction, due to excessive leaching of bases. While in an arid or semi-arid climate the soil processes tend toward an alkaline reaction because of no leaching of bases. Intermediate climatic conditions make for a neutral soil. Of course, the degree of weathering, or soil processes, and the nature of the material from which the soil was derived, affect the amount of acid or alkali present.

The reaction of the soil may influence the plant in several ways: (1) by direct corrosive effect on the roots hindering normal root development, (2) by depleting the soil of lime and other basic nutrients, (3) by dissolving poisonous substances, such as aluminum, in the soil and thus poisoning the plants, (4) by retarding the growth and development of beneficial soil organisms, and (5) by precipitating plant nutrients like iron and manganese. Any one of these factors may seriously hinder the growth of plants, and thus cause a poor garden or even a failure. To get the most from a garden one should adjust the reaction of the soil to suit the optimum needs of the plants.

As previously indicated, humid soils are generally acid. That means that most of Florida soils are acid in reaction. This is a very important consideration for gardeners in Florida. Fortunately, however, most cultivated plants including our highly prized garden specimens,

prefer an acid soil. Moreover, a large portion of the wild flowering plants so common in Florida not only tolerate but prefer acid soils for best production.

It is not only interesting but a significant character of such plants as azalea, hydrangea, strawberry and lily, to grow most successfully on rather acid soils. This is true of the rose -- the princess of garden plants. These facts are well known by the successful gardener. The time old custom of adding leaf mold and plenty of moisture to flowering and garden plants induces an acid condition in the soil -- oftentimes a necessary factor for success.

It should not be inferred, however, that all garden plants prefer a distinctly acid soil. Just the reverse is true with some plants. Such plants as abelia, celery, geranium, poppies and others grow best in a neutral to slightly alkaline soil. These differences in responses are inherent characteristics of the plants and can rarely be changed by man. Without taking these plant characteristics into consideration the best of gardeners can not make a success. Oftentimes the most serious problem confronting the gardener is his persistence in trying to grow plants on soils with unfavorable reaction, and at the same time having suitable corrective materials that he could use.

The cost of controlling soil reaction is relatively small. In fact, too small to interfere with the success of the gardener. After all, the primary objective of the gardener is to so adjust all his soil conditions that healthy and beautiful plants may be grown. To do this, it is essential that the plant be adapted to the reaction of his soil, or otherwise he must adjust the soil reaction to suit the needs of the plant. This is of first degree importance, particularly for garden plants.

By the use of physiologically acid fertilizers such as sulfate of ammonia, urea, ammonium phosphate, and leaf mold the grower can keep the soil sufficiently acid for the acid-loving plants, -- azaleas, strawberries, and others. Sometimes it may be necessary to use even sulfur or aluminum sulfate to secure the desired reaction. Aluminum sulphate will increase the acidity of the soil immediately following application, but sulfur requires several weeks before it brings about a more acid condition. The aluminum sulfate should be applied at the rate of 1/4 to 1 pound per square yard (depending on the soil) and watered in. The sulfur should be mixed with the soil at rate of 2 to 4 ounces per square yard and the soil moistened. It is very essential to avoid the use of hardwood ashes, lime and alkaline materials in growing acid-loving plants. While on the other hand, to grow cabbage, celery, dahlia and other lime-loving plants successfully it becomes necessary to avoid the use of much physiologically acid fertilizers. With such plants lime, hardwood ashes and alkaline forming fertilizers are essential, and necessary for success on most Florida soils. With sandy soils low in organic matter 1/4 to 1/2 pound of ground lime per square yard will be sufficient. For soils having abundant organic matter these amounts may be doubled. Although hardwood ashes are not as concentrated as ground lime, they are more active in bringing about a change in the reaction of the soil.

Although a number of garden plants grow best on distinctly acid soils, this does not mean that such plants grow without calcium and other basic nutrients. In fact, many such acid-loving plants require a high content of calcium for normal development. This means that for such plants the grower will need to add calcium in some neutral or acid form. One of the most practical ways of adding calcium under such condition is in the form of Superphosphate at the rate of 1/2 pound per square yard, worked into the soil. With many plants bone meal is a very desirable calcium carrier. Bone meal is not only safe to use but it improves the quality of the soil, thus making a more desirable plant.

It should be emphasized that only quality plants make a desirable garden. This means that a successful gardener will need to carefully consider those fundamental factors that influence the internal make-up of the plant. To influence the plant for quality, the grower will not only see that plenty of available plant food and moisture are present, but that the reaction of his soil is properly adjusted for the plants concerned.

It is just as essential that these adjustments be made for garden plants, as proper food and environment are essential to animals. The Roman gardener referred to making a soil "fat" for plants to feed upon.

In discussing the relation of soil reaction to gardening, the question of soil texture should not be overlooked. While it is true that sandy soils respond quickly to treatment, they may rapidly change in reaction following an application of certain fertilizers, and oftentimes produce injury to the plants. This means that where a grower desires to correct the reaction of his soil with soluble fertilizer materials he will need to be more careful about the amounts to apply on sands than on loams or clay soils. Soluble fertilizers, such as sulfate of ammonia, will burn tender plants if placed in contact with the roots or leaves. Therefore, the gardener should be careful about the method and rate of application of such fertilizers. They should be applied broadcast around the plants at the rate of 1 to 2 ounces per square yard. Hardwood ashes or lime applied to sandy soils often will cause chlorosis. To correct this,aluminum sulfate is a practical material to use.

One of the best ways of avoiding rapid changes in soil reaction from fertilizer treatment, is to add abundant amounts of organic matter such as compost, leaf mold, or some other available form of organic matter. For small areas, the gardener may deem it desirable to add some clay material to the sands for the purpose of adding a more stable body to the soil. Where plenty of organic matter and clay is present, the reaction of the soil will be more constant and thus make it possible to grow a healthy plant and consequently a better plant.

The gardener who has a variety of plants and soils can well afford to study his soil reaction problem for individual plants. In many instances it will be good business to secure a small soil test kit for measuring the reaction of his field and garden soils. These kits are simple and can be secured at a small cost. Some of the companies handling them will supply the gardener with a list of plants togather with

their optimum soil reaction. This, as a rule, is very valuable to the amateur gardener. Although the average layman might not successfully use the soil tester, the careful gardener can secure satisfactory results with a littlepractice. Unless the gardener does give his soil reaction problem careful attention, his chances for success will be small, especially for certain plants. Proper attention and care at the right time and in the right place will make a successful garden where others fail.

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Ornamental Gardening in Florida
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Talk No. 4
October 4, 1933

THE ROLE OF BENEFICIAL SOIL MICRO-ORGANISMS IN GARDENING

R. M. Barnette, Chemist
Florida Agricultural Experiment Station

The foundation of successful gardening rests on the establishment and maintenance of a fertile soil. In the building and tending of a fertile soil, the skillful gardener is really gardening underground. He is cultivating and nurturing an extensive garden of minute plants. If properly pampered this garden of grotesquely shaped, chaotically arranged, ever changing microplants will go a long way towards insuring a vigorous and healthy garden of higher plants. These microscopic plants are the beneficial soil microflora. The fertility of the soil depends on the growth and the activity of these microorganisms to a large extent. They are the life of the soil.

The numbers and kinds of the beneficial soil micro-organisms vary under different conditions. In general the more fertile a soil becomes, the greater the number of beneficial microorganisms it contains. An adequately cultivated, well-drained soil, which has been abundantly supplied with decomposing organic matter and liberally treated with the essential fertilizer constituents and animal manures, usually contains an ample number of beneficial microorganisms. Soil acidity and unfavorable moisture conditions are detriments to the beneficial soil microflora. The numbers and kinds of these beneficial microplants are as varied and interesting as those of the higher plants. They have been subjected to study and classification as have the higher plants.

The botanist classifies the higher plants chiefly on the basis of their physical growth characteristics. His basis is relatively simple when compared with that of the bacteriologist who must study the microorganisms under the microscope and use dyes and stains to bring out their size, shape and composition. The bacteriologist has differentiated three general groups of beneficial soil microorganisms; they are the soil bacteria, the soil fungi or molds and the soil actinomycetes. Each of these general groups of microplants has many representatives which are as interesting to the bacteriologist as are the numerous species of the higher plants to the plant lover.

The bacteria are considered to be one-celled plants which have three general forms; rod-shaped, spherical and spiral. They multiply by simple division; that is, a single cell splits into two individual single cells. Most bacteria vary in length from about 1/50,000 to 1/5,000 of an inch, while some monsters reach a length of 1/000 of an inch. However, their numbers and activities are numerous, making up for their minute sizes. They perform a prodigious amount of work in the many processes which they carry out in the soil. They are generally considered the most important beneficial component of the soil microflora.

The fungus or mold is a multi-celled body. The numerous cells form thread-like growths among which there is a division of the work they do. Some vegetative mold threads serve for the absorption of nutrients while others produce fruiting bodies or spores. The molds propagate themselves chiefly by means of spores. The fungi are active in breaking down the woody tissues of plant materials in the soil. They are second in importance among the soil microorganisms.

The actinomycetes are the third most important group of the soil microflora. They resemble the higher developed fungi in that they make a true branching thread-like growth -- but they resemble the bacteria in that the material of their bodies show many of the properties of the bacterial bodies. Apparently they belong neither to the molds nor to the bacteria. The actinomycetes may produce very beautiful gray, yellow, brown, blue, green, red or other pigments when grown on artificial media. Cultures of actinomycetes often give up an odor similar to the "earthy" odor of the soil and without doubt they are responsible for this odor in the soil. They are especially active in the decomposition of dead plant parts added to the soil.

These three groups of microorganisms and others as well bring about a number of beneficial transformations of soil materials. They are especially active in transforming the dead animal and plant parts to forms which may be assimilated by the growing plant. There are three essentially beneficial transformations: (1) the transformation of nitrogen compounds (2) the transformation of carbon compounds (3) the transformation of mineral substances. The processes taking place in these transformations are continuous and progressive in a fertile soil and serve to help maintain a favorable condition for plant growth.

The transformation of nitrogenous compounds by beneficial soil microorganisms includes on the one hand the fixation of elemental nitrogen from the air and its elaboration into complex plant proteins and on the other hand the conversion of complex plant and animal proteins into simpler nitrogen compounds which may be utilized by the growing plant. The fixation of nitrogen from the air is accomplished by the bacteria growing on the nodules of the leguminous plants and by a group of free-moving bacteria called the "azotobacters". Leguminous plants grown as ornamentals and for cut flowers thus help to maintain a fertile garden spot by increasing the supply of available nitrogen. Among the more recently introduced plants, the ornamental species of crotalaria are very efficient gatherers of nitrogen and at the same time add cheerful colors to the flower bed. It is usually not necessary to inoculate the crotalaria seed when they are planted as the organism necessary for their inoculation is widely distributed in Florida soils. In this connection, recently Harold Mowry of the Florida Agricultural Experiment Station has definitely proved that the several species of the Australian pine when properly inoculated with some soil organism will develop nodules on the roots and show a distinctly increased nitrogen content over uninoculated trees. The use of the Australian pine as a hedge, setting or windbreak evidently does not deplete the nitrogen supply of the soil but rather makes available a greater supply of nitrogen through the fixation processes.

The "azotobacters" or free-moving nitrogen-fixing organism are able to trap the nitrogen from the air without the presence of a host plant. They are found in a wide variety of soils. Their relative value as nitrogen gatherers is not as yet fully evaluated.

The complex nitrogen compounds of plants and animals, the proteins, must be converted into simpler nitrogen compounds such as ammonium sulphate, calcium, potassium, magnesium and sodium nitrates before they can be utilized by the growing plant. The beneficial microflora are responsible for the change of the nitrogen of these complex proteins into a form available to the growing plant. The microorganisms use the proteins as a food supply and convert the excess nitrogen into simpler forms. First the nitrogen is converted into ammonia by one group of organisms, then another group takes the ammonia and converts it into nitrites and still a third group takes the nitrites and changes them into the readily available nitrates. These processes in the soil are continuous and progressive. They are dependent upon an available supply of proteins in the soil and they represent one of the most important transormations which the soil microflora bring about.

The microorganisms are also responsible for the transformation of carbon compounds in the soil. The carbon compounds include not only the proteins but also such nitrogen-free materials as sugars and celluloses (wood fiber) in the tissues of plant and animal bodies. These latter compounds are attacked by some groups of the microflora as a source of food. They are broken down into compounds which may be used in building up the bodies of the microorganisms. In this process there are waste materials, water and carbonic acid, formed from the plant and animal materials. The carbonic acid is formed by the combination of carbon dioxide and water and this acid attacks the soil minerals and brings many desirable nutrients into solution, thus making them available to the plant.

Non-leguminous straws and other plant materials which are low in nitrogen content should not be added directly to a garden soil in great quantities. The nitrogen content of these materials is so low that in the process of rotting them in the soil, the microorganisms must call on the supply of available nitrogen compounds in the soil for the necessary nitrogen to build up their bodies and propagate themselves. Thus they compete with plants growing in the soil for the nitrogen compounds. Non-leguminous straws and like materials should be composted or used as a mulch. In the composting process, the celluloses, sugars and other plant compounds are broken up and there results a material which has a higher percentage of proteins due to the protein formed in the bodies of the dead and living microorganisms. This composted material will still decay in the soil and due to its high percentage of protein, nitrogen compounds available to the growing plant will be formed.

The transformation of minerals in the soil is an essential activity of the beneficial soil microorganisms. The minerals of the soil particles are made available to the growing plant by the production of acids in the processes mentioned above. In addition, plant and animal tissues contain minerals which are set free by the decomposition processes. The microbial bodies themselves contain nitrogen, carbon and minerals. When the organisms die, other microorganisms decompose their bodies - using a part of the materials as a source of energy, but at the same time setting

free a part of them for the growing plant. There are many other transformations which are brought about by the beneficial soil microorganisms but those mentioned above are among the most important.

Thus these minute plants digest the materials of the soil and make available to the growing plant the many essential elements necessary for its growth and wellbeing. This digestion process is continuous and progressive in a fertile soil and it ensures the plant a steady and balanced diet with few surfeits of foodstuffs and few starvation periods. The digestion processes carried out by the microflora of the soil are thus essential for the most effective utilization of the fertilizer materials by the plant. They insure vigorous, healthy plants with an abundance of full perfect flowers. These processes are dependent upon the life in the soil. The life in the soil is dependent upon the numerous beneficial microplants. Is it then singular that the mark of a good gardener is found in his ability to successfully garden underground!

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF FLORIDA

COLLEGE OF AGRICULTURE,
UNIVERSITY OF FLORIDA,
AND UNITED STATES DEPARTMENT
OF AGRICULTURE,
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AGRICULTURAL EXTENSION SERVICE
COUNTY AGENT AND
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Ornamental Gardening in Florida
Radio Series

Talk No. 5
October 11, 1933

THE INFLUENCE OF ENVIRONMENT ON FLORIDA GARDEN PLANTS

By - M.D. Cody, Professor of Botany and Bacteriology,
University of Florida.

Along with the minerals and the role they play in plant production, as well as on the types of soils and how they may be prepared and fertilized to best advantage in our gardens, we must consider the influence of environment on garden plants.

The factors that comprise an environment are water, temperature, air, light, soil, plant food, animals and other plants. Any change in the normal position of a plant requires time for readjustment to its new environment. Failure to make this proper readjustment results in subnormal growth or death of the plant.

The importance of water has already been brought out in considering its role in mineral transportation in the soil, as well as other functions performed by it. It is very vital to the plant in keeping the tender parts from collapsing, to supply the needed minerals and to provide a proper medium for flushing the cells of impurities. For example, an azalea to thrive must have an abundance of water, yet good drainage is equally essential.

The response of plants to water is such as to group them under three distinct divisions: (1) those which demand an abundance of water, such as submerged aquatics and swamp plants; (2) those that require a moderate though constant supply of water, such as most of our annual garden and agricultural plants, and (3) those which do best on very little water, such as occur on a very dry soil, as cacti, liatris, sunflowers and gaillardia. The water requirements of a plant should be studied and then carefully applied for best development.

Plants often suffer in the garden from too much water rather than from too little. A water-soaked soil is low in oxygen, and it tends to become sour from decomposition that goes on. The first condition can be corrected through drainage, and the second by a judicious use of lime. A wet soil is also cooler, which retards germination and growth. Too frequent watering tends to shallow rooting, and when watering is delayed or stopped the roots may be unable to go down deeper into the soil, and insufficient moisture rises to meet the increased demands; consequently, the plants wilt and soon die. The rose is a good example. The soil becomes packed from frequent watering and is low in oxygen content. Other dangers from too wet a soil are scalding of the lower stems and mildewing of the leaves. Damping off, one of the most destructive pests of seedlings, is encouraged by wet soil and poor aeriation.

Frequently one has noticed how plants droop and their leaves wilt or curl when exposed to dry winds or severe heat, but how they recover gradually when these conditions subside. This wilting is a means of checking the evaporation of water (transpiration) from within the plant. Toward dusk the plant recovers its former rigidity because less water is lost than is absorbed. Caladium, hydrangea and many other broad, thin-leafed plants illustrate this condition.

We are quite familiar with the value of starting bulbs in the dark for proper root development and while the leaves are almost colorless this is corrected shortly after bringing them into the light. Yet when the bulbs are allowed to start in the light the roots are poorly formed and the leaves are short and slender. The flower stalks are also short.

Nasturtium, sunflower, gaillardia, zelia and many other plants fare best in full sunlight for at least the greater part of the day than in the shade. Arbor-vitae, junipers, roses, sago palm and many of our conifers require much light for their best development; however, many of them will grow in moderate shade.

Often we become discouraged with our lawns because the grass does not spread well under the trees and shrubbery. The lack of sufficient light may be the cause of such failure. Bermuda grass requires considerable light for best development. St. Augustine grass can adjust itself to moderate light. Other factors, such as lack of sufficient moisture for the grass roots, since the other vegetation absorbs it faster, or the toxic effect produced by root excretions of other plants may also contribute to the failure of the grass in such areas.

We have observed how certain plants struggle for light. Plants kept before a window and allowed to receive light only from one direction will lean in this direction,and unless their position is changed will become "one-sided". Plants in a crowded seed-bed, or saplings crowded in a grove, are spindling largely because of their struggle for light. Grape, Virginia creeper, clematis, thunbergia and a number of vines climb over any sort of a support for light, and in some instances will shut off practically all light from the plants upon which they are clinging. A very good example of this is the effect the Florida or Spanigh Moss has upon our trees. This plant is not a parasite, as some believe, but the air, light and moisture it cuts off reduces the vigor of the tree.

Light is very vital to all green plants because it enables the chlorophyll, or green coloring matter, to make plant food. Yet sometimes the light is too strong so the plants have to change the position of their leaves, or modify their leaf-form to correct the light. Young, tender leaves and stems are frequently of a reddish tint. This pigment tends to shield the chlorophyll from the destructive effect of the light. Often hairs occur upon the surfaces of leaves and stems, to reduce not only light but also transpiration. These hairs reflect much light, thereby reducing the direct influence of the rays.

The duration of light affects the blooming and fruiting of many plants. Plants have been grouped as long-day, short-day and plants indifferent to length of day, according to the number of hours of daylight required for proper fruiting. Lettuce, cabbage, beans, tomatoes, melons, iris, sunflowers, zinnia, nasturtium and verbena require from 13 to 16 hours of light for blooming, and are regarded as long-day plants, while asters, chrysanthemum, cosmos, certain bidens, liatris and poinsetta require less than 10 hours of light to flower. These are short-day plants. By darkening the short-day plants for a portion of a mid-summer's day they have been induced to bloom. The converse is true for the long-day plants.

With a decrease in temperature to a certain minimum, growth in size is retarded, at lower temperatures the plant ceases to make its food, and with still lower temperatures respiration ceases and death ensues. Thus, temperature is not only necessary for life processes but also furnishes the energy for them.

A plant thriving in a warm place and moved to a cool one becomes inactive until it has adjusted itself to its new home. Possibly it can never do this. The reverse is true. Some plants are so fixed in their habits that much time is required to overcome them. This is well brought out by the deciduous habit of many of our northern plants on being brought southward. Every year the shedding of the leaves occurs at about the same time as in the original home, yet after a time, shedding of foliage starts a little later in accordance with the period in which the plant is in. Southern plants carried northward are readily caught by early frosts and are frequently unprepared for the northern winters because of the slowness in ripening of their wood. Frequently, we in Gainesville have light touches of winter before Christmas which tempers off the wood and permits the vegetation to withstand the colder weather that follows, while farther down in the state vegetation shows greater suffering even though the temperature does not drop as low as in the northern portion of the state at this later period. This tolerance to low temperature is tied up largely with certain chemical changes occuring in the wood of the plant, which are induced by the first touch of cold that causes the sap to fall. Dry seeds can withstand a temperature of 100 degrees Centigrade or a little above for varying periods but water-soaked seed are readily killed at 70 degrees Centigrade, so plants rich in sap are more susceptible to injury from temperature extremes than those low in sap.

Many plants are limited solely by temperature. Many costly attempts have been made to grow quinces, cherries, as well as certain desired varieties of peaches in certain regions of the South, but too prolonged high temperatures of summer, and insufficient cold in winter to stimulate the plants for proper growth and production have resulted. Temperature is a barrier to northern migration of citrus, water hyacinth, cypress, bidens, leucantha, crepe myrtle and many of our strictly southern plants, while peony, aquillegia, tulip, prince's feather, tamarack, spruce, lilac and other typical northern plants have not succeeded in the South, except where extra care has been taken to provide the proper habitat. Potatoes give highest yields in regions with the lowest summer temperature.

Many of our worst molds, rots and rusts of the garden develop best during warm, muggy weather.

Relation between plants and animals is brought out through the process of pollination, propagation and seeding of certain plants. Time here will not permit a detailed account of the special devices developed by plants to insure against "selfing" and to attract insects or other small creatures to effect pollination, or how they devoid on various animals and agencies for their dissemination, but many of them are ingenious and highly entertaining. Many of the labiatae and slender tubular flowers are highly specialized for this performance.

Moles, crickets, worms, rodents and insects do considerable damage to plants. The nematode, or eel-worm, is also a very serious pest in most of our soils, and can be controlled largely by selecting plants that are resistant to its infection. Some of the burrowing in our soils by these organisms helps to stimulate root growth and also to aerate the soil; however, it may do more damage than good at the time.

The importance of the Sumatra wasp in fertilizing the Sumatra fig; the bumblebee in relation to seed production of red clover; the value of the honeybee in our groves, and many other examples show the effect of these agents upon plant production, and the value of such an environment. Some of our unsolved problems in proper seed production may yet receive solution through this means. The relation of micro-organisms of the soil to plant growth is very important.

One can well afford to give careful thought to the selection of plants for the particular situation into which they are to be introduced by giving special regard to the influences of their new environment.

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Ornamental Gardening in Florida
Radio Series

Talk No. 6
October 18, 1933

PREPARING AND FERTILIZING GARDEN SOILS

By- W. A. Leukel, agronomist,
Florida Experiment Station

The fertilization of an ornamental garden is a matter where considerable judgment must be used by the individual. Only a few fundamental facts concerning the chief essentials of garden fertilization can be given in the time allotted here.

The establishment of a proper soil environment for plant growth is one of the first essentials in ornamental gardening. Such a plant environment means a friable soil high in organic matter. This soil condition not only provides various plant nutrients but conserves soil moisture so essential for plant growth. Organic matter when needed can be supplied to garden soils from four sources -- namely: woods-mold, barnyard manure, muck or well rotted compost. Barnyard manure, when used, should be well rotted. A sufficient amount should be used to prevent leaching in sandy soils and also to bring about a more friable condition in heavier soils. Manure should be plowed under and well incorporated with the soil before the soil is used for the growth of garden plants. If added while moist, its value will be enhanced. Where manure is not available, a good muck may be incorporated with the soil to equal advantage. Mucks should likewise be incorporated with the soil sometime before garden crops are planted. Most mucks are low in bacterial flora and therefore when well incorporated with the soil a better bacterial activity is created in the soil-muck mixture.

Well rotted compost can be applied and used to increase soil organic matter in the same manner as in the case of mucks and barnyard manure. This material can be prepared by composting all waste vegetation during the growing season. Compost should always be prepared in connection with garden fertilization.

Where soils have a high clay content, packing or puddling often occurs after heavy rains. Such soils are hard to cultivate when in this condition. Where the garden area is not too large, sand may be incorporated with the soil to give them a loamy consistency and make them easier to cultivate. Where the garden area is of considerable size, lime may be supplied to the soil in varying quantities depending upon its clay content. This treatment has a tendency to make the soil more friable and easier to cultivate. The application of lime to sandy soils should be practiced very sparingly or not at all. It may stimulate growth temporarily but later retardation of plant growth often occurs. Competent advice should be sought before using lime on these kinds of garden soils.

To further provide a proper soil environment for plant growth, some system of drainage should be provided to carry off the excess surface water after heavy rains and the free soil water. The underground plant parts such as roots, bulbs, etc., need a proper air supply as well, just as do the aerial growth parts. A water-logged soil deprives the lower plant parts of a proper air supply, and a retarded growth results. Plants utilize the water held by the soil particles or the so-called film water. Water that flows freely between the soil particles should be allowed to drain off and permit a proper circulation of soil air for plant respiration and bacterial activity.

Water is the so-called universal solvent. The availability and utilization of fertilizing materials depend upon the extent to which such materials are dissolved by the soil water and thus made available for plant growth. The utilization of fertilizing materials by plants can be realized only through an adequate water supply. The growth behavior of different plants can be controlled by proper fertilization only to the extent to which such materials are made available to plants by water. Vegetative growth is often stimulated through higher nitrogen fertilization supplemented by an ample water supply. Flowering and seed production in many plants is brought about not only by decreasing the supply of nitrogen but also by retarding the availability of such nitrogen by diminishing the available water. Besides facilitating the availability of plant nutrients, water is essential for the various metabolic processes that take place within the plant. The translocation and assimilation of the various plant nutrients within the plant are performed in a soluble form and water is required for this purpose. To further carry on these processes a certain turgidity must be maintained within the plant. This condition is brought about by maintaining a required osmotic pressure within the plant. Without an available water supply this condition cannot be maintained. Respiration and photosynthesis in plants require a moist surface within the pore spaces of the leaves for the absorption of oxygen and carbon dioxide. Plants in a wilted or semi-wilted condition are unable to carry on these vital processes efficiently and therefore are retarded in their growth.

The various requirements for water by plants necessitate some form of irrigation to furnish them with the needed supply. The individual can best judge for himself what form of water supply system meets his needs. Water should never be applied to plants in quantities beyond their growing needs. Such excess results in surface erosion and in the leaching of plant nutrients from the soil in the drainage water. Excessive evaporation of water from the soil surface can be avoided by irrigating garden plants during the cooler part of the day when such evaporation is at its lowest. Soil moisture can be further conserved through the use of mulches and the eradication of weeds. Weeds utilize a great part of the soil moisture necessary for garden plants, and their eradication should not be overlooked.

The fertilizers to be used for gard n plants depend upon the kind of plants grown and the stage of growth at which such plants are to be utilized. Besides the various forms of animal manure used for garden fertilization, various commercial fertilizers are available, both in the organic and inorganic form. Those known as complete fertilizers generally contain the three chief fertilizing constituents -- nitrogen, phosphorous, and potassium -- in various proportions or percentages.

Single fertilizers generally contain one of these constituents. If necessary a complete fertilizer high in nitrogen should be incorporated with the soil before planting or shortly after the plants begin to produce top growth. The procedure to be followed after this depends upon the kind of garden plant and the purpose for which it is grown.

For fertilizing purposes, ornamental garden plants may be divided into four classes:

1. Foliage plants
2. Flowering plants
3. Fruiting plants
4. Bulbs or fleshy roots

Foliage plants may be annuals or perennials. These plants are grown for their leafage or foliage. To produce this kind of growth they must be kept in a vigorous vegetative growth condition. After adding a complete fertilizer early in the season, fertilizing materials high in nitrogen should be applied at short intervals during the growing season. This fertilization should always be accompanied by a sufficient water supply to make such materials available to the plants. Where the iron content of the soil is insufficient for ample photosynthetic activity in the plants, a light application of copperas added to the soil in the form of a thin spray will be helpful. In case of perennial foliage plants nitrogen fertilizers should not be applied too late in the season so as to have the young succulent growth killed by early frost. Fertilizers lower in nitrogen applied during the late growing season will be stored within the plants and result in early vigorous growth the following spring.

To bring about a maximum production of flowers on plants a certain relative organic composition of the plants must be attained, especially between nitrogen and carbohydrate compounds in the parts of the plants where such flowers are produced. A vigorous vegetative growth should be attained by these plants during the early growing season. To attain this condition fertilizers rather high in nitrogen should be supplied to the plants. This fertilization brings about an abundant leafage for the elaboration of carbohydrate materials in the plants. After a sufficient size of plants with abundant leafage is attained, nitrogen fertilization with its accompanying water supply should be reduced. This brings about a lower nitrogen supply to the plants. The continual elaboration of carbohydrates by means of the large leaf area results in a high carbohydrate content in the plants in relation to nitrogen. This composition relation is associated with reproduction or flowering in such plants. If all other factors are favorable such as light, temperature, moisture, etc., abundant flowering will take place.

To keep plants in a flower producing stage, flowers should not be permitted to form fruits or seeds. Continual removal of flowers before fruit formation reverts the flower bearing parts of the plants to a vegetative growth condition, and the plant gradually grows back to the reproductive or flowering stage. After fertilization of the flowers or gametic union in flowering plants the plants acquire an increased capacity for absorbing plant nutrients. The process of reproduction appears to stimulate this feeding power of plants up to the time of fruit formation. The application of fertilizing materials not too high in nitrogen at this advanced flowering period will keep plants in a

vigorous growth condition by supplying sufficient mineral nutrients for abundant flower production. To promote this increased capacity of plants, fruit formation must not be permitted to take place.

Where the fruit of the plant is sought in ornamental garden plants, vigorous flowering is a pre-requisite for such fruit production. In addition to this, the plant must possess a stored supply of organic and inorganic foods so as to develop the fruit when it once begins to form. To obtain this condition in plants they should be fertilized with fertilizers rather high in nitrogen so as to produce vigorous vegetative parts with abundant leafage. This increased leaf area is needed for the elaboration of organic foods beyond the growing needs of the plants. These excess foods are stored within the plants and later utilized in the development of the fruit. As in the case of all flowering plants, when sufficient vegetative growth is produced the nitrogen supplied to the plants should be decreased. This with a slightly decreased water supply will bring the plants into flowering which is pre-requisite to fruit production. As formerly stated, plants have an increased absorbing power for soil nutrients after fertilization of the reproductive parts. Commercial fertilizer applied during this period will supply the plant with abundant nutrients for later production of fruit. After fruit formation occurs translocation of plant foods to the fruit forming areas takes place within the plant. If, before this period the plants have been properly fertilized, well formed fruits will result.

The fruit wood of many plants is formed the year previous to fruit formation. After reproduction in such plants, fertilization with a complete fertilizer stimulates the storage of plant foods and the production of fruit growing areas for the following season. During the late growing season phosphate and potash fertilization furthers the storage of plant foods for the following season. High nitrogen fertilizers at this time keep the new growth too succulent and susceptible to frost injury.

Plants grown for the production of bulbs or fleshy roots should be fertilized so as to stimulate the growth of the underground plant parts. Fertilizers applied to such plants should be high in soluble phosphorus. This element has a tendency to increase root or bulb production on these plants. Early vigorous vegetative growth is essential for the production of a large top growth with sufficient leafage. Roots and bulbs require the elaboration of large quantities of organic materials, especially carbohydrates. Therefore an abundant leafage is essential for this purpose. Nitrogen fertilization early in the season is necessary for a good top growth. Fertilizers applied later should be lower in nitrogen and higher in phosphorus. Where sugars form a large part of the materials in bulbs and roots, potassium is very essential for their elaboration. Fertilizers applied after early growth should have this element increased in their mixture.

To summarize briefly, garden soils should be high in organic matter content, they should be well drained and adequately watered. As to fertilizers, let us keep in mind that after applying a general commercial fertilizer early in the season fertilizers high in nitrogen will produce vigorous growth and fine foliage. If the plants are grown for flowers or fruit they should first be made to grow off vigorously, and then the nitrogen content of the fertilizer should be reduced. For bulbs, fertilizers high in phosphorus are best.

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Ornamental Gardening in Florida
Radio Series

Talk No. 7
October 25, 1933

GARDENING LITERATURE

By - Mrs. Ida Keeling Cresap, librarian
Florida Experiment Station

The literature of ornamental gardening has had a difficult time to come into its own. It has been hidden under all sorts of subjects and only within the last quarter of a century has it been brought out into the light of day to develop in its own importance.

It is possible that long before the advent of the book in the form of clay tablet or roll of papyrus, man practiced some sort of ornamental gardening. We know that he had knowledge of plants, and he had a certain love of beauty as is evidenced by the pictures chipped in stone that have been discovered from time to time by archaeologists in their excavations. Ornamentation of the body was evident, but whether this extended to man's surroundings we do not know.

Clay tablets and papyrus rolls were used for records in ancient times to a certain extent, but it was not until the 15th century when the German Gutenberg invented the method by which paper could be printed from movable blocks in a printing press, that a literature on any subject was assured. Almost immediately it developed that many people had the urge to write so that with the passing of the years the world has become fairly well stocked with good, bad and indifferent books.

Up to this time all the gardens had been made following a severely formal style. They were planned and laid out with geometrical precision. This was true to such an extent that in 1728 Batty Langley, in a book on "New Principles of Gardening," devoted all of Part I to geometry. The elaborate designs and figures could be secured only by the most careful computation.

This type of garden had existed for so long that gradually it became irksome to those people who longed for a more natural arrangement. Finally, the poets and painters began to make written and painted appeals for less artificiality and more natural beauty. Milton, Pope, Addison and the Dutch painters became insistent for this change in ornamental plantings and planning.

In 1764 William Shenstone in "Unconnected Thoughts on Gardening" wrote: "Gardening may be divided into three species -- kitchen-gardening - parterre-gardening - and landskip, or picturesque-gardening. The latter type is the one in which we are most interested. It consists in pleasing the imagination by scenes of grandeur, beauty or variety. Convenience merely has no share here; any farther than as it pleases the imagination." It is believed that in this writing of Shenstone originated the term "landscape gardening." It would

seem to me that in his expression "picturesque garden" he has also been responsible for our modern "ornamental garden" for an ornamental garden worthy of the name certainly must be picturesque.

In Shenstone's own beautiful garden, engraved on a tablet, were these lines:

"Here in cool grot and mossy cell,
We rural fays and faeries dwell;
Tho rarely seen by mortal eye,
When the pale moon, ascending high,
Darts thru yon limes her quivering beams,
We frisk it near these crystal streams."

What a beautiful picture this brings to mind and how suggestive of an ideal Florida garden!

It was some time before the ideas advanced by the poets for picturesque gardens spread through Europe. Many people persisted in continuing a practice about which Bacon had written over a century before: "As for the making of Knots or Figures, with divers Colored Earths, they be but toys, you may see as good sight many times in Tarts ... I do not like Images cut out of Juniper, or other garden-stuff; they are for Children."

The garden based on the elaborate geometrical design was doomed, and while its immediate successor was different from the garden of today, it was gradually approaching it.

It is a strange fact that much if not most of our early horticultural literature was written by persons who had no primary interest in horticulture. I have already commented on the part played by the poets and painters in changing the form of the garden. It remained for the physician and naturalist to give the world first knowledge of plants and plant life. The old "Herbals" written by them are of immense importance.

It was the physician and the naturalist who were first interested in the plant life of America. One of the earliest known American writers to list plants from England that would or would not grow in this country was John Josselyn. In 1672 he published a book entitled: "New England's Rarities Discovered in Birds, Beasts, Fishes, Serpents, and Plants of the Country." His list of plants consisted of an assortment of vegetables and flowers, including with cabbage and lettuce, the hollyhock, gilly flower, marygold (spelled m-a-ry-g-ol-d) and he comments that rosemary will not survive there. This is the only authentic account of what grew in those early New England gardens.

In 1791 William Bartram published his: "Travels through North and South Carolina, Georgia, East and West Florida." Bartram was a naturalist and he visited these states for the purpose of collecting plants. His list of plants found growing in Florida was the first one to be published. It is an important contribution to the early plant literature of the state and South.

In his "New Cyclopedia of American Horticulture," L. H. Bailey describes the colonial gardens most interestingly. He writes: "The colonial ornamental gardens were unlike our own in the relative poverty of plants, in the absence of the landscape arrangement, in the rarity of greenhouses, and the lack of smooth-shaven lawns (for the lawn mower was not invented till this century)." He gives a brief description of the private garden of Governor Peter Stuyvesant of New Amsterdam (now New York) which the Governor called the "Bouwerie." It required 40 or 50 negro slaves and several white servants to care for it. The site of that famous old garden is the location of New York's "Bowery" of today -- truly a great change.

The Bulletin of the Garden Club of America is replete with articles about the garden. One in particular of special interest was published in the September 1928 number of the Bulletin. It was "Colonial Gardens," by Rachel McM. M. Hunt. One interested in Florida gardens should read it.

With the beginning of the 19th century a number of American books on agriculture began to be published. The term "agriculture" was inclusive of horticulture, and floriculture or gardening usually were given some mention. In 1804, John Gardiner and David Hepburn published at Washington, D. C., a very small book, measuring only four by six inches, entitled: "The American Gardener, containing ample directions for working a Kitchen Garden, every month in the year; and copious instructions for the cultivation of Flower Gardens, Vineyards, Nurseries, Hop-Yards, Green Houses, and Hot Houses." The authors certainly wanted to cover everything while they were at it.

Another example of including information about vegetables, ornamentals or floriculture is shown in a book published in 1823 by William Cobbett; "The American Gardener. A treatise on the situation, soil, fencing and laying out of gardens; on the making and managing of hot beds and greenhouses, and on the propagation and cultivation of the several sorts of vegetables, herbs, fruits and flowers."

The first great landscape gardener of America was Andrew Jackson Downing. He was born at Newburg, N. Y., on October 30, 1815 and died by drowning on July 28, 1852. In 1841 he published: "Treatise on the Theory and Practice of Landscape Gardening and Cottage Residences." Four years later he published: "Fruits and Fruit Trees of America." The latter is credited with exerting more influence in arousing the interest of people in fruit growing than all other books at that time. After the Author's death it was continued and several times revised by his elder brother, Charles Downing.

It was not until 1828 that a writer published a book devoted exclusively to flowers. This was Roland Green's "Treatise on the Cultivation of Flowers." It was followed in 1839 by the first American book devoted to one flower. This was published by Sayers and was a treatise on the dahlia.

While the horticultural book was of great importance to the gardener, during the last fifty years of the 19th century it was the agricultural magazine that proved the most helpful.

In our own state, the Florida Dispatch, later becoming the Florida Farmer and Fruit Grower, published with a few interruptions from 1869 to 1910, and the Florida Agriculturist, from 1879 to 1911, carried many articles of interest to the gardener. These furnished the earliest information to be had concerning the growing of flowers and lawns in Florida.

In considering the literature of ornamental gardening one must not overlook the published proceedings of the Florida State Horticultural Society. The Society was organized in 1888 and for the first four years the proceedings were published in the Florida Agriculturist. In 1892 the 5th Proceeding was published separately, which has been the custom ever since.

By the beginning of the 20th century books and magazines were so numerous that the gardener, along with others, had difficulty in selecting what would be most helpful to him. In 1906, L. H. Bailey in his "Cyclopedia of American Horticulture" stated that at that time there were more than 600 books on American horticulture. That number has been multiplied many times now.

Many of you will recall the series of talks given over the radio last year on "Ornamental Gardening." There are a few copies of these talks left. If you would care for them write to the Florida Agricultural Experiment Station, Gainesville, and request them and you will be sent copies. They will be an important addition to your collection of gardening literature.

The part played by the agricultural experiment stations in developing the ornamental garden and its literature is beyond estimate. Research and experiments in soils, fertilizers, insects and diseases have been carried on by the Florida Agricultural Experiment Station, so that today the Florida gardener does not have to rely on what he <u>thinks</u> may be the best procedure in preparing his garden, but what he knows is best. The bulletins issued by the Experiment Stations and United States Department of Agriculture are sometimes considered too ephemeral to be classed as real literature but this is far from true. No Florida library's garden collection will be complete without including these valuable publications.

Before concluding I am going to give you a list of references of interest to a gardener. Some of the publications were written strictly for Florida and Florida conditions; others are of a general nature; as the fundamentals of gardening are the same, no matter where one lives, all should be of interest.

BULLETINS AND BOOKS ON ORNAMENTALS AND GARDENING

Florida Bulletins

The Florida Agricultural Experiment Station and the Florida Agricultural Extension Service at Gainesville have issued a number of informative bulletins on ornamentals and gardening. As long as the supply lasts, these may be obtained free by Florida residents.

In the following classified citations, all bulletins listed as "Station" bulletins or press bulletins should be ordered from the Agricultural Experiment Station, Gainesville, Fla., while those listed as "Extension" bulletins should be ordered from the Agricultural Extension Service, Gainesville, Florida.

Garden Flowers

Annual Flowering Plants for Florida -- John V. Watkins, Extension Bul. 73.
Growing Annual Flowering Plants -- W. L. Floyd. Press Bul. 443.
Herbaceous Perennials -- John V. Watkins, Extension Bul. 76.

Roses

Rose Growing -- W. L. Floyd and John V. Watkins. Extension Bul. 59.

Lawns and Shrubs

Lawns in Florida -- C. R. Enlow and W. E. Stokes, Station Bul. 209.
Foundation Plantings for Florida Homes -- A. P. Spencer. Extension Bul. 72.

Soils

The Soils of Florida -- O. C. Bryan. Extension Bulletin 42.

Trees, Palms, Vines and Ferns

Asparagus plumosus -- Harold Mowry. Press Bul. 384.
Native and Exotic Palms of Florida -- Harold Mowry. Station Bul. 228.
Ornamental Trees -- Harold Mowry. Station Bul. 261.
Ornamental Vines -- Harold Mowry. Station Bul. 188.

Diseases and Insects

Brown Patch of Lawns and Golf Greens, and Its Control -- Geo. F. Weber, Press Bul. 437.
Florida Truck and Garden Insects -- J. R. Watson. Station Bul. 232.
The Flower Thrips -- J. R. Watson. Station Bul. 162.
Easter Lily Mosaic -- Erdman West. Press Bul. 445.
Mosaic Diseases of Vegetable Plants -- Geo. F. Weber. Press Bul. 446.
Rose Canker -- William B. Shippy. Press Bul. 447.
Black Spot of Roses -- William B. Shippy. Press Bul. 448.
Powdery Mildew of Roses -- William B. Shippy. Press Bul. 449.
Yellowing of Centipede Grass and Its Control -- O. C. Bryan. Press Bul. 450.
Preparation of Lime-Sulphur Spray -- Geo. F. Weber. Press Bul. 452.
Methods of Preparing Bordeaux Mixture -- Geo. F. Weber. Press Bul. 453.
Clitocybe Mushroom Root Rot of Woody Plants -- A. S. Rhoads. Press Bul. 454.
Selection and Shipment of Plant Specimens for Diagnosis or Identification -- Geo. F. Weber. Press Bul. 455.

Other Bulletins

The State Department of Agriculture at Tallahassee has issued a number of bulletins on ornamentals and other garden subjects for free distribution. Also, the United States Department of Agriculture, Washington, D. C., has a list of puclications available for distribution. This list can be obtained from the Department, and bulletins on ornamentals and gardening which are of interest can be ordered.

Gardening Books for the South

The following books should prove to be of interest to Florida gardeners.

Baker, Mary Francis.
Florida wild flowers. An introduction to the flora of the Florida Peninsula. New York. Macmillan Co. 1926.

Claiborne, Elizabeth.
Manual of gardening for use in the central southern states. Nashville. Parthenon Press. 1932.

Dillon, Julia Lester.
The blossom circle of the year in southern gardens. New York. A. T. De La Mare. 1922.

Dorn, Mabel White and Marjory Stoneman Douglas.
The book of twelve for south Florida gardens. 1928.

Hume, H. H.
Gardening in the lower South. New York. Macmillan. 1929. (Rural science series).

McLaren, J.
Gardening in California, landscape and flower. 3d ed. rev. San Francisco, Am. Robertson. 1924.

Randall, G. M.
Dutch and French bulb-culture in Florida, also diversified farming. DeLand, Florida. The E. O. Painter Printing Co. 1926.

Simpson, Charles Torrey.
In lower Florida wilds. New York. Putnam. 1920.

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Ornamental gardening in Florida; a treatise on the native and exotic decorative plants adapted to Florida and their cultivation, with suggestions for the ornamentation of our homes and grounds. Little River, Florida. The Author.

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Out of doors in Florida; the adventures of a naturalist; together with essays on the wild life and the geology of the state. Miami. E. B. Douglas Co. 1923.

Small, John Kunkel.
Ferns of Florida, being descriptions of and notes in the fern-plants growing naturally in Florida. New York. Science Press. 1931.

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Flora of Southeastern states. (A new edition of which will be published shortly.)

Wilson, Mrs. Millar and Mrs. J. A. Ferguson.
In Florida gardens; suggested planting material both native and cultivated for Florida gardens. Jacksonville, Florida. The Authors. 1924.

Storied gardens of the old South; Michaux's garden, Middleton Place. Garden Magazine and Home Builder. Vol. 40, number 3, pages 165-167. November 1924.

The Bulletin of the Garden Club of America, Washington, D. C.

Other Books on Gardening

Bailey, L. H.
The cultivated conifers in North America. New York. Macmillan. 1933.

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The pruning book. New York. Macmillan. 1923.

_____ and Ethel Zoe Bailey.
Hortus, a concise dictionary of gardening, general horticulture and cultivated plants in North America. New York. Macmillan. 1930.

Barron, L.
American home book of gardening. New York. Doubleday. 1931.

Barnes, Parket T.
House plants and how to grow them. New York. Doubleday, Page & Co. 1927.

Beal, Alvin C.
The gladiolus and its culture, how to propagate, grow and handle gladioli outdoors and under glass. New York. Orange Judd Pub. Co. 1927.

Bennett, J. M.
Roadside development. New York. Macmillan. 1929.

Bottomley, M. E.
The design of small properties. A book for the home-owner in city and country. New York. Macmillan. 1929.

Correvon, Henry.
Rock garden and alpine plants. New York. Macmillan. 1930.

Eaton, Walter Prichard.
Everybody's garden; talks on natural design and the use of simple material. New York. A. A. Knopf. 1932.

Fairbridge, Dorothea.
Gardens of South Africa. London. A. & C. Black. 1924.

Findlay, H.
Garden making and keeping. Pop. ed. New York. Doubleday. 1932.

Fox, Mrs. Helen Morgenthau.
Patio gardens. New York. Macmillan. 1929.

Harwood, W. S.
New creations in plant life. An authoritative account of the life and work of Luther Burbank. New York. Macmillan. 1924.

Hawks, Ellison.
Pioneers of plant study. This book was originally planned, and some parts of it written, in collaboration with the late G. S. Boulger. London. The Sheldon Press. 1928.

Hole, S. Reynolds.
A book about roses. How to grow and show them. London. Edward Arnold. 1906. (Out of print but recently reprinted)

Hottes, A. C.
A book of perennials. 4th rev. ed. New York. A. T. De La Mare Co. 1931.

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1001 garden questions answered. New York. A. T. De La Mare Co. 1926.

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Practical plant propagation. New York. A. T. DeLa Mare Co.

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The book of shrubs. New York. A. T. De La Mare Co. 1928.

Hubbard, Henry Vincent and Theodora Kimball.
An introduction to the study of landscape design. New York. Macmillan. 1927.

Hume, H. Harold.
Azaleas and camellias. New York. Macmillan. 1931.

McCurdy, Robert M.
Book of garden flowers. Garden City, New York. Doubleday, Doran & Co. 1931. (Previously published under titles Garden Flowers Worth Knowing and Garden Flowers).

McFarland, J. Horace.
Modern roses. A uniform descriptive list of all important roses in commerce. New York. Macmillan. 1930.

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The rose in America. New York. Macmillan. 1926.

Moore, H. J.
Culture of flowers. Toronto. Ryerson Press. 1931.

Morgenthau, Helen.
Gardening with herbs for flavor and fragrance. New York. Macmillan. 1933.

Ortloff, H. S.
Annuals in the garden. New York. Macmillan. 1932.

_____ and H. S. Raymore.
Garden maintenance. New York. Macmillan. 1932.

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Informal gardens. New York. Macmillan. 1933.

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Perennial gardens. New York. Macmillan. 1931.

Rexford, Eben E.
Indoor gardening. Philadelphia. J. B. Lippincott. 1910.

Rockwell, F. F.
Dahlias. New York. Macmillan. 1929.

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Gladiolus. New York. Macmillan. 1930.

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Lawns. New York. Macmillan. 1929.

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Roses. New York. Macmillan. 1930.

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Shrubs. New York. Macmillan. 1928.

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The book of bulbs. A guide to the selection, planting, and cultivating of bulbs for spring, summer and autumn flowering - and to winter-long beauty from bulbs indoors. New York. Macmillan. 1929.

Rohde, E. S.
Scented garden. Boston. Hale, Cushman and Flint. 1931.

Rush, M. W.
Ignoramus garden book. New York. Sears Pub. Co. 1931.

Simonds, O. C.
Landscape gardening. New York. Macmillan. 1920.

Stevens, G. A.
Climbing roses. New York. Macmillan. 1933.

Volz, E. C.
Everybody's garden. New York. Orange Judd Pub. Co. 1928.

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Home flower-growing. New York. Macmillan. 1928.

Waite, W. H.
Modern dahlia culture. New York. A. T. De La Mare Co. 1928.

Weathers, John.
The bulb book on bulbous and tuberous plants for the open air, stove and greenhouse. London. John Murray. 1911.

Weston, T. A.
All about flowering bulbs for home and garden. New York. A. T. De La Mare Co. 1931.

Wilder, Louise Beebe.
Adventures in a suburban garden. New York. Macmillan. 1931.

Wilson, Ernest H.
Aristocrats of the garden. Boston. The Stratford. 1926.

China, Mother of gardens. Boston. The Stratford. 1929.

Felt and Rankin.
Insects and diseases of ornamental trees and shrubs. New York. Macmillan. 1933.

Heald, Frederick De Forest.
Manual of plant diseases. New York. McGraw-Hill. 1926.

Mason, A. Freeman.
Spraying, dusting and fumigation of plants. New York. Macmillan. 1928.

Rankin, W. Howard.
Manual of tree diseases. New York. Macmillan. 1923.

Voorhees, Edward V.
Fertilizers. New York. A. T. De La Mare Co. 1926.

Garden Literature

Dyer, Natalie L.
Ancient garden books. Garden club of America. Bulletin. Vol. 5, number 1, pages 64-69. January 1933.

Jensen, L. P.
Fascinating old books on gardening. Gardeners' Chronicle of America. Vol. 31, number 2. pages 35-36, 42. February 1927.

Traub, H.
The development of American horticultural literature, chiefly between 1800 and 1850. National horticultural magazine, vol. 7, number 3, pages 97-103. July 1928.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF FLORIDA

COLLEGE OF AGRICULTURE,
UNIVERSITY OF FLORIDA,
AND UNITED STATES DEPARTMENT
OF AGRICULTURE,
COOPERATING

AGRICULTURAL EXTENSION SERVICE
COUNTY AGENT AND
HOME DEMONSTRATION WORK.

Ornamental Gardening in Florida
Radio Series

Talk No. 8
November 1, 1933

PLANT NAMES, WHENCE DERIVED AND WHAT THEY MEAN

By - Erdman West, Mycologist
Florida Agricultural Experiment Station

For the past six weeks our fence rows, woods and many of our gardens have been gay with a native shrub bearing dense clusters of brilliant purple berries. Many of my audience will recognize it at once. What is its name? Well, the popular name is French Mulberry. But the botany books say it is a native of America and does not occur in France. Further, they do not classify it among the mulberries. Then what do they call it? The scientific name or botanical name is Callicarpa americana. But you say "Botanical names are so difficult. And they don't mean anything to me." Perhaps a little explanation of the form and derivation of botanical names will help us to appreciate them.

Many other popular names are just as misleading as the one just mentioned. Spanish moss is neither a moss nor Spanish, being closely related to the pineapple. Corn in the United States means something entirely different from corn in England. A few popular common names, however, are used consistently and mean definite plants, as Cherokee Rose and live oak. Many others are very ambiguous. Papaw may mean either one of two very different plants. The term "bay" is applied to so many different plants that I will not attempt to list them. Moreover, no English popular name would be understood in Russia or France or Japan. The objections to popular names then are that they are indefinite and not widely understood.

The use of Latin binomials to designate plants dates from the time of Linnaeus about 1753. Up to the time of this great Swedish naturalist, plants had been studied and described principally for their reputed medicinal properties. Close relationships among them had been recognized and related plants had been grouped under a common name. For instance, all roses were grouped under "Rosa", the Latin word for rose. The various kinds of roses were distinguished by short descriptions. Since Latin was the common classical language of the period, these descriptions also were in Latin. Linnaeus hit upon the happy plan of designating each kind by one Latin adjective in addition to the group name. A white rose of Linnaeus' time, he catalogued as Rosa alba and followed this with a description of the plant. Piper was the Latin word for pepper and so the plant that produced the black pepper of commerce became Piper nigrum, followed by the complete description of the plant.

Probably Linnaeus did not intend this combination to be the name of the plant when he first used it. He was resorting to it merely as an indicator to save the trouble of reading through each entire description. However, it soon became customary to refer to a plant by this combination without appending the description and thus the binomial system, as it is called, was established. Since then, attempts have been made to extend the combination to include three or more names,

but the two-name combination has become established throughout the world for the scientific designation of plants and animals. Certain codes of rules have been established for the formation of these names both in America and Europe, differing in minor respects but agreeing for the most part.

The botanical name of a plant, then, consists of two definite parts. The first part of the combination, as we have seen, indicates the group or genus to which the plant belongs. The second name tells the species or particular kind in the genus. Thus Linnaeus' white rose was Rosa alba. The name Rosa indicates the affinity of the plant with all the other roses. The alba part of the name distinguishes it from all the others in the group. So all the different roses would have Rosa for the first part of the name. The second or specific part of the name indicates the individual kind of rose. Rosa sinensis is a Chinese rose, because sinensis in Latin means Chinese. Rosa Carolina is a rose from Carolina. Rosa lancifolia is a rose with lance-shaped leaves.

In the beginning, the generic names were the Latin names for the plants but as new plants were found or described, new genus names had to be found for the various groups that were discovered. Sometimes the name of the man who discovered the plant was used as a basis after being Latinized. Generic names were frequently coined to honor famous botanists or patrons. Thus, the stinking cedar of the Chattahoochee River has the genus name Torreya commemorating the famous American botanist Doctor Torrey. The banana shrub has the genus name Michelia to memorialize the famous Italian botanist, Peter Michel.

Old Greek names were also used after being Latinized. The name of the French mulberry to which we referred earlier is an excellent example. The botanical name, you remember, is Callicarpa americana. Callicarpa comes from two Greek words meaning beauty and fruit. So Callicarpa means beauty fruit. Americana is a Latin adjective meaning American. A free translation of the whole Latin name would be American Beauty Berry, which is far more appropriate than French Mulberry the popular name it bears. The tulip tree or tulip poplar, Liriodendron, comes from two Greek words meaning tulip and tree. Many modern generic names are formed by taking some Greek word or combination of words that indicate an outstanding characteristic of the group and using it for the generic name. For instance, Cereus is the name of a genus of cacti, while Nyctocereus is a closely related genus the members of which bloom at night. Nycto comes from a Greek word meaning night. Another example is the forget-me-not, Myosotis. This generic name comes from two Greek words which mean mouse and ear, and was applied to this plant because the leaves resemble the ears of a mouse in shape. The derivation and meaning of most generic names are given in such books as Bailey's "Cyclopedia of Horticulture" and Gray's "Manual of Botany."

The second part of the binomial, the specific name, is frequently descriptive in character. Quite often the specific name is a Latin or Latinized Greek descriptive adjective. For instance, the summer grape is Vitis aestivalis, Vitis being the classical name for grape and aesti-valis meaning summer; the potato is Solanum tuberosum, the tuberosum part of the name referring to the fleshy tubers.

Many specific names are derived from the country of origin of the plant. Thus we get Citrus sinensis, meaning the citrus from China; Azalea indica, the azalea of India; and Fraxinum americana, the Fraxinum or ash of America.

Other specific names indicate the habitat of the plant. Pinus palustris is the pine of the swamps; Aleurites montana is the Aleurites on the mountains, and so on.

Very frequently, the specific name honors the collector or discoverer of the plant. Phlox Drummondii thus honors Drummond; and Quercus Michauxii was named for Andre Michaux who found this oak.

In contrast to my earlier comments concerning common names, let me draw your attention to how appropriate some botanical names are. In western Florida and further north is a small plant, hugging the earth at all times and perfuming the air in spring. Its common name is Trailing Arbutus. Botanists call it Epigea repens which literally translated means "creeping upon the earth" and describes perfectly the habit of this beautiful little wild flower. Another particularly apt name is that of the common flame vine that covers buildings with its fiery orange red blooms in spring. The botanical name Pyrostegia venusta means beautiful fiery roof.

There is a third part of the botanical name of a plant that is important and interesting too. This is the name or initials that follow the genus and species name, as in the botanical name of the mango, Mangifera indica L. This L. stands for Linnaeus and indicates that the scientist Linnaeus first gave the mango this scientific name. Sometimes, there are two names following the specific name, one of them in parentheses, such as Wisteria frutescens (L.) Poiret, with the L in parentheses. This means that Linnaeus first described the plant and gave it the name frutescens but put it in some other genus than Wisteria. Poiret later examined the plant and decided its affinities were with Wisteria and put it in that genus, so we get the present name. What a sroty this little botanical name tells when we know the key that unlocks it!

The pronunciation of botanical names is another bugbear for many gardeners. Anyone who has had an introduction to Latin should have no trouble with botanical names. Many books on the classification of plants give simple directions for pronouncing the names. While on this subject, I might mention some common plants, the names of which are often mispronounced. Many people say Ca-me-lia for Ca-mell-ia; Pitt-o-sporum for Pit-tos-porum; Sto-ke-sia for Stokes-ia; and Ag-er-a-tum for A-ger-atum

A very delightful treatise on this subject of plant names has been published recently by the Macmillan Company. It is "How Plants Get Their Names," by L.H. Bailey. In it you will find a more complete discussion of the derivation. It includes an appendix giving the meanings of most specific names, and a guide to the pronunciation.

Botanical names have other advantages which I have hinted at previously. A botanical name is definite in its meaning. Common names may be very local in their application and several may be applied to the same plant in different places but a botanical name, with few exceptions, is always the same and refers to a single kind of plant. Moreover, being written in Latin it can be understood by botanists anywhere in the world. The botanical name of a plant is the same the world over, no matter what nationality may be using it.

With these practical advantages in favor of the Latin names of plants, it seems desirable to learn and to use them. This is especially true when we consider the meanings of the names, their aptness to the plants they designate or the associations they bear to eminent botanists, intrepid explorers and other famous men. Really we are missing part of the pleasure of knowing our plant friends when we do not know their real names and how they received them. A little time with some botanical book such as Gray's Manual or Bailey's Cyclopedia of Horticulture, will open a new field of pleasure. Or the author of this paper will be glad to help you if you willwrite him.

COOPERATIVE EXTENSION WORK
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HOME DEMONSTRATION WORK.

Ornamental Gardening in Florida
Radio Series

Talk No. 9
November 8, 1933

ANNUAL FLOWERING PLANTS FOR THE WINTER AND SPRING GARDEN

By: John V. Watkins, Assistant Horticulturist,
University of Florida College of Agriculture

By far the greatest variety of annuals that we enjoy in Florida belong to the cool-weather group that blossom in the winter and early spring. The number of kinds that fall into this already long list are increasing each year as new sorts are being introduced by the seed houses. In addition to giving us new sorts, plant breeders have been constantly improving the old and tried species. Larkspur, nasturtiums, snapdragons, calendulas, California poppies and petunias are some of the old favorites that have been vastly improved in size, color, substance and design during the past few years.

The cool-weather annuals that bloom in the winter and early spring are, for the most part, cold-tolerant, and unless extremely low temperatures are experienced they will thrive during the months of October through April.

Many successful gardeners make their first plantings of the winter blooming kinds in late August and early September, at first protecting the tender seedlings from the direct rays of the sun by shades of cloth, dog fennel, moss, etc., until they have become sufficiently robust to grow, unshaded, in the open. Some of the late spring blooming annuals will not germinate well during hot weather and it is necessary, therefore, to wait until November to sow the seed of this general group.

The following lists may be helpful in regard to planting time:

Annuals that may be started in August or September include Alyssum, Babys' Breath, Blanket Flower, Blue Eyed African daisy, Calendula, Chinese Forget-me-not. Lobelia, Lupine, Moroccan toad flax, Nasturtium, Pansy, Petunia, Phlox, Pinks, Snapdragon, and Sweet Pea.

Annuals that may be started in November for late winter or early spring bloom include Alyssum, Babys' Breath, Butterfly Flower, California Poppy, Candytuft, Carnation, Cornflower, Double English Daisy, Hunnemania, Larkspur, Leptosyne, Lupine, Mignonette, Nicotiana, Orange African Daisy, Painted Tongue, Poppies, Scarlet Flax, Statice, and Stocks.

In those varieties there is room for wide choice as to color and kind of flowers. Discussing some of the leading ones, let's take Alyssum first.

The several varieties of Sweet Alyssum, with white or lilac flowers, are among the best of annuals for edging and for planting in the rock garden. Low growing, seldom exceeding a height of 12 inches, this plant should have a place in every garden, window box or hanging basket.

Babys' Breath. The white, rose or carmine flowers of the three varieties of babys' breath are especially valuable in flower arrangements; particularly is this true if sturdy flowers, such as blanket flowers, dwarf sunflowers, carnations or pinks, are the principal subject of the bouquet. The tiny flowers on wiry stems add a daintiness, a softness, to an arrangement that might be somewhat stiff and lacking in gracefulness.

Blanket Flower. The annual forms of the blanket flower, single, semi-double and full double, are of great value in any garden. The red and yellow daisy-like blossoms are desirable for cutting on account of their cheerful colors, long stiff stems, and excellent keeping quality.

Blue-Eyed African Daisy. Graceful, light blue, daisy-like flowers about 2½ inches across, with steel blue centers, are profusely borne by these plants. This daisy is one of the most easily grown of the hardy annuals and, like the blanket flower, it succeeds in trying situations, volunteering each year.

Calendula. A universal favorite, the calendula is one of our most important winter-blooming annuals. The charming double flowers in shades of orange and yellow are not only excellent as part of the garden picture but they are unsurpassed as cut flowers.

California Poppy. This is especially effective when grown in large groups in a sunny garden. Recently the seedmen have offered varieties in creams, white and reds, that are striking deviations from the typical yellows.

Calliopsis (Cal" li op' sis). The Calliopsis or coreopsis is another type of the numerous daisy-like flowers that play so important a part in an annual border. The flowers in shades of yellow, some varieties with maroon or terra cotta, are borne in profusion on stiff, wiry stems, and are valuable both in the garden and in bouquets.

Carnation. The hybrid annual carnations which have recently been developed by plant breeders will supply everything save size, for which the perfect florist carnations are prized.

Cornflower. This has long been a favorite and somehow seems characteristic of the old-fashioned garden. The single and double flowers of white, pink, red, blue and purple, borne in profusion in early spring, contribute beautiful clear colors to the border and are excellent for cutting.

Double English Daisy. Although the English Daisy (or Bellis) is really a perennial, in Florida it will not thrive after the advent of warm weather in May, and is grown as a winter annual so that it may enjoy the cool growing season. For edgings or for rock gardens, the English Daisy is excellent. The plants are merely flat, tight rosettes of

shining green leaves from which the flower stems arise.

Gilia (Gil' ia). Another blue flower of merit that blooms in the late spring is Gilia. The foliage is lacey, fern-like and is an attractive feature in itself. The flowers are rough, globular heads, about an inch in diameter and are borne in profusion all over the plant. As yet something of a novelty in Florida, the gilia has proven its ability to thrive here and should be tried in everyone's garden.

Godetia (Go de' sha). Although the Godetia, or satin-flower, like the Gilia, is not often seen it will succeed in Florida, especially in a partially shaded situation, and it undoubtedly deserves consideration as a spring flowering annual.

Hunnemania. The hunnemania, sometimes called tulip poppy, resembles a sulphur-yellow California poppy of giant size, is coarser and of greater substance. The plants, about two feet in height, are very prolific, hardy and easy of culture after germination. Difficulty in getting a good stand is the general rule.

Larkspur. The well-known Larkspur is so popular, so widely grown, that it seems hardly necessary to describe this most valuable annual. Single and double flowers of white, buff, rose, blue, lavender and purple are borne on erect spikes during the early spring. Some of the newer creations, named varieties having very double flowers of clear colors, are very charming, and should find places in every garden.

Lobelia. Lobelias, in their beautiful shades of blue, may be had in the dwarf, compact form, which is so desirable as an edging and also in the trailing or hanging form which is used in rock gardens, pots, boxes and baskets. The charming dwarf plants, under six inches in height, with many tiny branches, are covered with tiny blue flowers throughout the blooming season.

Lupine. As subjects for a tall border the annual Lupines are very effective, and they are no less striking as cut flowers. Their keeping quality is excellent.

Moroccan Toad Flax. Of comparatively recent introduction into Florida gardens, this little toad flax from Morocco is rapidly gaining the popularity it so rightfully deserves. It is a dwarf grower of exceeding hardiness that bears its spikes of tiny, snapdragon-like flowers throughout the winter and early spring.

Pansy. Nothing can approach pansies for edging or for bedding in the late winter and early spring. The newer, highly developed strains are characterized by gigantic flowers of most striking brilliance and endless variety of design. The pansy is distinctly a cool weather plant; seeds will not germinate well in the warmth of late summer, the young plants that are produced are sickly and slow growing.

Petunia. No garden would be complete without petunias. The humble, small single sorts are valuable for color effects, while the more pretentious, single and double fringed and veined giants always attract a great deal of attention because of their unusual texture, size and

colors.

The small single varieties are very easily grown from seed, but the double flowered varieties are best secured from florists.

Phlox. The annual phlox is one of the easiest of all plants to grow from seed. A wide variety of color is offered by the trusses of charming little flowers that cover the dwarf, spreading plants throughout the early spring. It is excellent as an edging, for ribbon beds, as a ground cover for a sunny expanse, and for naturalizing.

Pinks. Pinks are very much at home with us; numerous kinds thriving as annuals can be used as perennials if they are cut back in the early summer and fertilized for a second period of bloom. No attempt will be made to distinguish the species or hybrids, but it is suggested that different kinds be tried so that the gardener can select those which are best suited to his conditions.

Poppy. The poppies have long been garden favorites. The bold, bright colors of the hybrids of the opium poppy and the fragile, fine-textured, delicately tinted flowers of the Shirley group, offer us variety in substance, color and design. Poppies do not transplant well, the seeds do not sprout in hot weather; hence it is best to sow the seeds in November where the plants are to grow.

Scarlet Flax. This red-flowered annual variety of flax that is gradually gaining popularity as a garden subject in Florida deserves every gardener's consideration. A hardy, bushy annual, to two feet, of exceedingly graceful habit, it is covered with charming red open flowers throughout the spring.

Snapdragon. Although this is really a perennial, in Florida it is treated as an annual because it rarely survives the high temperatures and heavy rains of our summers. Like the pansy and the larkspur, it is distinctly a cool weather plant and is really successful only when it is grown through the winter and early spring months.

Statice. The annual kinds of statice are well adapted to our gardens, thriving, if necessary, under difficulties. Statice sinuata has, in the spring, tall spikes of blue or white flowers arising from dwarf, tight rosettes of lobed, spatulate leaves. The bonduelli variety is very similar in habit but produces yellow flowers, while suworori, the rat-tail statice, bears tall graceful spikes of delicate pink flowers. This last named species deserves wider trial as it is especially good and receives favorable comment wherever seen.

Stock. Stocks are old favorites that have developed wonderfully at the hands of plant breeders. Full, double varieties in many colors belonging to different strains, the plants of which vary in habit and time of bloom, are offered by the seed houses.

Sweet Pea. These are without doubt among the most important of our winter and spring blooming annuals. Their fragrance, delicacy of texture and design have won for them a place in every heart, but at the same time it must be conceded that the host of pests that prey

upon them is most alarming and often most difficult to control.

The Spencer sweet peas, now the most popular group, have reached a remarkable state of perfection. Winter flowering, or "early" strains planted in the early fall should start blooming in December if conditions are favorable, and the spring or "late" flowering strains, if planted in the winter, should produce a wealth of bloom in March, April or May. The list of varieties is long -- no kinds can be recommended as being preferable to others; one must try different sorts in order to discover which are best for the desired purpose, or be content with the "mixed packets."

Plant the seeds in a staggered double row so that the trellis may be erected between the rows. When the seedlings emerge treat the bed with a soil sterilizing compound to control damping off. It is best to thin the plants to stand a foot apart. When the plants are six inches high apply steamed bone meal so as to make the ground white, then stir it in lightly. A mulch of oak leaves or peat moss is valuable in conserving the moisture. When tendrils appear some sort of support must be provided. This may be poultry netting stretched between posts, a trellis of cotton cords running vertically over horizontal bars at top and bottom, or a line of brush stuck firmly into the ground between the rows.

The vines will stand considerable cold but the flower buds are so easily injured that protection on cold nights is suggested after the plants have commenced to bloom.

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COUNTY AGENT AND
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Ornamental Gardening in Florida
Radio Series

Talk No. 10
November 15, 1933.

PLANTS THAT PLANT THEMSELVES

By: John V. Watkins, Assistant Horticulturist,
University of Florida College of Agriculture

Nature has endowed certain plants with the ability to reproduce and establish themselves so easily and so rapidly that one often marvels at the magnificent displays of periwinkle, phlox, coreopsis, gaillardia and petunias that have escaped from cultivation, re-seeded, volunteered, and blossomed in profusion without the aid of man. In Florida we find numbers of exotic plants so thoroughly at home that they successfully exclude their neighbors from their colonies.

Of the annual garden plants that plant themselves one of the most satisfactory is Sweet Alyssum. This plant in its several varieties, with white or lilac flowers, is one of the best winter blooming annuals for edging or for the rock garden. Fortunately this dwarf, compact plant produces myriads of viable seeds that will furnish an abundance of volunteer seedlings for each season's planting. These tiny, self-planted individuals may be lifted and transplanted as they appear in August.

One is continually impressed with the self-planted Blanket Flowers, or Gaillardias, that are encountered on the high, dry sand dunes of our East Coast. Year after year the gay sprightly flowers are produced from the seed of volunteer plants that are being scattered farther and farther from their original garden sites. Usually there are abundant tiny Gaillardia seedlings appearing in the garden in October or November.

That striking daisy-like flower, the Blue-Eyed African Daisy, is one of the most accomodating of the plants that plant themselves. If one has ever grown this flower and has allowed the seeds to ripen and drop from the plant, he will certainly have enough plantlets in the autumn to supply not only his gardening needs but those of all his neighbors as well. Of easiest culture, admirable as a cut flower, the Blue-Eyed African Daisy should have a place in every self-planting garden.

The California poppy furnishes an abundance of warm tones of yellow, orange and flame color throughout the early spring and very fortunately for those lazy but sensible gardeners who depend in some measure upon volunteer seedlings, it also produces literally hundreds of plants each winter. These may be thinned to stand a foot apart or they may be transplanted if care is taken to move the long taproot intact in a ball of soil.

The Calliopsis, or Coreopsis, is one type of the several daisy-like flowers that play so important a part in a garden that plants itself. Of easy culture, growing in difficult places, and often naturalizing in large colonies, the calliopsis can be most highly recommended.

For blue flowers in the garden that plants itself, one should certainly consider the Chinese for-get-me-not, or Cynoglossum. The volunteer seedlings that are usually found in fair numbers bloom in a very short time. Possibly its greatest use is for blue color masses in the garden, because the flower spikes usually wilt badly when they are used as cut flowers.

The old-fashioned Corn Flower will sometimes, especially in disease-free soil, furnish enough volunteer seedlings to be considered a subject for the self-planted garden. However, it is not nearly so dependable as are most of the other plants we have mentioned.

Probably every one who is garden-conscious has remarked at one time or another about a gorgeous display of sprightly yellow that is furnished by a chance patch of late or Klondyke Cosmos. A rather between-season annual, the late cosmos comes into bloom in October or November when blossoms are sorely needed. This tall, coarse, composite is apparently not at all particular as to its requirements, as it succeeds without care and escapes from cultivation at the slightest provocation.

Ageratum, sometimes called Floss Flower, is a perennial in frost-free areas, but is a tender, heat-tolerant annual in those localities that experience sub-freezing temperatures. In any event, it re-seeds readily and deserves a place in our volunteering garden.

Globe Amaranth, also known as Bachelor's Button, thrives during hot weather, volunteers profusely, and can be depended upon to succeed under almost all conditions during the summer.

Annual Larkspur is one of the most striking, yet dependable garden flowers for the spring. It is distinctly a cool weather plant, the seeds of which will not germinate during hot weather. If larkspur has been allowed to mature its seeds, an abundance of tiny seedlings will be found at this time of the year. These transplant with the utmost ease. The flowers borne by volunteers will probably be single.

In late September, through October, when there is a paucity of flowers, the Marigolds contribute their bright yellow and orange blossoms to our gardens whose brightness has begun to wane. Certain types of marigolds will plant themselves year after year.

Moroccan Toad Flax, although of comparatively recent introduction into Florida gardens, is rapidly gaining the popularity it so rightfully deserves. It is a dwarf grower of exceeding hardiness that bears its spikes of tiny snapdragon-like flowers in the winter and early spring. This Linaria self-sows and volunteers most readily, apparently not deteriorating as regards the quality or the color of the flower even though chance seedlings are used as the planting stock year after year.

No spring garden is complete without Petunias. The giant ruffled sorts do not set seeds readily, but the small flowered, single varieties that you had in your garden this year have lavishly sown their seeds for your convenience and when you arrange your garden at this time of the year there should be ample planting stock for you and your friends.

The Periwinkle is a perennial in the lower peninsula, where great beds of this charming plant are forever causing comment among garden-minded people. Where frosts are the rule the plants may be killed but it is certain that there are enough seeds in the ground to perpetuate the colony. Exceedingly cosmopolitan, demanding nothing from man, this Periwinkle from Madagascar is truly at home in Florida and should be grown in everyone's garden.

The annual Phlox is one of the easiest of all plants to grow from seed. Self-sown seedlings are numerous in the vicinity of old plantings and even in places where discarded plants have been piled. Phlox is relatively free from pests, transplants most easily and succeeds in dry, light, sandy soil. It is excellent as a ground cover for a large sunny expanse. In parts of Florida it covers large areas, blooming in its season.

Poppies have long been garden favorites, and certainly they can never lose the universal popularity they have always enjoyed. The hybrids of the opium poppy are plants that plant themselves par excellence as they self-sow abundantly and do not transplant readily. Often the same garden spot is occupied year after year by these bold bright giants of the spring show.

The Moss Verbena is possibly a perennial strictly speaking, but should the garden experience very low temperatures the roots would be killed out in all probability. Self-sown seeds will, no doubt, be present in sufficient numbers to assure the continuance of the culture. The lavender or occasional white blossoms of this dainty verbena that are borne in the greatest profusion throughout the summer, are a vital part of the garden that plants itself.

Zinnias are probably the most important of our heat-tolerant summer annuals, without which our gardens would be colorless indeed from July to November. As early plantings become old, chance seedlings may be found under the parent plants and these may be transplanted to new locations for late summer and early autumn blooms. However, the seeds cannot be depended upon, ordinarily, to carry over the winter and furnish seedlings for the spring.

Probably the tallest of the annuals that plant themselves is the sunflower. Certain small flowered varieties that are excellent for cutting during the summer persist year after year, successfully maintaining their colonies. These volunteering sunflowers are particularly noticeable on the sand dunes of our east coast, growing side by side with the blanket flowers.

We have discussed only annual flowering plants, as these are best adapted to a garden that plants itself. When one has grown any of these persistent, hardy varieties and wishes them to plant themselves, he must, of course, allow the old plants to remain long enough to mature their seeds and drop them to the ground. Then they can be removed to make room for a new planting. In preparing the soil, spading should be shallow so that the self-sown seeds are not covered too deeply. Even though

the garden beds may be in constant use, volunteer seedlings of most of the plants we have mentioned will appear in considerable numbers at their proper seasons, if cultivation is not practiced too continually. If sand paths are a part of the garden scheme, it will be found that myriads of tiny volunteers will spring up along the edges of the paths. Close observation on the part of the gardener is necessary so that the seedlings may be discovered and transplanted about the time they have developed two pairs of true leaves. Probably the most difficult feature is the ability to identify the plantlets at transplanting time. One must learn, by experience, to distinguish the varieties so that they may be used in the garden spots best suited to their habit of growth, size, color and so on.

In addition to the garden use of these plants that plant themselves some are admirably adapted for roadside use. Some will persist year after year in spite of mowing and grazing of the road shoulders. For roadside use the lowest growing sorts are more desirable, and one of the best is the blanket flower or gaillardia. This plant is not liked by cattle, and is very persistent in its growth.

As a roadside plant, annual phlox has already been used by several garden clubs in the state and has proven fine. It is a hardy grower and spreads rapidly if not pulled up by admiring passers-by. Right here, let's put in a caution against this destruction of roadside beauty. A tourist will say, "My pulling a few of those flowers will not hurt," but what if every one who passes that way says the same? The big trouble is that many pull the plants out by the roots instead of picking them. These plants that plant themselves have to produce seed or there will be no flowers the next year. So may we all stop and think before we become a party to destroying roadside beauty that is ours only to look at and enjoy in passing.

Another good roadside plant that plants itself is the Periwinkle. It will do well if not mowed too frequently. Calliopsis is another that is good, although it attains a height of 18 to 20 inches. Though seldom used, moss verbena will make any roadside a place of beauty. It has proven its value in several places in the state on railroad right-of-ways where it has established itself in magnificent colonies.

In conclusion, let us all pay more attention to letting these plants have a chance on our roadsides and in our flower gardens.

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Ornamental Gardening in Florida
Radio Series

Talk No. 11
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PLANTING AND MAINTAINING THE GARDEN.

By - G.H. Blackmon, horticulturist, Florida Experiment Station.

The aesthetic beauty of a city, town, or community is dependent largely upon the appearance of the home grounds. It matters not how well kept the parks and streets, if the residential grounds are not attractive the beautiful effects can not result. The plantings about the home grounds are, therefore, important. They are an integral part of the general landscape and should be made with much careful thought and planning.

The plant material should be selected that will grow properly and give the desired effect for a well planned and executed planting will be a great disappointment if plants are used that are not adapted to the locations. Some have experienced poor results in plant growth by using material that was observed growing satisfactorily in other states, but the mere fact that plants succeed in other sections is no criterion that they will thrive under different environmental conditions.

Florida is wonderfully blessed with an abundance of native plant material that will fulfill the requirements in a great many instances in planting the home grounds. Then again, there are many introduced species that will give good results when suitably located according to the demands of the particular plants being used. Here it should be borne in mind that most hardy shrubs and plants are generally best transplanted during the dormant season from about November 15 to March 15.

The transplanting of native shrubs direct from the wilds is generally more hazardous than transplanting plants from the nursery where they have been grown for a year or more. Native plants, however, can be successfully moved to the home grounds and other desired locations when proper precautions are taken and the material is suitably situated. The new locations should simulate as nearly as possible the conditions where the plants are growing naturally.

Plants grown wild seldom have the heavily branched root-system usually found on those produced in the nursery, and this is one of the principal reasons why they present a special problem in transplanting. Shrubs that are to be moved into the gardens should be pruned back severely and kept well watered at all times if the best results are to be had. If the needs can be anticipated for some months in advance, it would be advisable to transfer the native plants to a bed or row the previous planting season where they can be carefully looked after, watered and fertilized so that they will produce good root-systems before they are transplanted to permanent places.

Some fertilizer should be applied at the time of transplanting. Steamed bone meal and cottonseed meal are excellent materials to work into the soil around the roots as the plants are being set. Organic material is of much importance to all garden soils and it can be supplied in composted manures, peat, and muck. Leaves in large quantities are supplied by oaks and should never be raked away from where they collect in among the shrubs as they are valuable sources of organic material and provide an excellent mulch in addition to their fertilizing value.

When shrubs are received from the nursery if they cannot be planted at once, they should be removed from the packages and "heeled in" to keep them in good condition until ready for planting. The location for any group of plants should be such that adequate growth and maximum vigor can be maintained, and the soil should have the proper drainage and exposure required by such plants. Those that will not tolerate shade should be used only in sunny locations, while those with a high shade tolerance can be planted where there is relatively little sun.

The soil should be well prepared before setting the plants. Organic material and fertilizers should be added to have a suitable condition for adequate growth. Everything should be done with the idea of pleasing the plant. Since azaleas, for example, cannot be grown successfully in a dry soil, during periods of dry weather they should be frequently watered.

The supply of soil moisture is of extreme importance. Without moisture the proper functioning of the plants cannot proceed as it is through the medium of moisture that the plant foods are taken from the soil. Moisture, as sap, conveys the plant foods to the leaves and the available foods from the leaves to various parts of the plant for the production of growth. Watering the soil should not be postponed until there is a wilting of the leaves; on the other hand adequate moisture should be present at all times. A copious supply of water should be made rather than the applications of scanty amounts that just wet the surface. The soil should contain the right amount of moisture throughout that portion occupied by the roots of the plants. For those plants that require a moist atmosphere, much sprinkling must be done during dry weather, and where there are trees that remove large quantities of water from the top 18 inches of soil it is necessary to apply water at more frequent intervals than where such trees are not adjacent to the plantings.

A permanent sprinkling system installed among the shrubs will make watering an easy task if the cut-off valve is properly located and the nozzles are so spaced that there will be a slight overlapping of the spray during the times when there is the lowest water pressure. The ordinary garden hose, however, is commonly used and will maintain a satisfactory moisture condition if it is constantly looked after. To give best results it should have attached a good simple-working sprinkler.

We come now to another one of the important problems in connection with the handling of garden plants, that of supplying the necessary plant foods. If the soil was properly prepared at the time of setting the plants, it will contain sufficient nutrients to start and maintain the growth for some months, but by June or July additional materials should be applied.

In addition to the importance of organic matter as previously mentioned, some commercial fertilizer should be applied to the soil in which the plants are growing. This can be in the form of a complete fertilizer such as 5-7-5 or the materials can be applied separately. The average home gardener will find the complete mixture more satisfactory. Bone meal and cottonseed meal, however, are find additional fertilizers for most garden plants.

Newly planted shrubs should have been fertilized when they were set, hence it will not be necessary to give them a spring application, but for established plant beds, a complete fertilizer should be applied in the spring. This should be applied evenly over the surface of the soil and raked in at the rate of about 5 pounds to each 100 square feet. A second application possibly containing more nitrogen should be made in July. No fixed rule can be made that is applicable under all conditions as the composition and amounts to apply will vary somewhat with different soil types and conditions. The experienced gardener, however, does not go so much on measured amounts but knows when the plants need feeding and applies fertilizers accordingly. It is important to remember that nitrogen is the most important in producing growth, and is also the element that is most readily lost by leaching from the soil. It should, therefore, be supplied in rather liberal amounts.

The art and practice of pruning is as important as the planting itself. It matters not how perfect the plans nor how carefully the plant material is selected and arranged, if the growth is not kept within the size that it is supposed to be, the main effect may be lost and the plants become leggy and straggly. Instead of being objects of beauty, they will present an unkept and unattractive appearance.

Most shrubs will require a certain amount of judicious pruning to keep them from out-growing the bounds within which their tops and branches are supposed to remain. A plant may be of a dwarfed habit of growth and fulfill the requirements of such a type admirably when young, but may become unsightly in several years if allowed to develop along lines of least resistance. In groups, certain plants will often outgrow others and crowd them out of the picture to such an extent that they become out of shape and fail to produce the effect for which they were planted. When plants get into such a condition through lack of attention, it is too late to maintain their original beauty without interruption and, while it is often possible to cut them back in such a way as to revive them and in a measure bring about the desired appearance, it is much better to direct growth of the individual plants by a proper and systematic pruning from the start.

Foundation plantings should be watched and not permitted to grow out of shape, as shoots can be cut out when the growth is improperly located without harm to the plants. This will prevent the group from developing into one too large or one that is one-sided.

The pruning of plants in general used mostly for a mass of foliage, such as, bankings, foundations and screenings, should be done during the late winter months just before the initial bud growth. This permits the new top to shape itself and keep its desired type and form with a minimum of care throughout the growing season. The flowering plants will have to be pruned at a time that will

not interfere with flower production. A general and safe rule to follow is to learn the flowering habits of the shrubs. Prune in the winter only those that bloom on wood of the current season's growth, and prune those that bloom on second year wood shortly after they are through blooming. Dead wood will occasionally occur in plants growing in crowded locations. This should be carefully removed as it develops, and the cut should be made well into the green wood area at the junction of the branches or to a bud so that growth renewal will readily take place.

To briefly summarize; Native shrubs should be cut back rather severely when transplanted, and the soils and locations should simulate those where such plants are growing naturally. Adequate amounts of organic materials should be thoroughly incorporated with the soil and additional applications should be made annually in addition to the applications of commercial fertilizers.

Generous amounts of bone meal or cottonseed meal should be worked into the soil, being placed around the roots and the soil should be thoroughly watered when the plants are transplanted. All plants should be set as deeply as they grew in the nursery, it being better to set them an inch or two deeper than to get them too shallow.

Copious watering of the soil is much more satisfactory than if the surface of the soil only is moistened. Plants that require a moist atmosphere should be sprinkled frequently during dry times in addition to keeping plenty of moisture in the soil.

The mere fact that you are interested in gardening is sufficient evidence that you are vitally concerned about the beauty of the home grounds. May I re-emphasize, therefore, the importance of handling plants in a way that will permit their proper development, as nature has so generously provided and intended, to the end that such plants can contribute their bit towards the ultimate beauty of the landscape.

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Ornamental Gardening in Florida
Radio Series

Talk No. 12
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ARCHITECTURAL FEATURES OF THE FLOWER GARDEN

Rudolph Weaver, Director, School of
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Architect for the State Board of Control

To those of you who are following this series of garden talks it requires no argument, I am sure, to convince you that the possession of a garden enriches your life. If you do not already own a garden then I hope you are planning one in the immediate future. If you are, then, of course it will be necessary to give some consideration to certain architectural features of your garden.

In this talk I am assuming that any feature of a garden which cannot be classified as plant material is, in some form or another, an architectural feature. Such elements are planned and devised as a setting for the plant material, to enhance, if possible, the beauty of the trees, vines, shrubs and flowers. All of which should be tied together into one harmonious whole and into unity with the house or other edifice, which, with the garden, is designed to delight the senses and beautify the lives of those whose good fortune it is to behold the garden or to walk therein.

Our aesthetic sense demands that there should be a balance established between the elements of a garden. So, therefore, since Nature is generally informal it is possible and desirable to introduce into the garden composition some architectural features which act as a foil, accenting by their differences the charm of growing things. But it should be recognized as a principle that great restraint should be used and no features should be added that could be omitted. There is nothing that so easily spoils a garden as an overabundance of architectural elements. Avoid overcrowding. Also make your arrangements simple. Do not mistake ingeniousness for design.

Another principle which should be accepted is that all garden architectural accessories should be of such character that they will harmonize with the character of the house. This should include stylistic characteristics -- if there are any -- similarity of materials, scale and color. These are elements of unity, and unity between house and garden should be highly esteemed.

The first step in the procedure of developing the architectural features of a garden is to consider the house plan itself. Where should the walks lead from the house entrances? What views do you have from the windows? Is it desirable to terminate these views within the garden with some feature? Through such an analysis you may develop the logical location of the architectural elements, those structural features about which the planting will take place. Ideal results are, of course, obtained when both house and garden are

planned together by one capable mind or through the cooperation of several minds working in harmonious collaboration.

After the plan has been devised then the details should receive careful consideration. In such a brief discourse as this it is obviously impossible to tell what should be included in a particular garden so the most that can be done is to enumerate some of those architectural features which have been used in many fine gardens in various parts of the world, and which, through repeated use, have indicated their desirability as garden elements and which, furthermore, may be found in both simple and world famous gardens.

No discussion will be made here as to the desirability of formality or informality of structural features; it is only necessary to follow your personal desires and use restraint.

In enumerating certain architectural features, I will first suggest the wall. Walls should be of course, when possible, of the same material as the house itself -- or of the same material as the foundation of the house. Walls may function in various capacities. They may be used to create different levels, either great or small.

Walls are, perhaps, the perfect background for growing things, especially when consideration is given to the color combination between the wall and the plant material and between the wall and the bloom, if any. There is a fine old wall around the garden of the Alcazar in Spain. It is covered with a lovely bougainville. While the arrangement is simple, the effect is regal. It is a good example for the Southern garden maker.

Walls of cement or plaster-covered masonry are the perfect background for the long shadow-forms of swaying stems and blossoms -- sun-printed in fairy shapes for the eyes of those who can see -- contrasting the light of the sun with the restful coolness of the shadows which it creates. Here we have the completeness of opposites which are complementary; manifestations of Nature's generous gifts such as dark and light, warm and cool, and when human skill assists we may arrange to each individual's satisfaction complete harmonies of color, as soft yellow walls to make a background for lavender or purple bloom, or any other harmony to satisfy the soul.

If, at a certain place beyond the wall there is a view, then the wall may be pierced and in the opening may be placed an iron grille or other ornamental device, architectural in character. Such screen-filled opening softens what may otherwise seem a severe handling and also brings into the garden added charm by permitting glimpses of the outside world.

Where different levels are possible by all means use a few steps. There is something about a flight of steps which adds a regal touch to a garden; wide low treads, suggesting leisure to the feet and adding variety to the terrain.

Where a wall is possible and appropriate, what could be more lovely than a vine covered pergola placed against it? Whether the pergola be formal or informal makes little difference. Against the wall it creates an outdoor

semi-living room effect where one may enjoy the best the garden has to offer; where one may entertain or read, or bask in the softened sunlight and enjoy the perfume provided in all well planted gardens.

The pergola in itself is one of the most charming architectural features of a garden. Do not make the posts too slender. If timber is used let the posts be substantial. When the timbers are large enough vines are more at home because they can twine about such structural members more gracefully. Of course the pergola should take its proportions from the house and whether or not it connects with the house it should still seem to be part of it -- echoing its character. If, for instance, the house is of cement plaster, the pergola posts may be of the same material. The same kinds of material recurring here and there tend to unify the elements, which is so desirable. This similarity of materials avoids fussiness and gives that ever-so-valued restfulness that induces peace and calm where one may quickly retreat and rest from an over-hectic world.

To the foregoing may be added, when space permits, water effects. In all times and countries man has provided reflecting pools wherein he may see the charm of his garden inverted in reflections; where the sky may be brought down and made an element in the effect; where the mirrored clouds may be seen to mingle with the other reflections in the pool, thereby bringing to the nature lover more and more of the pleasures of the out-of-doors. Those who have seen the pools in the garden of the Luxembourg in Paris; the basin in the Alhambra in Granada; the charming canal in the garden of the Generalife, that masterpiece of Moorish skill above the city on the hill opposite the Alhambra, or the canal of the Taj Mahal, or any of the pools in many of America's beautiful gardens, cannot but be impressed by the charm of this device as one of man's happiest inventions.

Where water is possible the rippling waterfall or the bubbling fountain is of course beautiful to the eye and another element soothing to the soul. In the garden of the Villa d'Este, at Tivoli, Italy, is a demonstration of the domestic grandeur which can be achieved through the architectural use of water. Here are low walled terraces hundreds of feet in length along which innumerable water jets spurt upward, cooling the air with spray, falling into long narrow basins and flowing again into still other basins on lower levels and again collected and released in other locations at still lower levels. What resident in a warm country would not envy the possession of such a garden? One who contemplates a comparatively small garden and desires a knowledge of how to use water should study this garden at Tivoli and the garden of the Generalife. Here one finds a well balanced interdependent series of architectural features of infinite charm -- a wealth of suggestion for gardens both large and small. From such gardens, planned by masters of the art, you may find just the feature that properly modified may become your own garden's gem.

I have already said that the house and the garden should be contributing parts to the ensemble. A properly appointed scheme should, of course, be provided with a balustraded gallery, or a balcony where the garden's owner may view from above the picture which he has created. Where the beauty of color, form, light and shade, and shadow, may delight the eye, while the delicate scent of blossoms by day or the pungent perfume of the night blooming jasmine may be enjoyed. Where the witchery of moonlight over the scene may transport one to another world and where one may say with the Arab who carved on the walls of the Alhambra "How beauteous is this garden; where the flowers of the earth vie with the stars of heaven. What can compare with yon alabaster fountain filled with crystal water?"

COOPERATIVE EXTENSION WORK
IN
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COLLEGE OF AGRICULTURE,
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Ornamental Gardening in Florida
Radio Series

Talk No. 13
Dec. 6, 1933

HOW TO PLANT FOUNDATIONS

Harold Mowry, Assistant Director
Florida Experiment Station

Foundation plantings constitute one of the major elements of landscape design. Much labor, time and thought have been given to the proper treatment of this phase of ornamental planting by eminent landscape architects and the following expressed thoughts on the subject are in large part drawn from such authorities as Waugh, Johnson and Van Melle.

All groupings of plant materials designed in particular relation to a house in its immediate surroundings are aptly termed foundation or base plantings. Such groupings form a complement in living green to the architecture of the home and serve to blend its structural lines with the general surroundings landscape. They are probably of less importance on the larger and more extensive estates; their value and effect to a large degree increase with the decrease in size of the grounds about the building.

The use of plant materials in home building has made remarkable progress in recent years, and home owners and home builders more and more are considering a home as being incomplete without an accompanying setting of foliage. It is true, of course, that many houses have no complementary plantingsbut withtheir value being demonstrated to a greater extent than ever before it is no longer considered as an overly expensive adjunct but as an opportunity toward improvement with comparatively little labor and expense.

When properly made, a foundation planting serves several definite purposes. It connects the house with the grounds and adjacent plantings so that after a time the house and grounds will appear to have grown together into a permanent unity, each an integral part of the other. Shrubs and vines tend to soften and blend architectural lines, imparting to the building a finished and complete appearance that is in harmony with its surroundings. Then, too, there are in many instances objectionable features that cannot be avoided in the back lot but which one does not care to have exposed to the public view. These may be effectually screened by the proper use of either shrubs or vines. Of course, all such views should be eliminated as far as possible, but in those instances where this cannot be accomplished, suitable plantings will help materially, and in addition will aid in the improvement of the general appearance of the whole place.

Around the high and open and unsightly foundation that is in common use because of the ventilation afforded during the summer months is indeed one place where foundation plantings are of decided worth, since they allow the wanted ventilation and at the same time remove the stilted appearance of the house. Again, properly placed plantings dress up a property, increase its value, and transform it from just a house to a home.

Not so long ago the possible effects of plants on architecture were

obscured by house design itself. There was that period when ornate building frills were in vogue and fancy scroll work in wood and wrought iron were considered, rather than plants, as the means of ornamentation.

However, with the passing of the unduly conspicuous building modes and the entrance of the simpler and more logical architecture there came also a clearer understanding and appreciation of the close relationship between home architecture and planting. It was readily seen that a well designed house, with its fitting complement of plants, had resulted in combining architects' plans with plantsmen's plans into a unit that opened up a new era in the principles of architectural planting and led to that highly specialized branch of agriculture now so well known under the name of landscape architecture.

Fortunately, there are no highly specialized or so-called standardized designs which require the usage of certain plants to the exclusion of others and since even the same varieties of plants differ materially in size and growth habit it is seldom that two separate plantings are seen that bear any striking resemblance. Thus, each planting is more or less a distinct entity and there is little liklihood of sameness or monotony in landscaping designs.

Any house reflects the realtion of nearby plants and plantings. Unsuitable plants detract from its appearance; on the other hand, it will gain from congenial association. Surrounding plantings impart of their nature, and no home is complete until planted.

Plantings reflect our personal preferences for plant materials, but only those should be used which are compatible with the outer characteristics of the home. This is well illustrated in the different architectural types in Florida wherein Colonial, Old English and Spanish modes are found. Many of the gaily colored acalyphas, crotons and other tropical plants are used to advantage in the tropical portions with the Spanish types, but the same plants could hardly be considered to be so well adapted for the others; and likewise, the coniferous varieties adapted to the Colonial or English types would not be so well fitted to the Spanish. The point cannot be too strongly emphasized that the primary aim is toward plant effects and not the masimum development of plant specimens.

The usual and desirable scheme of planting allows for visibility of the house from the street or road. This calls for open lawns and imparts the desired appearance of spaciousness. In planning, the scheme should first be thoroughly worked out and clearly visualized with due consideration being given to each of the different types of plants that will be used -- their adaptability to the soils and location, their ultimate size, and comparative rates of growth. Their resistance to insect or disease attack should not be overlooked. Plants should not be chosen merely because they have an appeal in the nursery row nor because their size at the time is suitable. Adaptability and eventual development must be considered. For those who are inexperienced in planting or unacquainted with the many available plants suitable for foundation plantings, there are numerous Florida nurserymen who will cheerfully furnish ideas or schemes of planting, together with lists of plants best adapted. Many books and bulletins are also available that will supply the wanted information as to arrangement, adaptability, selection, and care of ornamentals suited to foundation planting.

In the choice of plants there are several factors that if given due consideration before planting will make for more satisfactory results in the later development of the planting. Because of the variation in climatic conditions in the latitude extremes of Florida it is of primary importance that the plants chosen be hardy enough to withstand the coldest temperatures of the region where planted. Nothing is quite so disappointing and discouraging as the loss of a portion of one's plantings by freezing, for the gaps left in the foundation are later difficult to fill quickly and satisfactorily. The seasonal effect of flowering varieties must not be overlooked and blossom colors can be chosen to obtain the most striking and harmonious effects. Attention must be given to soil acidity; not all plants will thrive under like soil conditions even though every effort has been directed toward giving them adequate attention in the way of soil fertility. The type of foundation, whether it be high or low, more or less open, or closed except for ventilators, will have a strong influence on the type of shrubbery suited as well as on the arrangement of the plants. Generally with open foundations the effort is toward an unbroken bank of green, while with the low concrete, brick or stucco foundation the groupings are more scattered and smaller-growing plants are used. Heavily shaded locations usually require an entirely different treatment from sunny situations, since many plants are not adapted to both exposure extremes.

In foundation plantings there should be free use of evergreens, not necessarily conifers, but anything other than a predominance of deciduous plants. Florida planters have a distinct advantage over those of northern latitudes in that the variety of plants adapted to this use is extremely wide and varied. Nearly any desired effect can be secured, as there is an almost endless variety of types, heights, and outlines, as well as foliage variations among them. Usually the conifers are sparingly used, their placement being where accent points are desired with the balance of the planting consisting of a well-chosen variety of broadleaved evergreen shrubs.

In the arrangement of materials it is not practicable to lay down any hard and fast rules for the creation of good foundation plantings. Plants in pots or tubs may be tried at different places before they are finally set. Each situation has its own peculiarities and presents a problem of its own. Conventional planting schemes need not necessarily be followed. Bold planting after a creful study of the requirements of a situation usually brings desirable results. Such a method assures an effect different than that of one's neighbors and gives a sense of individuality that should be reflected in every phase of home building.

As the informal type of planting is the more desirable and most common, it is a general practice to choose two or three, or more, accent points on each side of the house to be planted. Such accent points might be corners, wide spaces between windows or doors and on each side of entrances. At these points the principal emphasis is given by planting the largest growing and most conspicuous plants. It is not at all necessary that the foundation planting be continuous, particularly if the foundation is of brick or stone. Vines have a prominent place and each, unless a solid wall covering, can represent a considerable accent.

A few "don'ts" might be included to advantage.

Don't overplant. Over-planting is a common fault and the crowding of too much miscellaneous material into a foundation planting is one of the

commonest errors of amateur enthusiasm.

Don't depend too much on annuals as the basis of the planting. They require continuous replacement and during some seasons of the year cannot be expected to have much ornamental effect. Perennial evergreen shrubs should form the primary planting with the annuals to be used as a supplement if they are desired.

Don't use too large or too conspicuous materials. Trees can be advantageously utilized only against the largest of buildings and some of our variegated foliage plants do not fit in well with all types of architecture.

Don't use too many conifers. There is almost no restriction in variety of broadleaved evergreens that are ideally adapted to foundation planting.

Don't be afraid of your own ideas as to plants and planting. Yours may give as good effect as if it had been planted from a blueprint. This is not offered in disparagement of landscape designs, but since many of us cannot afford the services of a landscape architect we should not let such a short-coming dampen our enthusiasm.

Lastly, don't fail to plant some sort of a foundation planting, if it has not already been done. There are yet too many houses, both rural and urban, that are bare of plantings. The time, money and effort expended will be returned many times over in the satisfaction derived from the enhanced appearance and valuation of your home.

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Ornamental Gardening in Florida
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Talk No. 14
Dec. 13, 1933

CHOICE PLANTS TO USE IN FOUNDATION PLANTINGS.

By - W.L. Floyd, assistant dean and professor of horticulture, University of Florida College of Agriculture.

In a subtropical climate such as ours, plants that grow and look green when those of more northern regions appear bare and lifeless are especially desirable. The broad leaved evergreens are fine for this purpose and Florida has a number native to the state and many others that have been introduced from foreign climes. Time does not permit enumerating the many fine plants available for foundation plantings in Florida. We will, however, discuss a few of the choice ones.

Cherry laurel is the first one we'll discuss. It is a native shrub or small tree. It may be kept pruned to shrub size for a long time. It has dark green, oblong leaves, 2 to 4 inches long, bears small, white fragrant flowers in racemes in late winter and spring. The fruit ripens in late autumn and resembles a cherry except that it is black. Cherry laurel is easily propagated from seed, it may be planted in a garden row much as peas or beans, allowed to grow for a season or two and then transplanted. It is valuable as a hedge plant. It stands shearing well, and stools out at the base, thus forming a wall of green from the ground up. When placed where it has plenty of room and pruned from the bottom it develops into a small, attractive tree. Cherry laurel requires a well-drained soil, it being practically worthless on wet, poorly drained soils.

Wax privet is another choice foundation plant. It comes to us from Japan and is one of the most popular members of the privet family. No foundation plant is seen more often about Florida homes. Occasionally, we hear uncomplimentary references to it because it is so common, but such are ill advised as the plant is attractive and worthy of a place in the most carefully developed planting.

It has broad oval leaves 4 to 6 inches long. They are dark green, shining as though waxed, which probably suggested its common name. Flowers of white or cream are produced abundantly in spring. The fruit is blue-black, berry-like with 1 to 4 seeds. These may be used for propagating new plants, but like most seedlings of shrubs and trees do not come true to the parent type. The plant is, thus, best propagated from cuttings. Wax privet stands pruning well, and grows in soil of medium or low fertility in sun or partial shade. It is attacked by root knot to a limited extent. There is a variety tricolor which has leaves variegated with yellow and pink when young.

Other privets sometimes grown in Florida are the Japan, California and Amoor River. The two latter, because they are hosts of whitefly, should not be planted in citrus growing sections.

Found so often along with wax privet as to be generally thought of as its companion plant is Pittosporum, having no well known common name. It, too, is a native of Japan. The leaves are somewhat lighter green, smaller, more leathery and of different shape from privet, with which they form a pleasing blend. The branches develop in whorls of from 3 to 6 from the nodes, and the flowers are creamy-white in fragrant umbels borne in spring. The fruit is an inconspicious capsule. There is a variety with leaves variegated with white but it is not so well suited for foundation planting as the green.

The viburnums are a large group of well known shrubs, among which are several native species most of which are deciduous; the two most desirable evergreen species the sweet or odoratissimum and suspended or suspensum come from India and Lin Kin Islands. They are much alike, the leaves of the first being somewhat smaller, the plant more erect, and the flowers in small erect panicles, while those of the latter are drooping. The leaves are glossy, light green, differing in color and texture enough from those already described to give pleasing variety when planted with them. They are quite free from insect pests and diseases.

Abelia, we must not leave out. It is a shrub of wide range, of long willowy growth. Its small oval leaves often show pink or red while young and turn bronze in autumn. The small tubular flowers of white tinged with pink are borne in panicles from June to November. It is a native of China, likes full sun, and is propagated mainly by cuttings.

Severinea is a spiny shrub worthy of our consideration. It has oblong dark green leaves about 1½ inches long. Its flowers are white, fragrant, opening in late winter and early spring, followed by a fruit which is a small berry that is black. Severinea is low and spreading, thrives in sunny positions, is related to citrus and comes to us from the same region, south China.

The Jasmines form a valuable group. Many of them are climbing or half climbing, the latter may easily be pruned to grow as dropping shrubs, a characteristic which is desirable in some plants of a mixed planting such as those made against foundations usually are.

The graceful and the downy varieties each have bright green leaves, and bear white fragrant flowers in dense hanging heads through a greater part of the year. They are so much alike that they are often confused, and because of the appearance of their white, star shaped flowers so conspicuous amid the wealth of small, green leaves they are often called Star Jasmine, as are two or three others of the Jasmine group.

Then, there's the primrose Jasmine. It bears yellow primrose like flowers, has dark green shiny, compound leaves of three leaflets. Its young stems are also green, the flowers are 1 to 2 inches across and flowering continues through a long period. It is a native of China, grows well in sandy soil under a considerable amount of shade.

All the Jasmines are easily propagated by cuttings or layers, occasionally forming natural layers about old plants where drooping branches rest on the ground.

Another choice foundation plant is the Feijoa. The Feijoa comes from South America and is important because of its gray-green foliage, which gives an added shade in the coloring. It bears lovely purplish flowers singly in spring, later ripens a few oval edible fruits about the size of peaches. They are green with a tough of crimson. The Feijoa is easily propagated from seed.

A pleasant reminder of our readings in classic literature where heroes were crowned with myrtle and laurel is Sweet Myrtle which has been brought to us from Southern Europe and is the classic myrtle. Its leaves are oval about one inch long, it has shining and aromatic flowers that are small white or rose tinted, and the fruit is a small blue-black berry. Sweet Myrtle may be easily kept to a height of 3 to 4 feet, though left unpruned it may become 10 feet high. It is of erect compact habit and has no serious pests or diseases. Frost discolors it, but in spring it recovers its true color if the cold has not been too severe. There is a smaller leaved form, also a variegated one. These should be used with careful discrimination as they do not always blend well with broader leaved plants. Sweet Myrtle will do best on a dry, well-drained soil.

Another of the myrtles, wax myrtle, is a native not given the attention it deserves. Its foliage is almost olive green, it grows easily and blends well with other plants. Its berries are coated with wax which gives the plant an interesting, unusual appearance. There is a dwarf form which is also important where plants that grow only 1 to 3 feet high are wanted.

All the time must not be used in talking of broad leaved evergreens even though few have been discussed of the large number that years of introducing, trying out and selecting by plant lovers have given us.

In a state where such coniferous trees as the pine, cypress, and cedar occupy so prominent a place in the landscape, small forms may well be used among our ornamental plantings.

Tall, erect forms fit into narrow spaces well, and often at corners and in angles give variety and pleasing contrast to the more abundant broad leaved evergreens among which they are placed.

The arborvitae are a varied and interesting group. Many are of small compact growth, some are upright columnar type, others like the Rosedale hybrid and Compacta are rounded or ovoid, some are golden, some are blue, green, and the greater number are bright green. Thus, a color, size and shape may be selected for almost any position.

There are many other choice coniferous plants. Italian cypress is a tall, narrow form of value, though very little used in Florida. Phitzer's juniper is a spreading form 2 to 3 feet high and 5 to 6 feet wide. Japanese juniper is an oval form growing not over 5 or 6 feet high. Creeping juniper spreads along the ground reaching a height of only 6 to 12 inches, the Yew or Podacarpus is erect and narrow, seldom exceeding 6 feet. Our native Comptie or Zamia looks much like a coarse fern but will grow in dry, sunny places where ferns will not thrive. These are a few of the conifers we have to select from that have proven their adaptability.

Still another group of plants, ferns, have a place against shaded walls, and underneath larger plants, where plenty of organic matter and water can be supplied, the Sword, Boston, leather and other cultivated varieties as well as attractive ones from the woods make green and attractive angles and spaces, where few other plants can be grown successfully.

In bays and other small indentations to face down the higher plants and add color may be placed herbaceous perennials such as four-o-clock, Stoke's aster, penstemon, physostegia, wandering Jew, and violets.

For such positions a number of bulbous plants are useful, as the day lily, zephyr lily, oxalis, snow flake, narcissus and others.

No state has a greater variety of material for making an attractive year round planting about the home, and no effort will add more beauty and grace to the home grounds, especially when combined with an open, well kept lawn, a well planned border planting, and a house painted to harmonize with the surroundings.

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Ornamental Gardening in Florida
Radio Series

Talk No. 15
December 20, 1933.

Growing Roses in Florida

by

Mrs. S. F. Poole
President Florida Rose Society.

No flower today is deservedly more popular than the rose - the queen of flowers. Every home should have a rose garden. Nothing gives to the home the same atmosphere of distinction as the rose garden.

Many people believe roses cannot be grown successfully in Florida, but under proper care we may grow beautiful roses successfully in any section of the state. There is no flower that will give more gratiffying results than the rose when properly cultivated , and the growing of roses is not such a big problem.

People coming here from other states to spend their winters are disappointed to see so few rose gardens. We have had winter visitors ask us if they could visit our rose garden, remarking that "they had not seen any roses growing in Florida."

Florida is foremost of all states in the union in climatic advantages, yet perhaps grows fewer roses than many of her sister states. True, there are natural climatic disadvantages in Florida, such as our hot and wet summers. On the other hand we have fine growing conditions from October to April. There are some varieties of roses, like the Pernets, that will not stand the rainy season. The solution we offer is to plant these varieties each fall, enjoying an abundance of beautiful flowers during the winter and spring before the rainy season starts.

Now is a good time to plan and plant a rose garden. Rose bushes have never been as cheap as they are today. Give thought to the proper location of your rose garden. Choose a well-drained location away from the roots of trees, and where the sun shines at least half of the day. A moist spot is desirable in so far as this will assist in maintaining the proper condition of moisture without excessive need for watering. At the same time it is essential that water does not stand and stagnate in the soil. After choosing the location and arranging for drainage and for the equally important matter of water supply, the next thing to be considered is the preparation of the soil. If your soil is light and porous prepare it to the depth of about eighteen inches. In digging out the bed place the top soil on one side and the subsoil on the other. Then fill in with alternate layers of top soil and compost. This compost is well made of two parts of muck and one part of cow manure. The compost should be prepared several weeks before using to allow it to age. Peat moss, or decayed leaf mould, may be added to the compost. To this add a liberal amount of bone meal. Mix all these materials thoroughly. If you wish, clay may be added to this mixture. Clay gives body to the soil and assists in the retention of moisture. On the other hand should your soil be heavy, dig out a portion of the clay, preferably subsoil and add sand and humus so that water will drain through readily.

Buy good two year old field grown budded plants from a reliable nursery-

man is my suggestion for obtaining plants. Regarding Root Stocks: - The most used understock and probably the one giving the best results is the Texas Wax or odorata. Many of the newer roses come budded on Rosa multiflora stock. While roses budded on this stock are vigorous and make a good growth the first year, the fact remains that bushes on this stock do not stand our rainy season as well as those on Texas Wax.

In planting the roses prune the bushes to about eight inches. Plant them from 15 to 24 inches apart, depanding upon the variety. This will place the plants close enough together to shade the ground above the roots, thus keeping them cooler and more moist. A great deal of space is wasted in most rose beds by spacing the plants too far apart. Hybrid perpetuals should have a distance two to two and one-half feet. Wider spaces should be left every four or five feet for paths to permit proper cultivation and watering and room for cutting flowers. The bushes should be set at the same depth as they were growing in the nursery. Firm down the soil thoroughly around the newly set plants. Then water the plants adequately for they should be kept moist until the roots have taken hold. Excess moisture at this time prevents root growth. After plants are rooted keep them watered well during dry weather. Take time to set your rose bushes. They look better and are more successful if a number of the same kind are planted together rather than scattered miscellaneously through the bed. Then too, the stronger growers are sure to encroach upon the weaker sorts and prevent their development.

As to fertilization, roses are gross feeders and if fine quality blooms with long stems are to be expected, a well planned fertilizing program must be carried out. There is nothing better than dairy manure, bone meal or tankage. An application of hard wood ashes annually may correct acidity as well as stimulate bacterial action. This double function makes more plant food available. In the fall and again about the first of March it is well to use some complete balanced fertilizer with an organic base containing all the elements of plant food, such as nitrogen, phosphoric acid, and potash. The firstof June give your roses a liberal application of bone meal and then do not fertilize them again until fall. Allow the plants to go partially dormant during the hot and wet period. We must always bear in mind that all of the flowers come on the new growth and to get this growth we should fertilize regularly every month or six weeks during fall, winter and spring.

Cultivation versus Mulching; much has been said on this subject. Many rose growers have better success mulching, others prefer shallow cultivation. We believe it depends on your own local condition. We prefer a mulch of oak leaves, grass clippings, peat moss, or any suitable material during the summer. It shades and keeps the ground cool and moist. During the winter we practice shallow cultivation.

Many questions are asked about pruning. I have found it best to prune in September or October, depending upon the condition of rose bushes. In cutting back rose plants do so when and where you have mature wood and a strong eye to cut to. Of course the amount cut back will depend upon the strength, age, vigor and variety of the plant. Plants should be gone over thoroughly, cutting out diseased, dead and weakened wood. Leave about six of the best and strongest canes. In all pruning a symmetrically shaped bush should be kept in mind.

If your rose plants are not doing well perhaps they are not getting the

proper care. It may be lack of food, soil conditions caused by certain types of fertilizer, lack of moisture, roots of other plants or trees, or it may be caused by a fungous disease, such as black spot, or powdery mildew. If you have neglected to fertilize give them a liberal application of a complete fertilizer, such as a four-eight-five analysis. Then give them a thorough watering. If the bushes should still refuse to grow try moving them to a newly prepared bed, or if you wish to leave them in the same bed dig them up and heel them in while you remove the old soil. Then make a new bed into which you may reset your bushes. Choose the time when the plants are at the nearest point of dormancy. They should be cut back, both tops and roots.

The most troublesome insect pests in rose growing are aphids and thrips, and the worst fungous diseases are blackspot and powdery mildew. Aphids attack the new growth or the soft tender shoots below the bud. Thrips are more often in the flowers. They are the cause of flowers failing to open, turning brown and withering up. They are particularly noticeable on some varieties, such as Mrs. Francis Scott Key. For control of these insects use Black Leaf 40 or other tobacco extracts. For control of black spot first make a thorough cleanup of the fallen leaves and follow with an application of lime-sulphur, or Bordeaux mixture every ten days or two weeks until the trouble is under control. It is better to keep constantly ahead of blackspot and insects than to wait until they have a good hold before starting to fight them. Black spot is a matter of prevention and not one of cure.

Much could be said about rose varieties. Some growers are content to grow Radiance only. It is all right to grow Radiance, but be sure to try some of the new varieties.

In this way valuable additions may be added to our list. Our rose gardens would be commonplace if no one ever tried new varieties. For instance, if several years ago no one had experimented with new varieties would we have the Radiance today? Some of the newer varieties which we tried last year proved to be quite successful, such as E. G. Hill, a beautiful dark red rose, vigorous and a free bloomer. We believe it is going to be as popular, if not better than the Etoile de Hollande. Talisman is giving good results. President Herbert Hoover is decidedly worthwhile. While it resembles the Talisman, it is more vigorous and has longer stems. Betty Uprichard, a two-toned rose, semi-double, is very vigorous and worthwhile. We consider Kaiserin Auguste Viktoria the best white rose, better than the new ones. We have tried Edel. It did not stand the summer very well. Dame Edith Helen is probably the most beautiful pink rose. Blooms are very large, full-double, pure glowing pink. My experience shows that it is a vigorous grower but a shy bloomer.the first year. The second year the bushes look scraggly, and the blossoms are smaller. Some of the new roses we planted last season, that do not show any ill effects from the hot weather and the rainy season and are thus highly prized are Mrs. Nellie Perkins, salmon pink. Editor McFarland is a very beautiful rose, a deep even pink with a faint tracery of white upon the edge of the petals. It inherited its vigor and productiveness from one of its parents, the Radiance. Mrs. Pierre S. DuPont, blossoms are a deep golden yellow; one of the best yellow roses that we have tried. Another good one is Ami Quinard, velvety, crimson maroon, semi-double blossoms and the bush is of extraordinary vigor.

If you are after new climbers, by all means plant Mermaid. It is a single rose of five brilliant white petals heavily washed with gold and glorified by a great burst of golden stamens. You will like it. We also have in our garden climbing Scorcher and Daydream and they are very promising.

Perhaps some of you do not know that there is a Florida Rose Society, an affiliated unit of the American Rose Society. The qualifications for membership in the Florida Rose Society is an interest in roses and a desire to know more about them.

The society publishes a rose bulletin annually. "Growing Roses in Florida". The articles are all written by Florida growers of authority. Its aim is to help the members in growing better roses, and particularly to help the beginners who may become members. For new members joining before the first of January the membership will be extended through nineteen thirty-four. These new members will receive the nineteen thirty-four rose bulletin, and in addition the nineteen thirty-three rose bulletin as long as they last.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
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COLLEGE OF AGRICULTURE,
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AGRICULTURAL EXTENSION SERVICE
COUNTY AGENT AND
HOME DEMONSTRATION WORK

Ornamental Gardening in Florida
Radio Series

Talk No. 16
December 27, 1933.

HARDY ORNAMENTALS FOR THE FLORIDA GARDEN

Harold Mowry, Assistant Director
Florida Experiment Station

Climatic conditions of Florida are exceptionally favorable to plant growth and this accounts in large measure for the wealth of ornamentals found in the state. Few other areas in the United States can compete as to variety and it is exceedingly doubtful that any other state can boast of a near approach to the wide range of tropical and semi-tropical plants found within its borders. The numerous native plants suited to ornamental usage have been supplemented with introductions from all continents and it is a conservative estimate that no less than a thousand varieties now enter in one form or another into Florida's lists of ornamental plants.

In recent years, ornamental gardening has received a great impetus, mainly through the efforts of the statewide organization of Garden Clubs whose work is now apparent in every section of the state. As a whole, the value and desirability of ornamental planting is becoming well established but there are yet too many residential lots, homes and streets unplanted. Some few owners are found who apparently care but little for the beautification of their home grounds. Such a condition is quite probably due in large measure to ignorance of plants and a lack of appreciation that properly made and well kept plantings not only enhance the beauty of a property but its monetary value as well. Again, the planting of ornamentals is neglected in many instances because of a lack of information concerning varieties best suited for specific uses and their adaptability to the different areas of the state.

It is discouraging after having planted shrubs or trees, diligently cared for them throughout the summer and fall and brought them into a thrifty growing condition to have them severely damaged or killed outright by cold the following winter. Many shrubs and vines may be killed to the ground by cold but will spring from the uninjured roots and make a vigorous growth the following summer. Some, however, if subjected to severe frosts, may be killed outright and to prevent such losses it is advisable to plant only varieties known to be hardy in the locality. For any given section of the state there are numerous trees, vines and shrubs that are climatically adapted and sufficiently hardy to be planted without fear of cold.

By the term hardiness, as referred to plants, we usually have reference to their ability to withstand low temperatures without appreciable damage. Hardiness seems to depend on several factors, among them: the natural cold resistance of different species and varieties, the condition of the plant as to health and dormancy at the time the cold weather occurs, the age and size of the plant, temperatures prevailing previous to

cold periods, and possibly with some species the amount of sunshine prevailing in the winter months. Since the freezing process in plants does not cause death through rupture of the tissues but primarily through water loss in the cells and the formation of ice in the intercellular spaces, it appears that the softer the growth and the greater the sap content the more susceptible is the plant to injury.

To a degree, plants may be enabled to withstand colder temperatures if it is possible to bring them into a condition of dormancy prior to the advent of the coldest weather. This is difficult of accomplishment but is believed to be aided by withholding both late seasonal cultivation and late applications of soluble nitrogenous fertilizers and by applying some form of potash salts in early fall.

Paradoxical as it may seem, growers in Florida quite often have certain plants severely cold-damaged when the same varieties are unhurt at points one or two hundred miles further north by even lower temperatures. Such conditions evidently are occasioned by our fluctuating winter temperatures wherein rather extended periods of warm weather -- warm enough to prevent complete dormancy or even cause increase of sap flow or actual growth -- are followed by sudden temperature drops that are damaging in their effect.

Our winter sunshine, too, seems to have its effect on the dormancy of many plants. This is strikingly brought out in the case of the litchee -- the Chinese tree bearing the delectable bright red fruits that appear like clusters of large strawberries. This tree is indigenous to the Canton delta region of China where it thrives and is seldom injured by cold. Canton is in the same latitude as Havana. Coconut palms are found in abundance in Havana and also as far as Palm Beach, which is over 3½ degrees northward. Strangely enough, coconuts do not grow in Canton because of the low winter temperatures, while the litchee in Florida is occasionally injured by cold. The difference in the zero point for vegetative growth in the two plants offers the only explanation for their difference in behavior. The litchee evidently is stimulated into a flush of growth at about 60 to 65 degrees Fahrenheit while the coconut requires much higher temperatures. A comparison of sunshine for the month of February of a given year showed Canton to have but 5½ hours for the whole month, while southern Florida, with a higher mean temperature by about 7 degrees, had nearly 200 hours for the same period. Florida's fluctuating temperatures and high percentage of sunshiny days make it virtually impossible for the litchee to remain dormant and as a consequence it is not resistant to the infrequent periods of relatively low temperatures. Many other plants fall in the same category, notably the Mexican lime, guava and mango, not to as noticeable a degree though the cold susceptibility is similar.

As is well known, the degree of hardiness in plants varies widely in the various species. Most plants of the tropics cannot withstand much cold of sustained duration and should not be planted in those areas commonly subjected to occasional temperatures of freezing or below. Ordinarily, there is no pronounced dormant season with tropical plants that corresponds to that of the plants of the cooler temperate zones. Some are deciduous, being without foliage for short periods, but the time of leaf shedding may be induced more by seasonal drought or moisture conditions than by temperature alone.

Normal prevailing winter temperatures in Florida have brought about a separation of the state into what may be termed three climatic or plant zones. Differences in the lower temperature extremes of the three areas are not great but within that range is a critical point for many tropical plants that suffer more or less severe damage, or death, when exposed for several hours to temperatures below freezing.

The most tropical parts of the peninsula are the coastal areas of the extreme south, extending roughly from about Fort Myers or Punta Gorda on the west to Palm Beach on the east but excluding much of the interior area lying between. The narrowness of the peninsula, the warming influence of the Gulf and the Atlantic Ocean, and the close proximity of the great ocean river, the Gulf Stream, all tend toward a tempering effect on temperature fluctuation and it is seldom that even slight frosts occur in this portion of the state.

It is in the southern section that the truly tropical plants are found in abundance. A great part of the native vegetation is identical with that of the neighboring West Indian Islands and it is only in this part of the United States that a tropical flora is found. Tropical exotics thrive and plants from equatorial regions have been introduced in great numbers. Here the gardener and plant lover may plant to his heart's content with but little restriction as to variety and without the necessity of much consideration as to the plant's cold resistance. It is true that some of the plants of more temperate climates do not thrive under the warm environment but that is of little consequence since for each plant of that type there are many entirely satisfactory substitutes. Ornamental gardening in this area is offered an exceptional opportunity to produce plant effects that can be duplicated nowhere else in the several states and growers should be and are making the most of the climatic advantages available.

North of this area and extending approximately to a line drawn through Marion County lies what is commonly termed the central area or zone. Climatic conditions here vary but slightly from those of the southern zone except that winter frosts may be of more frequent occurrence and of somewhat greater intensity. Freezing temperatures are known at infrequent intervals and at such times the tenderest plants may be injured. Within this region are limited areas having exceptional frost protection that permit the growing of nearly all those plants of the southern area.

All of western Florida and that part of the state north of Marion County may be considered as the northern plant zone. It is here that the coldest temperatures of winter usually occur and frosts are most frequent. Few of the tropical plants are adapted to withstand the prevailing winter minimums and when planted generally prove a disappointment. To a degree, this lessens the variety available as compared to farther south but it need be no deterrent as numerous highly desirable ornamentals are well adapted. Restrictions of this area are by no means to be compared with those of more northern states and the comparisons made here are only for the purpose of calling attention to temperature variations existent within Florida.

There are no distinctly marked boundaries in the three arbitrarily-

named areas since few winter seasons are identical to the extent that given minimum temperatures of one winter can be taken as an exact criterion of the cold that may be expected at a designated location the next year. Florida's cold weather -- such as it is -- in nearly all instances is brought in by northerly winds and is seldom of over two or three days' duration. Freezing temperatures, when they do occur, rarely last over a few hours. This condition allows for fairly wide differences in temperature minimums even in closely adjacent localities. Some local areas are noted as being cold "spots" while others, because of some topographical protective influence are well known as warm or "frost-free" locations.

Because of the temperature differences obtaining, three factors should be given consideration in the choice of ornamentals:

First: The relative hardiness of the plants in question.

Second: The area, that is, the northern, central or southern area, in which the plants are to be grown.

Third: The local situation as to probable protection afforded by nearness to lakes or ocean, by elevation, or by overhanging trees and nearby buildings.

Due to the extremely large number of ornamentals available for Florida planting, it is impossible in the time allotted to give anything like a comprehensive list of those adapted to the different sections. In many instances, observation of those plants growing in the vicinity will give a good idea as to the ones adapted to that particular area. Quite reliable information as to the climatic adaptability of the numerous varieties may also be had from the many nurserymen who grow ornamentals. The Experiment Station, too, has a list of many of the more common plants, arranged as to hardiness, that may be had for the asking.

The questions of hardiness and adaptability of the plants to be used about the home and in the garden are of paramount importance and should be given due consideration in garden plans since the ultimate success of the planting will depend largely on these factors.

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Ornamental Gardening in Florida
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Talk No. 17
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THE PROPAGATION OF GARDEN PLANTS

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University of Florida, College of Agriculture

In the growing of anything some plans have to be made for perpetuating the kind. This we call propagation, and it is one of the important jobs in the having of a fine garden. Most gardeners leave a lot of the task of propagation up to nurserymen, who make a speciality of that work, but there are many who get great satisfaction in propagating many of their own garden plants. Knowledge of how the different kinds of plants are propagated is really a part of good gardening.

Plant propagation may be defined as the increase in plants to perpetuate the species or the variety. It involves the art, the science and the knowledge of the best time, place and manner of propagating each kind of plant. The art may be acquired by following an example, either written or manual, or by the trial and error method. The science may be acquired from books or from an experienced gardener.

Methods of propagation divide themselves into two general classes - sexual and asexual, the sexual method id dependent on the formation of seeds, and the asexual method is used when seeds are not available. Under the asexual classification we should consider the various types of propagation, such as division, cuttings, layerage, bulding and grafting.

In this paper we will consider only the planting of seeds, division, cuttings and layerage, and will omit the more technical discussion of budding and grafting.

The planting of seed is by far the simpliest and most used method of propagating flowering plants. That, however, is a much bigger job than just sticking a few seed in the ground and covering them. There is a time to plant them, certain soil to plant them in, a depth to cover them, and they need the right amount of moisture.

We'll discuss the planting of seed in more detail, but now suppose we discuss some of the more interesting asexual methods of propagation.

Division: Propagation by division is the easiest, quickest and best way to increase most herbaceous perennials and many bulbs. Dig the plants, shake off the dirt and it will be apparent that they will divide up into units or small plants all having roots, stems, buds orleaves. These units may be separated and planted. The beds should be thoroughly prepared beforehand and abundant water should be added to pack the soil well about the roots. Plants are best divided after the blooming season, but with care theymay be so increased at any time.

Cuttings: This method also is much used in the propagation of perennials and it is not at all difficult if a good grade of sharp, clean sand and plenty of water are used.

Old stems are cut in three or four inch lengths, just above and just below convenient nodes or buds. The leaves on the upper node should be left intact. A sharp knife that will make a clean neat cut is the best tool to use in making cuttings.

A flat or box of any convenient size in the bottom of which several holes have been drilled to allow the free passage of water is an ideal receptacle for the rooting of cuttings. Cover the drainage holes with coarse material so that the sand will not wash through. Fill the box with coarse sand to wit in an inch of the top; pack well, insert the cuttings to the upper nodes, and water to firm thesand about the cuttings. Shade the flat and keep the sand moist at all times. When the roots are about one inch long, set the young plants in fertile soil that can be readily watered, and protect them from thehot sun or cold until they are well established.

Dormant hardwood cuttings of garden shrubs may be made in eight or ten inch lengths,tied in bundles and buried in sand upside down. When inspection shows that a callus has formed on the basal end, the cutting may be lined out in nursery rows. They are set so that only one or two buds are above the ground level The moisture must be adequate and constant if a good percentage of well rooted plants is expected.

Layerage is that method of propagation in which plants are increased by rooting their stems without detaching them. When these stems are well furnished with roots, they are severed and the new plants are transplated as individuals. Many of our woody and semi-woody garden plants aremost easily propagated by layering, which is a favorite method with many gardeners because successful increase is practically assured.

Simple layers are made by bending down the lower branches of a plant so that it comes into contact with the soil. Usually a trench is made to receive the stem which has been notched or nicked with a knife to facilitate rooting. After the soil has been leveled and firmed over the branch, a peg or a brick is used to hold the layer in place. Frequent watering is most important to insure the quick development of an adequate root system.

Continuous layers are those in which whole stems or canes are buried under a few inches of sand. New plants arise from eyes or buds along the canes. The method cannot be used with many plants, and even those that may be increased in this way, do not produce large numbers of progeny.

Chinese layering is a popular method used in increasing plants whose branches cannot be bent down to the ground. The stems are notched where the root system is wanted and the wounded area is bound tightly in a wad of sphagnum moss, fibrous peat or other moisture holding material. String, tape or raffia is wrapped round and round the wad to hold it firmly in place. Frequent watering of the layer is essential. When roots begin to emerge through the ball of moss, the new plant should be severed and potted as an individual. Chinese layers are used to make new root systems on potted or tubbed specimens that have become leggy. Pots, cans and cups of various materials may be used in this type of layering, especially if soil is preferred to moss as the rooting medium.

Planting Seeds: The one item of greatest difficulty with most gardeners is getting a good stand of seedlings and protecting them from the dreaded disease known as "damping off". During August, September and October, when most annual seeds are planted, the warm weather is very favorable to the growth of damping-off organisms and the loss of seedlings is tremendous, if proper precautions arenot observed.

There are, perhaps, as many different methods of planting seeds as there are gardeners. The method described herewith has been used successfully at the horticultural grounds of the College of Agriculture for the last five years, and though it isnot necessarily the best way to plant seeds, it has proven very satisfactory.

First of all, the autumn sown annuals may be divided arbitrarily into two classes - those which transplant readily and those which do not. Seeds of the former are planted in flats, while those of the latter are sown in the open ground where the plants are to stand.

The flat may be a shallow box of any convenient size that has plenty of drainage holes or cracks in the bottom to allow water to pass freely out of the soil. Thorough drainage is exceedingly important in soils where tender seedlings are grown, as a sour, water-logged soil is fatal to most young garden plants. In the bottom of the flat should be placed a layer of pine straw, dead grass clippings or other coarse material so that the soil will not wash through the drainage holes.

The soil used in flats may be any good grade of garden soil which contains a fair amount of well-rotted organic matter such as cow manure, oak leaves, peat moss, etc. The older the soil is, the better. Soil that is free from root-knot nematodes is, of course, desirable.

Firm the soil to within half an inch of the top of the flat with a brick or a block of wood. Flood this gently packed soil with a solution of one of the organic mercury compounds that are indicated for the control of damping off. After this solution has drained off, sift the seeds, broadcast, on the wet soil. Cover lightly by sifting sand

through a screen
or sandy soil over the seeds. Covering the seeds too deeply is a common error. Generally speaking if the seeds be just barely hidden good results may be expected. After the seeds have been covered with soil, place a wet newspaper over the flat. Water should be sprinkled on the paper whenever it becomes dry. In this way there is no danger of washing the seeds out of the soil, and the soil is kept uniformly moist. The wet newspaper should remain on the flat until the seeds germinate. Place the flats on boxes or benches that are protected from ants which often carry away the seeds. Some of the most popular of our autumn-sown annuals, such as pansies, snapdragons and larkspur, are cool weather plants and their seeds will not germinate readily if the temperature is excessively high. Forthis reason, to assure a fair stand, it is important that the flats should be placed in the coolest possible situation. The north side of a building, under a tree, or under an open shed should do nicely.

After germination the flats must be placed where the seedlings can get an abundance of light; if they are left in the shade, the seedlings will grow into weak, leggy plants. We have found that a muslin shade such as is used for celery or tobacco seed beds allows sufficient light to penetrate to the young plants. Shortly after germination, the flats should receive another application of a compound for the control of damping-off. Water should be carefully applied through a fine spray.

When the seedlings show about four true leaves, they may be transplanted to well prepared beds where they are to bloom. Choose a cool, cloudy afternoon for transplanting if it is at all possible, and set the plants about 12 to 18 inches apart. Close planting is desirable to assure bold color masses. As further insurance against damping off it is often a good plan to use the damping-off control immediately after transplanting. Great care should be exercised in watering the young plants until they are well established. Overwatering can be as harmful as under-watering.

The second class of annuals, those which are planted in the open ground where they are to bloom, may be handled much the same as vegetables. Sow the seeds thinly in shallow drills or trenches. Cover lightly with soil and sprinkle with a damping-off control. The drills or rows may be covered with wet strips of burlap. If this material is used water will not wash the seeds out of the soil, and the soil stays uniformly moist. If ants are abundant, grits or cornmeal should be sprinkled liberally along the rows. These will be taken in preference to the seeds. As soon as the seeds germinate the burlap must be removed and a second application of the damping-off control should be made. When the plants are well established, thin so that they stand about 12 to 18 inches apart.

In summing up, we might say that the one big thing to bear in mind in propagating plants is that different plants demand different methods and it is up to the gardener to learn the likes and dislikes of their different kinds of plants. When plants are considered as individuals and something with life in them, the gardener is much more likely to be successful in having a fine garden.

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DECIDUOUS TREES FOR THE FLORIDA LANDSCAPE

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Florida Agricultural Experiment Station

Trees occupy an important place in any well-designed and executed landscape planting. They function as does the frame of a picture, and bring out the lines and boundaries with the proper setting so that the full and complete effect of the other plant material is developed. Restful breaks can be established along roadsides, in parks, estates and country club grounds with the proper use of the right trees.

Ornamental trees should be selected for their individual ability to produce certain definite and desired effects. Evergreen trees are often used because of their beautiful green appearance during the dormant season, but there are many locations and types of plantings where it is more desirable to use other kinds. Trees for shade and beauty during the summer months are required on practically all small home grounds. Where the full benefit of the Florida sun is desired during the winter months deciduous trees are the most satisfactory ones to plant. With proper selection and arrangement it is possible to meet adequately such requirements with a great variety of trees that shed their leaves during the dormant season so as to admit practically all of the sunlight during the time when it is most desired.

There are many types of landscapes, especially those of large proportions, where deciduous trees can be used most effectively. Color combinations in foliage and flowers of exquisite beauty can be produced in great abundance during the spring and autumn by the correct arrangement of such trees in the planting. Colors in great array are magnificently portrayed in the natural woods of Florida during the spring and fall months when the foliage of persimmons, oaks, sweet gums, maples and others in gorgeous hues blend harmoniously with the green of the pines. After all, what is more beautiful than the natural landscape upon which all successful plans must be based if suitable and pleasing surroundings are to be developed.

There are two general types of deciduous trees adaptable to Florida landscapes. Those that shed all their leaves during the fall and those that shed their leaves during the latter part of the dormant season and become completely defoliated just before or about the time of the initial spring flush of growth. The native cherry, red oak, hickory and pecan are representative trees of the first group, while laurel and water oaks represent the latter.

The soils required for deciduous trees are much the same as those for the general plantings made in landscape arrangements. Therefore, if

a good lawn and shrub soil is available, good results will be had in planting and growing trees adapted to Florida conditions. In general the land should be well drained, but of such condition that it will retain sufficient moisture that maximum results will be obtained from the water supply and vigorous growth of the trees maintained.

Transplanting is done during the dormant season according to the general rules for setting trees. The holes should be large enough to admit the roots without crowding and to a depth that will allow the roots to be as deep as they were in the nursery or in their natural location. In setting the trees it is best to plant with the roots no deeper than they grew. Use only top soil and press it firmly about the roots and add about one pound of bone meal as the holes are being filled. When the holes are three-fourths full, water thoroughly and then fill in with loose earth. The tops of the trees should be cut back rather severely to balance with the root systems at the time the trees are transplanted.

When trees are removed from their natural locations one should take up as good a root system as possible and protect it from drying winds and sun with damp moss or burlap until transplanted. The root system on trees with trunks not over two or two and one-half inches in diameter should be not less than two feet across, three feet is better, and the roots should have a depth length of 18 to 36 inches, depending upon the kind.

The size of trees that will give the best results after transplanting is an important item. Nursery-grown trees are graded by feet up to 12 feet high and by caliper of trunk in inches for larger grades. Most trees will grow off much better if medium sizes are selected rather than the extremely large ones. Pecans, hickories and walnuts in general should be of the 5 to 6 foot or 6 to 8 foot grades or smaller, although trees as large as 8 to 10 feet can be successfully planted about the home where individual attention can be given them. For other kinds, trees with trunks not over two and two and one-half inches in diameter should be planted, although water oaks up to 4 to 6 inches in diameter often are transplanted successfully with bare roots.

Trees in the landscape ordinarily receive little or no cultivation, as it is generally desired to have the lawn grass completely covering the ground. There are some species, notably the pecan, that will grow off to a much better advantage if a small area about the base is kept clean of growing vegetation and mulched with organic material for the first two or three years. This latter practice, however, is not so important if the trees are located in lawns that are kept well watered and fertilized. Adequate soil moisture must be maintained, otherwise the trees will not make suitable growth.

A general fertilizer analyzing about 5-7-5 should be applied in the spring and again in the summer to supply plant foods in sufficient amounts to produce growth. Bone meal and cottonseed meal are also good materials to use on the soil in which shade trees are growing. If the lawns in which trees are located are properly fertilized during the growing sea-

son it will not be necessary to make additional applications, but it would be advisable to increase the amounts somewhat in the areas occupied by the tree roots. If trees are to be given special fertilizer in lawns it is best done by plugging, i.e., punching holes in the earth in the root zone and filling with fertilizer, preferably bone meal.

The pruning of deciduous trees should be generally attended to during the dormant season which in Florida is approximately from December to March. About all that need be done is to prune out any dead and interfering branches. All pruning should be done so that the cut is made next to another branch or where the limb joins the trunk of the tree to insure proper healing of the wound. When removing dead limbs the cut should be made well into the green wood area. The cuts should be made with a sharp saw and in such a way as to avoid splitting. All cut surfaces of more than one inch in diameter should be covered with a good grade of outside paint or wound dressing to prevent the entrance of moisture and wood-rotting fungi. Decaying wood that started from broken or poorly pruned branches and unprotected cut surfaces has caused the weakening and death of many trees that otherwise would have lived for a much longer period.

Trees may become unsightly and lose their vatility and usefulness due to attacks of insects and diseases, and gardeners should be prepared to prevent such losses. Complete information regarding control methods of destructive pests can be obtained from the University of Florida Agricultural Experiment Station.

There are a large number of deciduous trees, both introduced and native, from which Florida gardeners may select material for planting. The native trees are sufficiently numerous to fulfill almost any requirements. There are numerous oaks, sycamore, cypress, sweet gum, maples, hickories and others native to Florida that are excellent trees for landscape and street plantings. There are also many introduced trees which should not be overlooked that thrive satisfactorily when properly located, including Ginkgo, Koelreuteria formosana, Aleurites, Pecan, Black Walnut and many others.

Laurel and water oaks are probably themost commonly used of all deciduous trees for roadside, street and landscape plantings. The red or Spanish oak gives good results and is often left where growing naturally when clearings aremade. All of these make beautiful trees and furnish abundant shade, but the last named is the only one that sheds the leaves completely in the fall, the other two being more or less tardily deciduous.

The Bald cypress and the Pond cypress are two common native deciduous conifers that can be transplanted and grown successfully as ornamental trees. They present a very beautiful appearance, especially in the spring when the new growth has the light green, feathery appearance.

The Sycamore is planted as a shade tree to some extent throughout the northern areas of Florida where it thrives satisfactorily. Owing to its grayish white bark it can be used effectively where it is desirable to have a tree that will show among or against a mass of green foliage. Some object to its leaves as they fall.

Sweet Gum is another native tree that is found throughout most of

Florida that is a vigorous grower. It is pyramidal in general shape, tall and well suited for roadside, avenue, and group plantings where such deciduous trees are desired. The foliage is dense and turns to shades of beautiful reds and yellows in the late fall months.

The Red maple which is native over Florida from the southern parts through to the northern areas, is used to some extent in ornamental plantings. It presents a beautiful appearance in the spring and the foliage turns to bright red and yellow colors in the fall, which makes it very attractive. This tree should be employed more extensively, as it transplants easily and is well adapted to natural conditions where the soil is suited.

Native hickories are not generally transplanted, but are frequently left as specimen trees when clearings are made. They are beautiful trees, especially Hicoria alba and Hicoria glabra, and lend much dignity and beauty to landscapes. The Water hickory, Hicoria aquatica, can be transplanted successfully and is especially valuable in rather wet locations.

The pecan is planted extensively as a shade tree throughout central and north Florida. The large trees frequently noted about the homes in the state are mostly seedlings, but the later plantings are mostly of named varieties. With the proper variety it is possible to have ornamental shade trees that will also produce a supply of nuts for home use and for sale.

The Maiden hair, or Ginkgo biloba, is planted sparingly as an ornamental tree in the northern part of the state. It presents a pleasing appearance during the growing season, and again in the late fall when the foliage turns to a golden yellow. As the fruit has a foul odor it is best to plant only those trees bearing the staminate flowers.

The tung-oil, Aleurites fordi, introduced from China, presents a a beautiful appearance in the spring when in full bloom. It is also rather attractive as a foliage tree during the summer months but owing to its habit of growth it would be best suited as a part of the banks and clumps of small trees rather than in a location where an extremely large stately specimen is desired. Other species which are planted to some extent in the southern part of the state are Aleurites montana; A. moluccana; A. cordata; and A. trisperma.

Koelreuteria formosana is as yet quite rare in Florida, but succeeds as an ornamental deciduous tree on well-drained lands over most of the state. This is a flowering tree that can be utilized effectively where color is desired in the late summer and fall. It produces great panicles of small yellow flowers that appear in late September and early October followed by the red capsules containing the seed. The colors are very showy and attractive and the trees can be used in numersous ways in various sized landscapes and home grounds.

There are two walnuts that are used to some extent as yard trees that thrive in central andnorth Florida. The Black walnuts make beautiful shade trees of considerable proportions that are quite useful as well as ornamental. The seedling Japanese walnut is found growing about homes less frequently than the Black walnut and is a much smaller tree. Nuts

with delicious kernels are produced in abundance by both of these walnuts which adds materially to the home supply.

There are many deciduous trees other than those mentioned and briefly described that can be successfully used in Florida landscapes and for street and roadside plantings. Much fuller lists with complete descriptions and instructions for planting, fertilization, cultivation, etc., can be obtained by writing the University of Florida Agricultural Experiment Station.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF FLORIDA

COLLEGE OF AGRICULTURE,
UNIVERSITY OF FLORIDA,
AND UNITED STATES DEPARTMENT
OF AGRICULTURE,
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AGRICULTURAL EXTENSION SERVICE
COUNTY AGENT AND
HOME DEMONSTRATION WORK.

Ornamental Gardening in Florida
Radio Series

Talk No. 19
January 17, 1934.

ORNAMENTAL FLORIDA FRUIT TREES

By
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To the prospective orchardist the only considerations entering into the selection of fruit trees are the quantity and quality of fruit to be expected and the market returns, but to the home owner who wishes to have a few fruit trees around his house it is of interest to know what ones will serve an ornamental function as well as provide fruit for his table. Florida has no fruit trees which make such a striking display as northern apple, cherry or peach trees in the spring, yet there are many among Florida's fruit trees which are as well worth growing for their ornamental value as for their fruit. In nearly every case they are attractive the whole year, instead of having only a relatively brief period of loveliness in the spring.

Most of the attractive fruit trees of Florida have ornamental value chiefly because of their compactly symmetrical habit and their evergreen foliage. In a state where so many brilliantly colored shrubs and vines abound, it would almost seem enough to ask that fruit trees should be handsome evergreens. But of the three F's of ornamental value -- flowers, fruit and foliage -- we have some fruit trees with all three and some with two, as well as those with only handsome foliage to recommend them as ornamentals.

Perhaps the best-known examples of fruit trees with a triple F for ornament -- attractive flowers, colorful fruit and beautiful foliage -- are found among the citrus species. The waxy, white flowers, with a delightful fragrance, are set off in spring by the background of glossy green foliage, while in winter the same beautiful green serves again as setting for the yellow, orange or red fruits. The most ornamental of the citrus family is the kumquat, whose numerous fruits, like orange-yellow plums, adorn the shapely little trees for months. Of slightly larger habit and more spreading, willowy branches are the tangerines, whose fruits are the size of small apples and vary in color from bright orange to a decided red, according to the variety. While it is more difficult to obtain and keep symmetrical specimens of orange and grapefruit trees, we would undoubtedly value them more for their purely ornamental effect if they were not so common. Where they must be grown in tubs and kept in a greenhouse through the winter, orange trees are considered very attractive ornamental trees. A well-grown grapefruit tree is handsome at all seasons, but especially so when the great yellow balls of fruit are hanging in clusters all over it in winter. All of these citrus trees can be grown throughout nearly the whole of peninsular Florida. They are fruits which had their ancestral home in far eastern Asia, but they have spread around the whole world in the subtropics.

Of even wider range of distribution in Florida is the loquat, which adds the charm of bright yellow clusters of fruit and panicles of fragrant, though not strikingly beautiful, white flowers to the green of its symmetrical body of foliage. It attains a height of 20 feet usually, and forms a compact, round-headed tree. The large leaves are glossy, dark-green on the upper side and covered with a brownish felt on the under side, and form a dense mass of foliage all the year. The juicy yellow fruits, of the size of small plums, have a very pleasant acidity added to their sweetness, and so are especially tasteful to tourists whose palates find the richly sweet tropical fruits somewhat cloying. Pleasant to eat out of hand, loquats make a splendid preserve or jelly. For the lower half of Florida, at least, this is the only very satisfactory representative of that most prominent family in northern horticulture, the Rose family, to which the apples, pears, cherries, peaches and plums belong. It also is an Asiatic fruit, native to central-eastern China originally and cultivated for centuries in China and Japan. From these countries we have imported several choice varieties, while others have been developed in recent years by a California horticulturist. One small village in China is said to have shipped out $20,000 worth of loquats in a single year, and in Japan the fruit production runs above a million dollars annually.

Limited to the more tropical portions of Florida, the lower coastal areas mostly, are two handsome trees which have come to us from the far East Indies -- the rose-apple and the jambolan (Jum' bo lan'). Both are large evergreen trees with medium-sized, somewhat leathery, glossy green leaves which form a fairly compact body of foliage. The rose-apple is the more widely grown of the two, both in this state and in the rest of the world. Besides its handsome aspect it is remarkable for its fruits and flowers. The fruits are the size of a large round plum, light yellow in color, and have a firm but very tender flesh perfumed with the odor of rose-water and slightly sweet. It is used to give an aroma to jellies. The flowers would be rather inconspicuous greenish-white blooms if it were not for the great number and size of the stamens. These stand out like long yellow pins filling a pin cushion, or like a yellow pompon, being three inches across the stamen cluster. The new leaves appearing in spring add the lovely wine color of their flush to the green of the older leaves. The flowers of the jambolan do not have such a showy pin-cushion effect as those of the rose-apple, but are attractive white buttons on the dark green coat of foliage, while the fruits are like small deep-purple plums. They are used for preserves and jellies, rather than to eat out of hand.

Of the trees which combine ornamental fruit with attractive foliage habit, the mangos probably rank first. For handsomeness of foliage aspect alone a fine specimen of mango has few equals. It makes a symmetrical, round-headed tree of up to 60 feet in height, with glossy slender leaves which are a rose red when they first appear in the spring and remain a dark green for more than a year. In such fine varieties as the Haden and Mulgoba, the pendant clusters of brilliantly colored fruit make a sight not soon forgotten. And when in late winter the whole tree is nearly covered with a mantle of panicles of small yellowish flowers, the mango would almost seem to qualify for a triple

F, also. In its best varieties the mango is by far the finest of the strictly tropical fruits, having a pleasant aroma and a delightful subacid quality added to its sweetness. It is to the tropics what the peach is to the temperate zone, and can be grown in Florida as far north as Merritt's Island on the east coast, Bradenton on the west coast, and Lake Placid in the center of the state.

The West Indian star-apple is a tree of somewhat more tropical requirements than the mango, but of even more beautiful foliage aspect. The tree itself is by no means so large and stately, but the leaves are glossy green above and a lovely satiny golden-brown underneath. So as the leaves dance in the breeze, they gleam like burnished copper whenever their undersides meet the sunlight. The flowers are small and rather inconspicuous, but the fruits are as large as a medium-sized apple and may be either light green or bright purple. Within the fruit is a rather soft white flesh of melting sweetness. When the fruit is cut across the middle, it presents much the same appearance as an apple, with a star-shaped cluster of seeds at the core, and hence the name "star-apple." Its sister species, a native tree in southern Florida, takes its name from the very similar character of the leaf undersides, and is known as the "satin-leaf."

Another tree with beautiful fruit and handsome foliage is the lychee (li'chee). It is rather difficult of cultivation, although it is fully as hardy as the mango, and there are hardly a dozen bearing trees in the state. But it is a tree which well repays the trouble of growing it. Like the loquat and the citrus fruits, the lychee is a gift from the Celestial Empire, where it has been cherished for over 2,000 years as the finest of all fruits. The tree is small, round-headed, and compact, with glossy, dark-green foliage of slender, rather drooping, compound leaves. The fruit is borne in grape-like clusters, and each fruit is like an oval red strawberry, with tough, roughened skin. Inside is a clear, translucent pulp of very agreeably blended sweetness and acidity. The dried fruits constitute the well-known "lychee nuts" of Chinese confectionery. As is true also of the mango and the loquat, it is necessary to have grafted trees from named varieties to be sure of fine quality fruit.

While the okee fruit is usually eaten after frying, rather than fresh, and partakes in many respects of the quality of a vegetable rather than of a fruit, yet it is always classed as a fruit. And as such it deserves consideration among those fruit trees having attractive fruits. It is a plant which came to the West Indies a century and a half ago from West Africa, in the days of the slave trade. The tree habit is somewhat open and the foliage rather a light green, and it would hardly be worthy of planting for ornamental value were it not for the distinctive fruits. These are bright-red capsules of 2 or 3 inches length, borne in large clusters, and the open habit of the tree serves to make them the more conspicuous. When they are fully mature they split open to disclose a shining white pulp containing large black seeds. The pulp has a very nut-like flavor when fried in butter. The tree is decidedly tropical in requirements, about like the star-apple, or perhaps succeeding as far north as the mango.

The sapodilla, or "dilly," is a strikingly handsome tree which endures winds but not frost. Native to Central America and southern Mexico, it is one of our native American fruits, as is the star-apple of the same family. The tree habit is tall and stately, often spreading out into a great rounded top but always compact, and the medium-sized leaves are a deep, glossy green. The brown fruits are usually the size of a small apple, and contain several seeds of medium size imbedded in a light-brown flesh which is soft and sweet and is slightly gritty, like a northern pear. On the Florida Keys the "dilly" is one of the few fruits which grow satisfactorily, and it is highly prized. The milky juice of the bark forms the basis for chewing gum, and in Central America great areas of sapodillas are tapped for the chicle (chick'l) to supply our great chewing gum industry. But apart from either the fruit or the chicle, the sapodilla is a tree worthy of planting for its handsome aspect. It is unusually free from either diseases or insect pests.

Another very sturdy and handsome tree which endures no touch of frost is the tamarind. Slow of growth, like the sapodilla, it develops at length into a very large, compact, round-headed tree. The finely divided foliage is a light green shade and peculiarly beautiful. Indigenous to tropical Africa and perhaps to southern Asia, it has been cultivated for so long in India as to make its origin uncertain. It is well worthy of cultivation for its beauty of habit alone, but it also has valuable fruits. These are pods of 4 to 8 inches length and an inch across. This tree belongs to the Pea family, and within each brown pod is a thick brown paste of high sugar content and high acidity. A delicious cooling drink, like limeade, is made from this pulp in the West Indies, while in the Orient the tamarind is valued as an ingredient of chutnies and curries. Like the sapodilla, whose range it shares, this handsome tree has few diseases or pests, and it is very resistent to storm winds.

The Cattley or Strawberry guava is a rather small tree, rarely exceeding 20 feet, with very attractive glossy, deep-green leaves and smooth brownish branches. It is native to Brazil, but was carried to China by Portuguese traders early in the 16th century. And thus it became known at first to Europe as a Chinese fruit. There are both yellow and red-fruited varieties, both alike being highly valued for making jellies as well as for eating out of hand. The fruits are much the size of plums. The tree is about as hardy as the orange, and is rarely attacked by either diseases or insects.

A handsome fruit tree of very narrow range of distribution in Florida is the jak (jack). This brother of the famous bread-fruit is only hardy enough to grow where the sapodilla and tamarind flourish, and is an immigrant originally from the mountains of southern India. It forms under favorable conditions a tall, dense-foliaged tree of stately habit. The fruits are very unusual, being as large as a foot-ball and borne directly on the trunk or main branches. They are hardly a sufficient reason in themselves for the growing of this tree, so far as fruit quality is concerned, but their unusual character makes them highly interesting and the tree itself is a decidedly handsome one.

Another decidedly tropical fruit tree, which has come to our

shores from the nearby West Indies, is the Mammee Apple or mamey. The large, glossy deep-green leaves are borne on a very compact framework, and the tree is handsome and stately. The large fruits, like huge russeted peaches, have a flesh which when fully mature is of the texture of half-ripe peaches. They are valued rather for use in preserves, to which they impart an apricot flavor, than for use as a dessert fruit.

Closely related to the persimmon is a handsome evergreen tree of medium size, the black sapote, which had its origin in the highlands of southern Mexico. Like so many of the tropical fruit trees, it has glossy, somewhat leathery leaves of medium size. The fruits are as large as small apples, and contain a soft pulp of dark chocolate brown which is very sweet. As a dessert fruit it is more esteemed in Mexico than in this country. The tree is very tender to frost.

The Otaheite (O-ta-hite') - gooseberry is a small tree, native to Madagascar and India, which grows well in the southern half of the state. This handsome, erect, little tree has its leaves ranged in pairs along the sides of small branches, so that they appear to be large compound leaves, and these feathery branches stand out stiffly from the larger branches, giving a very characteristic appearance of compactness to this small, round-topped tree. The small green fruits, about an inch across, are ribbed, and they have a quality similar to the goose-berry, so that they make good jellies and jams.

Summing up, we note that the kumquat, tangerine, loquat, rose-apple, and jambolan are of ornamental value for foliage, fruit and flowers, all three; the mango, lychee and star-apple combine colorful fruits with handsome foliage; and the sapodilla, tamarind, jak, mamey, black sapote, cattley guava and Otaheite gooseberry are valued for fine foliage and tree habit. And these are only those of Florida's fruits which have ornamental value as trees apart from the value of their fruits in themselves.

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Ornamental Gardening in Florida
Radio Series

Talk No. 20
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ROSE VARIETIES FOR FLORIDA

H. Harold Hume, Assistant Director, Research
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What roses shall I plant? is a direct question that must be answered in some fashion by everyone making a rose planting or setting out only a few bushes in the garden. And the answer to the question, whether that answer be dependable or not, may be obtained from various sources. It may be had from rose catalogues that are today, in many cases, veritable works of art. Roses in these booklets are displayed singly, in beds, in groups, on arbors or pillars, in color and in black and white. Who, having seen these catalogues, does not wish to plant a rose or a dozen? The text goes with the pictures; it matches them in flowery language and the story of the rose and its behavior is complete. And so, hunting through the pages of the catalogue, there comes into existence a mental rose garden, the bushes in vigorous growth, the leaves healthy, green and lush, with flowers in gorgeous hues of pink, or red, or copper, or yellow, or glistening white. Thus in the cool of a winter's night, by wandering through a catalogue, the answer is found to the question, "What roses shall I plant?"

But the catalogues do not tell all the story; they do not give a complete answer to the question, "What roses shall I plant?" The descriptions give certain information; they tell certain things about the varieties, their good points are set forth, but as a general rule the rose planter must learn their shortcomings and deficiencies for himself. This is where the catalogues fail.

Certainly it is a safe conclusion that all the varieties listed are not adapted to Florida conditions. Why are they not adapted? To begin with, a lot of rose varieties named and introduced, originated in different parts of the world, never should have been introduced anyway. They have nothing of particular value to recommend them. I know there is a constant tendency on the part of plant lovers to interest themselves in plants that are new; they want the very latest thing and the rose originators, introducers and nurserymen have found it to their advantage to cater to the desire for the new, even to the extent of displacing better plants. In consequence there has swept over this country a wave of rose super-salesmanship in the promotion of varieties that is not based on actual performance, and this, unfortunately, is resulting and can but result in a deplorable situation, a loss of interest in the rose on the part of those who grow it. They have been fooled too often. To be plain and candid about it, I have never been able to understand why a perfectly fine, well-adapted old rose should be displaced by one of more recent origin for no better reason than that it is new. I believe in new roses; I believe in testing them, in trying them out, but for me they must equal in all particulars those I have and present some additional point of merit before I discard the old, dependable sorts. I believe in new roses, but we must not make gardens with them or buy them in quantity until they have been tried and found satisfactory for our area.

Roses of today are of very mixed parentages. Hybridizers have bred roses of many kinds and from them evolved our garden forms. Some of these parents give plants adapted to our conditions, others do not. If into the makeup of a rose there enters too much of an original species that belongs to a dry climate, we are likely to fail with it because our rainfall of 55 inches or so annually is entirely different from that to which it is adapted or to which one or more of its parents has been accustomed. Heat and moisture induce poor growth in the summer season; diseases lay hold of stems and leaves, and, to use a good Florida expression, "it just peters out." Furthermore, roses that go back to parents from cold climates are likely to be failures. They will not succeed unless they are well chilled in winter. Occasionally following a cool winter they may flower, but that is not often. And so, though they may be grown into good stout plants, they do not bloom. They are failures for just the same reason that plums, raspberries, currants, horseradish and other plants from northern climates are failures here. We have succeeded very well in keeping growing roses and other plants warm by building greenhouses around and over them, but we have not got very far yet with refrigerating them. Some varieties of roses are notoriously weak growers, the stems are slender and weak, the foliage scant; they haven't enough stamina to produce buds of size that hold up their heads. Away with them!

The first requisite of any rose for Florida is ability to grow vigorously. They may make good green shrubs if nothing more. The second requisite is freedom from diseases and insects. Why grow roses to feed insects and harbor diseases if they alone will benefit? And the third desideratum is free flowering, -- an abundant harvest. Whether the flowers are white, pink, copper, red or yellow does not matter if they are not produced or are few and far between. When vigorous growth, freedom from disease and free flowering are assured, other things, as color, shape of bud, habit of growth, can be considered.

There are still other things that must be considered in growing roses in Florida. In what part of the state are they to be grown and what is the objective? Our state is of vast extent, north and south, east and west. In consequence the climate is not uniform. It is warmer in the southern portions in winter than in the north and west. Roses may be grown and flowered out-of-doors all winter long in southern Florida or in favored spots elsewhere. Seldom do they bloom throughout the winter in northern and northwestern Florida. Only a very few times have I known it to happen in the last thirty-five years.

Because of these differences in climatic conditions, two entirely different systems of rose growing have come into existence. It is fortunate that many varieties of roses begin to bloom within a few weeks after they are planted. Consequently in southern Florida, in addition to making gardens with dependable varieties, many other roses can be planted in autumn on heavily fertilized ground and treated as roses are in northern greenhouses. Fine flowers are produced. The plants cost little and in spring the planting is abandoned and a new one made the following autumn. By this method the so-called greenhouse varieties, for the most part not adapted to all-the-year-round conditions, may be grown. The plan is adapted to the growing of fine cut flowers, but only by the stretch of some imagination can this be called rose gardening.

In the colder sections, a different situation is presented. Roses planted out-of-doors in autumn or winter do not bloom until spring and if there are to be roses from them in autumn, the other good flowering season, they must be of such constitution as to pass through the summer in good condition. Right here is where many varieties fail, among them a great many of the newer sorts, par-

ticularly those carrying pernetiana (per-nee-she-ana) strain as a part of their makeup. On the other hand, there are many fine enduring sorts that grow on in gardens year after year. They represent the rose groups best adapted for use in rose gardening in this state.

Again, there are differences in soil conditions that must be considered. One set is represented by the flatwoods of northeastern Florida, another by the rolling clay or clay underlain soils of western Florida, a third by the sandy ridges that run down through the state and form a part of its so-called backbone, and a fourth by the rocky lands found in parts of the extreme south. Roses of certain sorts can be grown in some of these areas and the same ones perchance not in others.

Enough has been said to make plain the fact that Florida conditions for rose growing are not uniform for the state. There are distinct climatic and soil areas that present different problems. It is true that soils can be made and drainage in some measure will take care of surplus water, but we can't do much about changing climate (rainfall, temperature and length of day), and our course in rose-growing lies along the line of using varieties that will grow in spite of it or because of it, whichever way you like to state it.

Then back to the catalogue again. It will be noted that following the varieties certain letters have been placed: T. for tea roses, H. T. for hybrid tea varieties, H. P. for hybrid perpetuals, Nois. for noisettes, and so on. These letters indicate definite groups of roses of known origin. They are at the same time an indication of how they are likely to behave in a given location. The roses important for us are to be found, for the most part, among the Teas and Hybrid Teas, both bushes and climbers. To these may be added Bengals, Noisettes and a few others. In recent years a new strain has been bred into our rose varieties, designated by the name Pernetiana. One of the regrettable mistakes that has happened is to call these Hybrid Teas. True, from the standpoint of their breeding, they may be rightly so designated, but because they are distinctly different in their behavior from the old types of hybrid teas, they should not be so listed. Better to call them Pernetiana or Hybrid Pernetiana roses. Ville de Paris, Los Angeles, Miss Lolita Armour and Talisman, for instance, belong here. The only satisfactory results likely to be had from these sorts is in growing them as winter roses.

There are other sources from which information on rose varieties can be secured, but one more only can be mentioned. In nearly every community there are individuals who have tested and grown many sorts. Rose growers are easy to approach and always willing to help others. Consult them, see what they are growing, find out what kinds are most dependable -- then go back to your own garden and plant those varieties. Having made such a planting, add to it a few that are new and untried sorts. You will add a new interest to your rose ventures and increase your rose knowledge.

So far, I have dealt with fundamentals only that we may have a better understanding of some of our rose problems, our failures and successes. Now for a few remarks on each of several varieties that are most dependable, remembering that new sorts are on trial that a much larger number may be grown far south under conditions approximating those of greenhouses.

If I were to make a rose garden in Florida, with space enough at my disposal, these varieties, considering the fundamentals already mentioned, would be my choice:

ANTOINE RIVOIRE, H. T., has a creamy white flower, rose-pink tinted toward the center; very double. A vigorous grower with clean foliage, a moderate producer. It ranks as a good garden variety and the flowers are fine.

DUCHESSE DE BRABANT, T., a very old rose, dating from 1857, with soft, rosy-pink flowers. Vigorous in growth, free in flowering, resistant to black spot. This was President Theodore Roosevelt's favorite rose.

ETOILE DE HOLLANDE, H. T., originated in 1919, is one of the newer roses. A good grower, with clean, deep green leathery foliage, color a dark velvety rose-red, the center lighter. Very fragrant. A good rose.

FRANCIS SCOTT KEY, H. T., a hybrid of Radiance, with large, rounded crimson-red flowers, is often a satisfactory variety in Florida. It is a vigorous grower with good foliage.

FRAU KARL DRUSCHKI, H. P., is one of our strongest growers and when its large white buds and open flowers are secured in good condition they are very lovely. However, it is not a particularly free bloomer and in spring the flowers are likely to be injured by thrips.

FREIHERR VON MARSCHALL, T. The flowers of this rose are a dark, carmine-red, and the young shoots in their coloring almost match the rose. It is a vigorous grower, but it cannot be called a free flowering variety. However, I have always esteemed it highly and grow it in my garden.

GRUSS AN TEPLITZ, H. T. Few roses are redder than this and none sweeter or more intensely scented. It is a vigorous plant, very resistant to disease; the flowers are dark, velvety scarlet, usually borne in clusters. It is very prone to produce seeds abundantly and the hips should be cut off to prevent weakening the plant. The climbing variety is also good.

KAISERINE AUGUSTE VIKTORIA, H. T. A rose of moderate vigor with long, pointed cream-white buds, of good lasting quality. When the flowers are open they are almost snowy white with a slight lemon tint at the center. The stems are rather weak. It is a moderate grower, but when well fed is usually satisfactory in its behavior.

LOUIS PHILIPPE, Ben. Perhaps there is no more common or widely distributed rose in Florida than this; in fact, it is sometimes called the Florida rose. It has excellent foliage; it never seems to be bothered particularly by black spot. The flowers, often produced in clusters, are double, rounded or somewhat flattened, dark red. It is an excellent garden shrub and dates back to 1834, so it is just a hundred years old this year.

MAMAN COCHET, T. A pink rose with long, pointed buds and large flowers. Pale pink, deeper in the center and light yellow colored toward the base, on good strong stems. The leaves are leathery and dark green. The growth is vigorous but rather open and inclined to branch widely. It does not flower with particular freedom, but the blooms are very fine when secured at their best. There is a white variety known as WHITE MAMAN COCHET, T., which, in all respects, is the counterpart of the pink one except for the coloring of its flowers, which are white, tinted red on the outer petals and pale lemon yellow toward the center.

MME. LAMBARD, T. This is another of the old-time roses, strong growing and free from most rose diseases. The flowers are pink, rosy salmon at the center. It is very double and blooms freely.

MARIE VAN HOUTTE, T. Than this there is probably no finer rose in its coloring. It dates back to 1871. I have seen bushes that at twelve years of age were eight feet high and eight feet across, and so free from disease was the foliage that not a single bit of black spot was in evidence. The flowers are pale yellow, large and very double, flushed with carmine-pink along the edges and likely to show more pink coloring in cool weather. It is a very satisfactory bloomer and a rose that can be recommended unreservedly.

MINNIE FRANCIS, T. In habit of growth this rose somewhat resembles Mme. Lambard, but in petal style it is quite different. The petals are more open and a beautiful shade of pink. The foliage is healthy and the bush is a strong grower.

RADIANCE, H. T. Some people have said we have too many Radiance roses and yet it continues to be one of the roses that people plant because it is easily grown and those who have difficulty in handling others under our conditions find it very satisfactory. Probably as long as roses are grown in Florida, Radiance roses will be grown. It is vigorous, produces its flowers on good, strong stems, and has most of the merits that a good rose for our conditions should have. It is fragrant, pink, light on the inner surface of the petals, deeper on the outside, a continuous bloomer during the growing season and regardless of the opinion of some people who speak disparagingly of its merits and its commonness, I would recommend it for any and every garden. Its counterpart is

RED RADIANCE, H. T. The same style of bush, the same style of flower, but different in color. It is a clear shade of cherry-red, fine, vigorous and dependable.

SAFRANO, T. The buds of this rose are unsurpassed. When the flowers open they are only partly double, salmon in color, the bush is vigorous and under any sort of decent conditions long-lived. An old and very dependable variety, it was originated in 1839.

In addition to these, I would recommend OPHELIA and SUNBURST and MARY COUNTESS OF ILCHESTER for further trial.

CLIMBING ROSES

ANEMONE: is a pink Cherokee, not nearly so vigorous in its growth as the white form, producing its lovely, single, pink flowers during the spring months. Closely related to it and much like it is RAMONA, darker in color, so that it is sometimes called the Red Cherokee. And then there is the CHEROKEE ROSE itself, that came to us from western China but has become so much at home that it is often regarded as a native American plant. The white form is a rampant grower and it needs a lot of space where it can climb high into the tops of trees or over buildings, but it is well worth having wherever there is enough space. SILVER MOON is a Cherokee hybrid, glistening white, with more petals than Cherokee. It is a very strong grower that apparently has given a good account of itself in northern and western Florida. The MACARTNEY ROSE resembles Cherokee in its pure white, single flowers, but it is a different species

(Rosa bracteata)and the foliage is totally unlike that of the Cherokee. It is naturalized in different parts of the state and forms dense clumps from the many shoots that come up from the ground.

BANKSIA. The two Banksia roses, alba (white) and lutea (yellow), are both well worth growing. The flowers are small and clustered. Perhaps there are no finer climbers than these two.

BELLE PORTUGUOISE. A strong, rampant growing rose that must have plenty of space. It was probably first introduced into this state and grown in St. Augustine, where it is highly esteemed. The buds are long and pointed, the flowers are very large, sometimes as much as six inches across, partly double, flesh pink in color. The foliage is dark green and glossy.

CLIMBING PERLE DES JARDINS, Cl. This is one of the best of the yellow roses. A climbing sport from the bush form of the same name. I think on the whole it is more satisfactory than MARECHAL NIEL. I have never had any success with the bush form of this name, but the climbing variety is a most satisfactory rose.

CLIMBING PINK MAMAN COCHET, Cl. T. A counterpart of the bush of the same name, but a strong, vigorous climbing rose.

CLIMBING ROSE MARIE, H. T., is a rose-pink flowered variety with good foliage, vigorous and free-flowering.

DEVONIENSIS, Cl. T. A very old rose (1841), white tinged with blush. Very vigorous, often called the "Magnolia Rose."

DR. W. VAN FLEET, H. W., is a strong growing climber with pale pink or almost white buds. There are fine plants of this in northern Florida, perhaps elsewhere.

FORTUNE'S YELLOW: For exquisite coloring in shades of yellow, gold and bronz, no rose surpasses this. It is a moderate climber with good foliage; the flowers are produced abundantly along the twigs. However, it is only in bloom for about a month in spring, but because of its dainty coloring and the beauty of its half-double flowers it merits a place in any rose garden.

PAUL'S SCARLET CLIMBER is a good climbing rose with deep, dark, rich scarlet flowers. It is a moderate grower.

REINE MARIE HENRIETTE, Cl. H. T. A vigorous growing, free blooming, climbing rose, with cherry-red flowers. When given proper care and attention it makes a magnificent plant. It is inclined to lose its leaves at the base so that the branches or stems are bare, and this is its main drawback.

REVE D'OR, Cl. T. This rose holds its foliage well down to the base of the plant, deep green, vigorous and strong growing. The flowers are almost the counterpart of those of Safrano, buff yellow or salmon in color.

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Ornamental Gardening in Florida
Radio Series

Talk No. 21
January 31, 1934

SPRAYING FOR FLOWER GARDEN INSECTS

A. N. Tissot, Associate Entomologist,
Florida Experiment Station

Everyone has heard the expression, "Every rose has its thorn," but only those who have grown a flower garden know how true it is that every flower also has its insects, -- whole swarms of insects!

During recent years a great deal of attention has been given to home beautification and the growing of all kinds of flowers. With the increase of these flowering plants there has come a corresponding increase in the number of insect problems. Perhaps nothing detracts more from the beauty of a plant or group of plants than to have the leaves or flowers ragged and half-eaten by caterpillars or grasshoppers, or to have the leaves yellowed and curled from the feeding of aphids or other sucking insects.

Most of this damage can be prevented by the intelligent use of the proper insecticides. With a dozen or so of the standard proven insecticides to choose from, one can control almost any of the insect pests that are likely to occur in a flower garden.

For convenience we may divide all flower garden insects into two large groups according to their method of feeding. The members of the group which we call the biting insects have well-developed jaws which enable them to bite off and eat portions of plants. Those of the other group which we call the sucking insects have an entirely different method of feeding. These insects have a sharp tube-like structure which they thrust into the leaves or other parts of plants and through which they suck up the plant sap which serves as their food. It is very important that we know to which group an insect pest belongs because upon this fact will largely depend the method of control that must be used.

The insecticides which may be used in the flower garden fall into two groups: the poisons or internal insecticides and the contacts or external insecticides. In general the poisons are used for controlling insects of the biting type while the contact insecticides are used against the sucking insects.

The manner in which one applies an insecticide will be determined largely by the nature and habits of the insects which one wishes to control and by the available equipment for applying the control. For example, if one is troubled by caterpillars which bite through and eat the entire thickness of leaves, all that is necessary for good control of the caterpillars is to cover the upper surface of the leaves thinly and evenly with a poisonous material. This method of applying the poison would, however, have little or no value if

the caterpillars merely skeletonized the leaves by eating away the lower surface and leaving the upper surface untouched. In a case of this kind it would be necessary to apply the poison in such a way that the lower surface of the leaves would be coated. Suppose that we have a rose bush infested with aphids. These are sucking insects which feed upon the sap of the plant. This sap is obtained from inside the plant, being sucked up through a fine tube-like structure which is thrust into the tissues of the plant. It is impossible for such an insect to take up and swallow a material which covers the surface of the plant. Here we must use material that will cause the death of the insect when it comes in contact with its body.

The most satisfactory and widely used of the poison insecticides is arsenate of lead. This is sold in the form of a thick paste or as a white powder that somewhat resembles flour. The powder form is generally considered more desirable and is the form usually carried in stock by insecticide dealers. Arsenate of lead may be mixed with water and used as a liquid spray or it may be used in the form of a dust. When used in water the usual dosage is one ounce of the powder to three gallons of water. To prevent burning of the plants one ounce of hydrated lime should be added to each gallon of the spray solution. Arsenate of lead can also be combined with some inert powder such as hydrated lime, fullers earth, talc, or low grade flour and used as a dust. The proportion which has proven most generally satisfactory is one part of the lead arsenate powder to six or eight parts of the lime or other dilutent. These proportions are by weight and not by measure as different brands of lead arsenate may vary greatly in texture, some being light and fluffy while others are much heavier and more compact. Those who object to the white residue left on the plants by these sprays and dusts can obtain a green arsenate of lead that is fully as effective as an insecticide and whose residue is scarcely noticeable on the foliage.

The fluorides and fluosilicates form another group of insecticides which can be used for the control of biting insects. These also leave a white residue on the treated plants and they have few advantages over arsenate of lead but can be used as a substitute for the latter if it cannot readily be obtained.

The gardener has a large array of different brands from which to choose when he buys a contact insecticide for use against sucking insects. The majority of the satisfactory contact insecticides are plant derivatives, the active killing agents being extracts or compounds made from certain kinds of plants. One of the oldest of the contact insecticides and one which still is used very extensively is nicotine. All tobacco contains nicotine in a greater or lesser amount and finely ground tobacco is sometimes used as a contact insecticide. In a few special cases it may prove effective, but in most cases the nicotine is given off so slowly that the insects will not be killed. It is usually more desirable to employ one of the commercial nicotine preparations. Nicotine sulfate is the form which is most generally available but there also is on the market a solution of pure nicotine. The most common brand of nicotine sulfate and one which can be obtained most anywhere is known as"Black Leaf 40." This is a black liquid which as the name implies contains forty percent of nicotine. Nicotine sulfate can be mixed with water and used as a liquid spray or it may be combined with a powder of some sort and applied as a dust. For use against aphids and some other soft-bodied insects nicotine sulfate is used at the rate of one and one-half teaspoonful to one gallon of water. For more resistant insects more of the nicotine must be used. When nicotine sulfate is used alone in water, the spray tends to collect in large drops and runs off the

plants. To counteract this tendency a small amount of soap or other spreader is usually added to the spray solution. These substances cause the spray to spread evenly in a thin film over the surface of the plants and the bodies of the insects.

Another group of contact insecticides is composed of extracts or compounds of pyrethrum and of certain leguminous plants. Pyrethrum powder has long been used as a household insecticide sold under the name of Persian or Dalmatian insect powder. This powder is not so satisfactory for outdoor use against insects on plants but some of the prepared pyrethrum sprays have proven very effective for this purpose. There are a number of different insecticides containing preparations of rotenone. Rotenone is the active insect killing agent in the plants known as derris and cubé. The pyrethrum and rotenone sprays are effective against the same type of insects that are controlled with nicotine and they have a certain advantage over nicotine in that they will also kill some of the larger and more resistant insects that cannot be controlled with nicotine. Some of the easily procured pyrethrum sprays are: "Evergreen," "Red Arrow," "Kaloil," and "Agripax." Rotenone is the active agent in the sprays "Derrisol" and "Cubor." An insecticide called "Florote" contains both pyrethrum and rotenone.

There is another group of contact insecticides which may be mentioned though their use in the flower garden will be rather limited. These are the oil emulsion sprays. They are useful mainly as a control for white flies and scale insects which sometimes attack roses and other woody ornamental plants.

Whether one shall put on a liquid spray or a dust will depend upon the available equipment and to some extent on weather conditions. A dust treatment can be applied more quickly than can a spray. On the other hand plants can be dusted only when the air is perfectly still while sprays can be put on even though there be considerable breeze blowing. To properly apply the liquid sprays one must have a sprayer of some sort. If one has only a few plants it may be possible to get along with a small sprayer or atomizer such as is commonly used for applying fly and mosquito sprays. If one has a fair-sized garden it will perhaps be advisable to get a compressed air or knapsack sprayer having a capacity of two or three gallons. The better sprayers of this type having a copper tank will last longer, but the less expensive ones with a galvanized iron tank will apply the insecticide just as effectively and will last for a number of years if carefully washed and dried after using.

There are two common types of small hand dusters which are suitable for use in the flower garden. In one type the dust is blown out and distributed by a bellows arrangement while the other type operates somewhat like a tire pump. With such a duster the dry insecticide can be applied thinly and evenly and it can be blown in any direction so that the undersides of the leaves can be protected as well as the upper. If one has neither a sprayer nor a duster dry insecticides can be applied by placing the material in a cloth bag and shaking this above the plants. One objection to this method is that the powder is applied very unevenly so that some parts of the plants will have entirely too much while other portions will be wholly unprotected. Then, too, this method allows the insecticide to be applied to only the upper surface of the leaves and is practically useless against insects that feed only on the lower surface of the leaves.

There are a great many different kinds of insects that may and frequently do become troublesome in the flower garden, and no attempt will be made to enumerate all of them. It may, however, be well to mention some of the more common pests and briefly consider the easiest methods of controlling them.

The caterpillars which are the young or larvae of the moths and butterflies constitute one of the important groups of the biting insects. In general they can be controlled by covering the plants with a spray or dust of arsenate of lead. The younger stages of many of the caterpillars can also be controlled effectively by the use of one of the pyrethrum or rotenone sprays.

Some of the beetles, notably the flea beetles, sometimes become injurious in flower gardens. The treatment prescribed for the caterpillars will also prove effective against most of these.

Cutworms, mole crickets, and grasshoppers cannot successfully be controlled with either sprays or dusts. The best method of dealing with these pests is to feed them a poisoned bait. A very satisfactory bait is made by thoroughly mixing four ounces of paris green with six pounds of bran. This mixture is next moistened with water to which has been added a little syrup and the juice and grated rind of an orange or lemon. This bait is best applied late in the evening and may be sown broadcast where the pests are found or it may be scattered thinly along the rows of plants.

The aphids or plant lice make up a group of the sucking insects that is often troublesome in flower gardens, almost all kinds of plants being subject to attack. Aphids multiply very rapidly and the main requisite for successful control is that the treatment be applied at their first appearance before the infestation becomes too general. Leafhoppers, plant bugs and fleahoppers are other sucking insects that may attack our garden flowers. Thrips form still another group of the sucking insects. They are very small, yellow, brown, or black insects that are commonly found in flowers but which occasionally injure other parts of plants. Their small size enables them to go into the depths of flowers where they are protected and it is difficult to reach them with a spray material. The various sucking insects are controlled by the use of nicotine sulfate spray or dust or with one of the pyrethrum or rotenone sprays. Some of these insects are more resistant than others and a stronger spray must be used to kill them. The manufacturers of insecticides give directions for mixing their sprays for use against different kinds of insects and these should be followed for the particular insects in question.

The essential elements in the control of insect pests of the flower garden can be summed up in one sentence. Keep a close watch of the plants and detect the first appearance of the pest, determine if it is a biting or sucking insect and on what part of the plant it is feeding and, having learned these facts, apply a suitable insecticide.

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Ornamental Gardening in Florida
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Talk No. 22
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DISEASES OF THE FLOWER GARDEN

By George F. Weber, Plant Pathologist
Florida Agricultural Experiment Station

"Oh, Daddy, can you come out in the garden? There is something real important about the flowers," thus shouted ten-year-old Joan shortly after returning from Sunday School.

Doctor Allen, a distinguished physician, slowly laid down his widespread paper and moved from the upholstered chair to the garden.

"See," said Joan, "the lilies are all dying and do you remember what you told me yesterday about them? You said, 'Consider the lilies of the field, they toil not, neither do they spin and yet I say unto you that even Solomon in all his glory was not arrayed like one of these.' I didn't understand all about it but these sick ones don't look that way."

"Well, my child, it looks as though some of our lily plants are sick."

"Daddy, can you 'tend to them and get them well?" asked Joan.

"I'm afraid not, but you know we have some plant doctors in Gainesville. Suppose we send some of the sick plants to them and find out the trouble."

As Dr. Allen sought a trowel, little Joan hurried to join some playmates in a neighbor's yard. As the lilies were being dug, many thoughts were going through the active brain of Dr. Allen. He knew that the flowers, leaves, stem, and roots were necessary for accurate diagnosis. And, when sending these, thought he, why not send along a few of the mildewed zinnia leaves? He shook the dirt from the lily roots and wrapped them in paper. "I'll also send some Ageratum leaves that are yellowing and show yellow spots, and these petunia flowers that are stunted and mottled." After half an hour, a number of diseased plants, spotted leaves and malformed flowers were carefully packed for shipment to the Plant Pathologist at Gainesville. Though mute, Dr. Allen's mind was functioning as follows as he leisurely surveyed his flower garden and perennial plantings: "Flowers, of all created things, are the most innocently simple, the most superbly complex playthings for children, soothers of human sorrow, ornaments of the feast and companions of the corpse, beloved by the idiot and studied by the thinking scientist. Yet when they get some disease, it's a different story."

The specimens and letter were duly received at the Experiment Station, along with others from various parts of Florida. The plant pathologist worked over the morning's mail; he examined the specimens, with and without the aid

of leaves, mounted the parasitic organism to found in the diseased areas under the microscope, plated out several of them to grow a day or two under observation, consulted his co-workers and some technical books dealing with plant parasites and the diseases they cause. Gardening, you know, is one pursuit of human endeavor in which both sexes and all degrees of education and refinement unite. No one is too polished to see the beauty of flowers, nor too rough to be capable of enjoying them. It attracts and delights all. It seems to be a common field where every degree of taste and refinement may unite and find opportunities for their gratification.

A day or two later, Dr. Allen received the following reply to his letter:

"Dear Mr. Allen: Your letter and specimens have been received and I shall here attempt to give you definite information concerning the questions asked and a diagnosis of the troubles on the specimens you sent in.

"Your question asking what mosaic is, is well demonstrated by the easter lily and petunia specimens which you sent in to us. They have the disease, and all plants in your garden showing these symptoms should be carefully removed and destroyed because the disease is contagious and will spread to healthy plants. Mosaic is the name applied to this disease of plants the symptoms of which are green and yellow mottled, stunted, malformed leaves. The entire plants are usually stunted, causing the plant to appear more rosetted than healthy. No parasite has been found responsible for the disease, but there is something contained in the sap of mosaic plants that causes the disease in healthy plants, when sap from a diseased plant is transferred to a healthy one. This 'something' is known in plant science as a virus and mosaic is often referred to as a 'virus disease.' Sucking insects such as aphids, jassids, etc., are probably more responsible for its spread than anything else and it can be quite well controlled by controlling them. Fungicides are of no value in its control and mosaic plants should be removed because they cannot be cured. Press Bulletins from the Experiment Station dealing with this trouble will give you further details.

"The leaf spots of marigold and phlox are caused by certain parasitic fungi. The one on marigolds is not commonly found, while the one on phlox is found annually. Both are severe, however, and can be satisfactorily controlled by a liquid 4-4-50 Bordeaux spray or by dusting with 20-80 copper-lime dust. These fungicides should be applied often enough to keep all new growth covered and protected.

"The zinnia leaves showing the white powdery substance on the surface have a disease known as powdery mildew and those with the scattered small angular spots with dark reddish-brown to purple borders have a leafspot disease caused by another fungus. The powdery mildew can be controlled by dusting the plants with finely ground sulphur applied when the plants are wet with dew. Applications should be made often enough to keep the mildew checked. The leafspot is controlled by applying bordeaux or copper-lime dust, the spray when the plants are dry and the dust when they are wet. If both diseases appear on the plants at the same time a single liquid spray of lime-sulphur is probably most effective. Don't try to combine bordeaux and sulphur; they will not mix well.

"The ageratum leaves showing small circular yellow spots with brown centers, have a disease known as rust. This is a true rust caused by a specific fungus and has no relationship to the term 'rust' erroneously applied to various diseases such as mildew, anthracnose and blights. The spotted ageratum

leaves should be picked off and buried if only a few plants are infected. If the infection is general, cut back all plants to three-inch stubs, remove the leaves on the stubs and then dust heavily the surrounding soil surface, after the tops are removed and destroyed, with fine sulphur.

"The rose leaves show black spot and I might add that finely ground sulphur is the best fungicide to apply to control this disease which is so common everywhere. The sulphur should be fine enough to go through a 300 mesh sieve. The lilies, African daisy and coreopsis plants are being killed by the common, soil inhabiting fungus, Sclerotium rolfsii. The fungus is common and destructive and nothing can prevent a plant dying that shows the wilt symptom of the disease. You should carefully remove these plants and the soil immediately surrounding them with a shovel; be careful not to scatter the small, brown, round sclerotia that appear in numbers around the base of the stem, because they propagate the fungus that causes this disease.

"As to hollyhocks, they do not do well in this part of Florida because soil fungi attack them during their resting period -- you know, these plants are biennials -- and kill them or weaken them so that they do not do well the second year. Many other biennials and perennials are affected in this same way.

"Many garden diseases are carried over in the soil. To control them the soil should be sterilized. This is best accomplished by using a formaldehyde solution prepared by diluting one gallon of commercial formaldehyde in fifty gallons of water. After being thoroughly mixed, the solution is ready for application for which use a garden sprinkling can is very handy. The soil to be treated should be loosened and the formaldehyde solution applied at the rate of one-half gallon per square foot of soil surface. Apply slowly so the solution will not run off, and immediately cover for twenty-four hours the wet soil with tarpaulins, canvas or burlap, previously submerged in the solution. This prevents rapid evaporation of the formaldehyde from the soil and insures better disinfection. After ten days the soil is ready to plant. Be careful not to reinfect the soil with tools or by walking across it when planting. This treatment will not control nematodes or kill numerous weed seed that may be present.

"Washed sand and potting soil can be easily disinfected by baking in an oven as one would cook a five-pound roast. Be sure the soil is thoroughly wet when baked. Small flower pots containing soil can be disinfected by submerging in boiling water for ten minutes. There are other methods of sterilizing soil not so easily applied and more expensive, but I will not go into that now but suggest that if you are interested further I would be glad to hear from you again.

"Thus, often diseases are carried on the seed. Flower seed should be disinfected before planting. Some of the larger seed such as sunflowers, four o'clocks and castor beans can be easily handled, but petunia, poppy and alyssum seed are usually so few and so small that they are almost imperceptible. In regard to all flower seed, I would suggest a dust treatment with Semesan. To dust the seed purchased in the common five or ten cent packets of seed, tear off a corner of the packet, insert a pinch of dust, bend over the torn corner to seal it temporarily and shake it vigorously for a minute. Larger amounts of seed can be treated in the same way by using pint or quart fruit jars as containers.

"For the same reason, narcissus bulbs should be soaked two hours in a double strength Semesan solution and gladioli corms should be soaked seven hours in double strength solution before planting. It would also be advisable to dust bulbs and corms at digging time as soon as they are dry before placing them in storage to reduce the decay in storage and insure good clean stock for fall planting.

"The dying of seedlings soon after they emerge from the soil is generally spoken of as 'dampoff.' This disease is caused by any of several soil-inhabiting, parasitic fungous organisms common in almost all Florida soils. The disease is encountered annually by all gardeners. These fungi attack the young tender seedlings at the soil line. The cells in this area are killed and collapse, the stem is weakened and the seedling falls over and dies. This trouble can be checked by applying a normal liquid solution of Semesan so that the top half inch of soil in the seed bed is wet; this will require about a quart of solution to ten square feet of soil surface. This treatment should check the disease in thirty-six hours. It can be repeated after 48 hours if necessary. The application of this solution will not harm the seedlings.

"One other caution: In watering flower gardens it would be more desirable to apply water in the early morning than in the evening and also to water more thoroughly and not so often.

"I have attempted to give you the information you asked for and also to diagnose the diseases you sent to us. Possibly some additional questions will arise after reading this letter, in which case I would be glad to attempt their answer at any time you care to inquire.

"Respectfully yours,

"Plant Pathologist."

Dr. Allen read the letter with considerable interest and set about to put into action the recommendations he received. He went back and forth from garden to tool shed apparently very busy, and as he busied himself with the tasks he could have written the following lines if he cared to register his thoughts:

"To raise your garden flowers various arts combine,
Learn them well in practice so no plants decline.
Conceive plant constitutions whether weak or strong,
And put them in that element where such groups belong.
As a guardian soldier dull the insect's knives.
Be their good physician, carefully guard their lives.
Give them space and sunshine to swing and sway and blow;
Act as dietician so that they live and grow."

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Ornamental Gardening in Florida
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Talk No. 23
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Pruning Trees and Shrubs or Butchering Them - Which?

Chas. E. Abbott, professor of horticulture
University of Florida College of Agriculture

Pruning is the process of cutting off excess or undesirable living, dying or dead branches, twigs, roots or other plant parts to benefit the parts that remain.

The practice of pruning is as old as human history. It is referred to specifically in Leviticus (XXV, 3, 4) where the Children of Israel are told to prune their vineyards and gather the fruit during six years, but in the seventh year to let the vines go unpruned. In five other passages in the Old Testament figurative reference is also made to pruning and pruning hooks. In spite of the ancient origin of the practice and the efforts of many investigators during the intervening centuries, we have by no means reached the limits of knowledge, but can claim to have discovered and demonstrated only a few important principles and useful practices. These are, however, understood by comparatively few of the people who grow plants, and even by many of the self-styled "pruning experts", as evidenced by the ill effects observed in numerous fruit and shade trees.

Proper pruning demands knowledge of plant physiology. Unless the person doing the pruning has at least a working knowledge of how plants grow he will be unable to prune intelligently to procure desired results. On the contrary he may, and probably will, do far more immediate or ultimate harm than good. Simply to top off limbs with an axe, or improperly to remove others with a saw is not pruning but usually a type of tree butchery or vivisection; for the tree is almost sure to suffer and sooner or later die from the effects. Again, without having a definite, desired end, and intelligently working within the scope of the underlying physiological principles the specimen treated may develop nothing but disease, decay, death and disappointment.

With every kind of fruit, even with the ornamental plants, such as flowering shrubs, there are various systems and ideals of pruning and training. These, so far as the woody fruit and hedge plants are concerned, differ mainly in the form which it is designed to give the plant and in the management of the annual growths. Some differences are due to variations among the varieties or species, others to the aims sought, still others to environmental conditions or the fashion of the locality, and many are merely a matter of the grower's whim or caprice.

In no branch of plant culture is it more important for the cultivator to have a clear mental picture or ideal for which to strive than in pruning.

Plants, both fruit and ornamentals, are so open to accidents of cultivation, storm, disease and insect attacks, that it is often impossible to secure, much less maintain, an absolutely ideal specimen, yet the ideal plant must be held tenaciously in the pruner's mind or his mechanical skill will count for naught and the plants he prunes will necessarily be uneven in form, appearance, development and prolificacy. With a clear ideal constantly held while at work the pruner may approach even approximate realization of his desires, and will be able to counteract undesirable tendencies and to direct the energies of the plant in the right direction. With no plants is this more important than with young ones.

Common practice demands a little pruning with transplanting operations but it is difficult to make any hard and fast rules which should be followed. The plants vary so much in their habit of growth that of necessity practices suitable to one plant may be detrimental to another. However, there should be in every case some relation between the length of the roots and the size, height and diameter of the top, when trees or plants are transplanted. The roots ordinarily left on small plants will be short, while on larger plants the roots will be longer. In almost every case the largest and by far the most important part of the root system is left in the ground. Even if it were possible to take up the entire root system with the plant or tree, its close contact with the soil would be destroyed and is not reestablished except as new roots grow.

Some plants, such as arborvitae and azaleas, have finely branched root systems, while others, as the pecan, persimmon and crape-myrtle have very poor root systems. Yet such plants as persimmon and crape-myrtle can be transplanted as easily as can citrus or any of the other plants with much branched root systems, if the job is done at the proper time.

The tops of most woody plants should be pruned back to establish an equilibrium between the functions of the top and roots. This is necessary that the amount of water lost by transpiration from the top will not exceed the amount of water absorbed by the greatly reduced root system. If this is done the chances for success are much greater than if the top is large in proportion to the roots.

In pruning the tops of plants and trees every precaution should be taken to prevent injury to the parts that remain. Many cases of decay and permanent injury to trees can be traced to improper pruning. One of the most common mistakes is leaving stubs of branches when they are cut off. In removing a branch the final cut should be made as close to the trunk or branch as possible and in such position that the face of the wound will be parallel to the general flow of the sap on the part from which the branch was cut. A stub left while pruning is like a blind alley, the sap cannot circulate through it and the living tissue soon dies. Too frequently limbs are broken off by storms and the resulting stubs are as much of a menace as those that man may leave.

A sharp knife is often desirable for pruning small trees and shrubs and should always be in reach. Pruning shears are less desirable for small plants because too frequently they bruise the bark. Most of the injury can be avoided if the sharpened, movable shear is held next to the tree stem. A variety of pruning saws are available. For small branches and limbs a 20-inch curved pruning saw is satisfactory. Two-edged pruning saws should not be used because the extra edge frequently damages nearby limbs.

Small branches should be removed with two cuts. First make an undercut until the saw binds, then cut down with the saw directly above the undercut and proceed until the two cuts meet or until the limb breaks off. All cuts should be clean and smooth so that no splinters or tears remain in the bark.

Large limbs usually have to be removed with at least three separate cuts to prevent the edge from splitting and to keep the bark from tearing. First remove the bulk of the limb 12 to 18 inches beyond the first cut, in the manner described for small limbs. Usually it is easier to make an undercut until the saw pinches and then proceed with a cut from above, a few inches ahead of the undercut. The weight of the branch will break it off but the undercut will prevent the bark from tearing down. Next take off the stub, which can be done easily with the heavy limb gone. The cut should be flush with the trunk even though the scar will be fairly large.

All wounds of an inch or more in diameter should be painted over with white lead paint or some other good tree wound dressing. Neglect of this precaution may lead ultimately to the loss of a tree. Decay may set in at the site of the open wound and travel downward into the center of the trunk.

The time of pruning varies with different species but as a general rule the work should be done while the tree is dormant. Deciduous trees may be pruned late in their dormant season, and evergreens at any time except when actively growing.

Trees and shrubs that form their flower buds during summer and fall previous to the time when the blossoms open, such as azaleas and spireas, should be pruned, as a general rule, immediately after the plants have finished flowering.

Those plants that produce their flowers on shoots of current season's growth, such as abelia, hibiscus and roses should be pruned during the dormant season so as to avoid interfering with the production of flowers.

Nature is not at all concerned with the production of large, well-shaped flowers (such as roses) that gardeners like. Her only aim is to produce seeds, the more the better. Consequently an unpruned rose bush is likely to produce a great quantity of relatively small flowers of no particular shape and value for garden purposes.

The purpose of pruning roses is two fold; to conserve the energies of the plant by directing its vitality into those branches which can best use it, and still further to concentrate it into the proper number of flowers that the plant can develop to perfection.

Pruning, consequently, includes two distinct operations, thinning out, which means completely removing dead and undesirable wood which nature would destroy anyway, thus permitting new growth to devote itself to the business of producing flowers; and shortening the remaining shoots to control the number of flowers; so that they may be creditable in form and size.

For pruning bush roses in North Florida the best seasons are early in October and in late February. Farther South, the October pruning may be delayed and the spring pruning advanced. In pruning roses one should first remove all dead

and weak shoots, then cut back the strong shoots, removing one-fourth to one-third of the old wood.

Climbing roses should be pruned less than bush forms, but all dead and weak wood should be removed. This should be done immediately following the heavy blooming of spring.

In conclusion, it should be especially emphasized that the principal effect of pruning on any plant is a modification of the nutritional balance in the plant. The immediate, visible effect of pruning is to stimulate growth close to the cut portions of a few vigorous shoots. This response may be due in part to an increase in the water and nitrogen supply to those portions remaining, for the total number of growing points has been reduced, whereas the absorbing surface has not been diminished. The results of any kind of pruning, especially on young trees, is to retard the development of the entire plant - tops and roots.

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Ornamental Gardening in Florida
Radio Series

Talk No. 24
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Flowering Trees for Florida

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In selecting ornamental trees, we ordinarily consider them for their value as shade or as a background for other ornamentals. In Florida, however, we have a surprising number of trees that are notable for the beauty of their flowers. Some of these are also splendid foliage trees and would gain a place regardless of their blooming habit, whereas, there are many others which are notable only or primarily for their blooms. In the latter group we find many deciduous trees which, if planted in quantity, give too much of a northern atmosphere during the winter months, whereas Florida should be notable for the tropical or subtropical atmosphere of its ornamental plantings. The deciduous flowering trees come into consideration most extensively for northern Florida, where many of them are native and where it is more difficult to maintain winter plantings of a subtropical appearance.

Because many of the deciduous trees are natives, we will discuss them first, together with other flowering trees for northern or central Florida. Two of these are familiar to all--the Redbud, or Judas tree, and the Dogwood. Both of these grow wild in Florida hammocks and, while they are leafless during the winter, they outdo themselves during the spring. The Redbud is one of the first trees to burst into bloom in the spring and its wealth of small pink flowers is produced before the leaves and, when displayed against a background of green, it is very beautiful. The tree is usually small and frequently poorly shaped and should be planted with other trees. The Dogwood is another early spring bloomer which adds beauty to the Florida hammocks and to countless home plantings. When in full bloom the tree is almost a mass of white. The flowers themselves are small and inconspicuous but the display is caused by white bracts or modified leaves surrounding the actual flowers. This condition is not uncommon in plants, the well known Bougainvillea having small flowers while the wealth of color comes from the subtending bracts.

Another native deciduous tree that is a thing of beauty during the spring if the wild crabapple. Under Florida conditions it grows to a height of 25 ft. and can be advantageously used to give a touch of color when it is badly needed in early spring. Other deciduous trees that are notable for their bloom and which are suited to northern Florida are the Catalpa, which flowers in early summer; Aleurites fordi, the tung tree, which bears a profusion of white and pink bloom in the spring; the fringe tree, or Old Man's Beard, a native, which bears in spring a wealth of greenish-white flowers, Vitex Agnus-castus, commonly known as the Chaste or Hemp tree, and Koelreuteria formosana, which flowers in October.

In using any of the deciduous flowering trees, the fact that they are leafless in winter must be borne in mind. They should be planted, if possible, so that they have a green background in winter and particularly during the blooming season, if they bloom before the leaves appear. It is no easy matter to lay out grounds so that such trees will be inconspicuous during their leafless period, but with care in planning this can be done and the colorful results are well worth while.

In addition to those we have already discussed for northern and central Florida, we have a number of others of real value. Some of these are deciduous but only for a short period, while others get a new crop of leaves coincidentally with the loss of the old leaves, so that they are never bare of foliage. The Magnolia, which grows wild through Central and North Florida, is notable for its large white flowers and its glossy foliage. A relative of the Magnolias, the tulip tree, or yellow poplar, is found native along streams and is frequently planted. The Mimosa, Albizzia Julibrissin, is frequently planted in dooryards through North and Central Florida and its fernlike foliage and flowers, with a profusion of long and conspicuous stamens, make it notable in its class. The Loblolly Bay and the Jerusalem Thorn about complete the list of flowering trees for northern Florida.

For the central and southern areas of the state, the choice of flowering trees covers a much wider range of possibilities, and many of the species are notable, not only for their bloom, but also for the beauty of their foliage and their general value as ornamental trees. Relatively few of these are deciduous in the sense that they remain leafless throughout the winter, though many of them are leafless for periods of from one to eight weeks, generally during the spring. This period of leaflessness is usually not sufficient to condemn them for general ornamental usage and they are consequently not sharply distinct from the evergreen trees. Some of these flower during the leafless period and for that reason the flowers stand out even more strikingly than do the flowers of the evergreens.

Many of these flowering trees are very sensitive to cold and, in choosing flowering trees for central or southern Florida, great care should be used to pick those species which will stand the degree of cold that may be expected in the locality where they are planted. Some will be found adapted only to the lower East and West Coasts, where frost seldom occurs, while others are suited to protected locations in Central Florida. Since the number of available species is so large, it is possible to make selections with a particular location in mind and thus avoid any severe cold damage. Most of the species that have already been discussed for North Florida will do well in Central Florida but many of them will not do well in extreme South Florida. Some of the genera already discussed for North Florida include other species which are adapted to southern Florida. Albizzia Julibrissin is grown throughout the north and central area, as previously mentioned, while Albizzia Lebbek, known commonly as the Woman's-Tongue tree, is grown only in south Florida; the tung oil tree Aleurites fordi and A. montana are adapted to northern Florida, while A. moluccana, cordata and trisperma grow satisfactorily in the southern districts, A. moluccana being an evergreen.

The outstanding flowering tree of southern Florida is the Royal Poinciana, tropical in habit, which is grown throughout the lower east and west coasts and in well protected locations in central Florida. Generally a low-spreading tree with fern-like foliage, it carries during the early summer months a

massive cap of brilliant scarlet flowers. The individual flowers are two to three inches across, with rich scarlet petals, except for the upper petal, which is tinged with yellow. These flowers are borne in large racemes and form a scarlet layer overtopping the green of the foliage. The tree grows rapidly and may reach a height of 30 ft. with a spread at least equal to the height and often more. Probably no other flowering tree is as strongly favored for South Florida, and its rapid growth and wide adaptation to soil conditions has made it extremely useful for many types of planting.

Another of the greatly favored flowering trees for Southern Florida is the Jacaranda. Like the Royal Poinciana, it has a fern-like foliage and in the period from April to June bears a profusion of lavender-blue flowers, in long loose panicles. Just prior to the blooming period, the tree is partially or wholly without foliage for a short time. This has been one of the favorite flowering trees of Florida for many years and probably has a slightly wider climatic adaptability than has the Royal Poinciana.

There are many other trees which are used extensively on account of their flowers, though probably they are not as generally known or as extensively used in home plantings as the two mentioned above. The two species of Bauhinia, namely, alba and purpurea, commonly known as orchid trees in Florida, are being more extensively used than in the past, particularly for roadside plantings, and their large flowers are very beautiful during the spring, they bear a marked resemblance to orchids.

Among the species that present a showy and beautiful bloom must be recorded the various species of Cassia that are grown in Florida. Like a number of our other flowering trees, the Cassias belong to the family Leguminosae, the notable representatives of this family being, of course, the Royal Poinciana. The Cassias in Florida are all small trees with finely divided foliage and a profusion of bloom in spring. Cassia fistula has yellow flowers and is frequently called the Golden Shower. C. siamea has pale yellow flowers and C. nodosa has pink flowers, as has C. grandis, while C. Beareana has beautiful yellow flowers. All species need good protection from cold.

Two other species that are notable for their great wealth of bloom are Spathodea campanulata and Stenolobium stans. The former is known commonly as the Fountain tree or Tulip tree. It has large scarlet blossoms which are produced in great profusion in short racemes. The tree is evergreen and may reach a height of 60 to 70 ft. It is a worthy relative of the flame vine, belonging to the same family. Stenolobium stans also belongs to the Bignonia family and is commonly known as Yellow Elder. This species does not make an outstanding tree, being rather shrubby in character. It is notable for its beautiful yellow flowers, borne in the fall. Planted with other ornamentals it gives a pleasing touch of color during the fall season.

In addition to those already mentioned for south Florida, there are a number of others having blooms of beauty or of interest. A number of these do not present the brilliant sort of show that is characteristic of the Royal Poinciana or Jacaranda but the single flowers are of outstanding beauty or of great and interesting peculiarity. Dillenia indica, while little used as yet, is a splendid ornamental both on account of its foliage and its beautiful white flowers which are 6 to 8 inches across. The various species of Plumeria, which commonly are known under the name of Frangipani, produce a wealth of flowers, various species giving flower colors of red, yellow and white, the

flowers appearing for several months in the year. Tabebuia pentaphylla produces a notable amount of long pink flowers in the late winter and spring months. One of the species having a flower of outstanding peculiarity and interest is Couroupita guianensis, known as the cannon ball tree and a relative of the Brazil nut. The flowers are very large and of a peculiar shape and are borne on long woody racemes on the trunk and larger branches. The flowers are reddish-yellow on the outside and crimson within and peculiarly folded. No particular display of bloom is present but the peculiar method of bearing the flowers together with their peculiar shape makes it a very interesting tree. It is not possible to mention all of the valuable species here but this will give an idea as to the extent of the available material.

In placing flowering trees in ornamental plantings, their characteristics should be studied carefully with regard to the location. The list of available material is great, and we have only touched the surface here. To be valuable as a blooming ornamental, the flowers should be showy and should last for a long time. Many trees are beautiful in bloom but the bloom passes too quickly to make them of great value, unless they are outstanding for other reasons. Others, while having marevelous single blooms, do not bloom heavily enough to make an attractive show. Still others, while carrying beautiful blooms, are poorly adapted to specimen planting owing to their irregular shape and must be placed with other plantings. A proper selection of blooming species properly placed will add much to any ornamental planting by giving a succession of colorful blooms to break the green of other shrubbery and trees.

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Ornamental Gardening in Florida
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Talk No. 25
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The Development of Garden Plants

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Many gardeners are now planning to grow flowers in their yards or gardens. On turning the pages of a seed catalog or garden book, they, no doubt, are profoundly impressed with the great variety of plants available. One wonders how and from what source the seedsman has assembled so vast a collection of varieties of different ornamentals. Great numbers of varieties are offered among garden plants. How has this great variation in plant types and forms been developed?

One has only to turn back the pages of memory a few years to realize that many of the plant forms and types we enjoy today were not known or heard of 20, 10, or even five years ago. Seed catalogs undergo annual revisions to keep pace with new developments in plants. Some of the older varieties and types are passing out of use and newer productions are offered in their stead.

Nature herself is constantly making changes in the architecture of her materials and productions. Such changes in nature man calls "sports" or "breaks" or more technically "mutations". Man has preserved many of these changes and used them in bringing into existence newer plant developments. Such changes may occur at different times, and under different conditions, wherever the plant may be found growing. These changes may take place among plants growing in the wild state, but changes among wild plants are more likely to pass unnoticed than changes in plants under cultivation and observation.

Improvements among plants have been brought about, not by any one person, but by a number of workers laboring in different fields. The explorer, the collector, the plant introducer and the plant breeder have all combined their efforts in bringing about the wonderful changes noted among garden plants of today. The collector labors to bring together as many variations as possible of a particular group of plants. The explorer goes out into unexplored and uninvestigated regions and searches for new and different kinds of plants peculiar to those regions. The plant introducer assembles plants from different foreign lands and introduces them into other continents where they have never been tried. It remains for the plant breeder to utilize these variations, wherever they may be found, or from whatever source they may have come. He employs his knowledge of the laws of inheritance, and works to bring forth new types and new combinations of characteristics in a plant which he hopes will be more useful and more desirable to man than those already available.

What are some of these desirable characteristics? This is not an easy question to answer since desirable characteristics for one group of plants may be quite different from those desired in another group. The plant breeder knows that man is ever demanding something better in plants. These demands are often in the

nature of a change in some vegetative form of the plant, a difference in the quality of the fruit or color of the flower, greater producing abilities and ability to withstand the rigors of a different environment, or to survive attacks of disease and insect pests.

As we look around we see varieties that are tall and those that are dwarf. There are those with climbing habits and others with an upright stature and still others that are spreading and have a low habit of growth. There is also form in leaf, in fruit, and flower. Examples of these various forms come immediately to mind when we turn our thoughts to the flowering plants around the average home. Quality is a factor of paramount importance in developing field, truck and horticultural plants. Color of flower will ever be foremost in mind when seeking improvements among garden plants grown for their flowers. The public is ever anxious to procure something new and different in the color scale.

Many garden plants are planted in beds and used for cut flowers. In either case the ability to produce flowers is essential. It is not uncommon for the breeder to find a plant that produces flowers of fine quality, but the flowers are produced in quantities too few for the plant to be of commercial importance.

There is the desire to grow certain types of plants in distant latitudes and at different altitudes; and so extend their limits of culture. In an effort to meet these demands, hardier varieties that will grow under more trying conditions are produced.

Some soils are infested with plant diseases, and the need arises for varieties that show resistance to their attacks. These diseases as well as insect pests hinder the growth of plants. At once a demand is made on the breeder for new varieties and types that may be grown successfully under such conditions. Soil differences exist in other respects - some are acid while others are alkaline in nature, some are rich in plant nutrients while others are poor and much depleted. Through years of developing and testing, the breeder has developed varieties adapted to growing under varied soil conditions.

Seasonal habits must be reckoned with in plant development. There are the annual, biennial, and perennial plants. Among the annuals there are those furnishing flowers early in the season, others blooming late, and some that are good producers practically throughout the growing season. Even within the same variety, in some instances strains have been developed that are early and we have others that are late. Such differences are inherited. They are produced by nature and not by man. Man can only preserve and utilize them in an effort to bring about a new type of plant.

Let us now turn our attention to a few of the common and well-known garden plants and see if we can note any recent changes and developments among them. Take for example the zinnia - the Old Maid of the garden. This is a flower that came originally from Mexico. It was introduced into European gardens, and there named in honor of an European physician, Dr. Zinn. When the zinnia was first introduced, its chief claim for existance was that it was an easily grown annual, enduring under various kinds of hardships and neglect, and that it had a long season of bloom. Originally the flower itself was unkempt and ragged, with colors far from the color standards of today. Many will recall the dingy whites, the greenish yellows and the murky reds. But note the miraculous changes that have come about when one views the range from fiery red to the delicate pastel shades in the zinnia gardens of today.

The zinnia has achieved its greatest advances since about 1920 when a California grower started developing this common garden flower. Not only more and purer colors have been produced, but variations in shape and form and size have been achieved. There is the mammoth dahlia-flowered form which appeared some 20 years ago in the fields of a seed grower. It appeared as just one plant in which the petal arrangement of the old type zinnia had been changed by nature into a more graceful and beautiful combination. This original dahlia-flowered zinnia was red in color. Seeds of it were saved and from this planting a mixture of flowers of several colors, still retaining the dahlia form, were produced. Then followed several years of growing and selection before the dahlia type was fixed in various colors. But look at the zinnia collection of today. It is the pride of many gardens, presenting itself in many attractive forms and gorgeous colors. In addition to the courtly dahlia-forms, there are the dwarfs in their array of splendor, the quilled, the lilliput or pompons, and the richly colored giants, all from the once neglected garden plant - The Old Maid.

What has been accomplished over a relatively brief period for the zinnia, has been realized also for many other annual plants. One need mention only a few. There are the petunias among which we find the single and plain petaled, the fimbriated and fringed, the fluffy ruffles and the giant double fringed with flowers in enormous in size. At the same time the color range has been extended to meet the demands of the most fastidious.

Among the nasturtiums there are both dwarf and climbing types, together with a brilliant color range never before seen in this plant. The sweet-secnted double Golden Gleam is probably the newest accomplishment of nasturtium breeders.

Many new and improved types far superior to the small flowers of the old form have been developed among the marigolds. There are the tall and the dwarf varieties with a scale of colors running through shades of lemon, orange, gold and mahogany brown. The doubles are marked improvements over the old form.

The calendula or Scotch marigold is a flower that is common in Florida during the winter season. Here one finds yellow, orange and primrose colors that are very showy. More recently there has been added to the list of types chrysanthemum-flowered varieties with loose petals and those with long quilled and twisted petals.

Vast improvements have been made among numerous other annual flowering plants, common in Florida gardens. Let us not think, however, that all the developments and accomplishments have been among the annuals. Marvelous changes have been developed among the biennial and the perennial flowering plants as well. To mention a few such as the gladiolus, amaryllis, the canna and the iris and day-lily - plants common in Florida gardens - one recalls the great variation in type and form of plant and color ranges among the flowers and in some instances color ranges in the foliage.

Hybridization or cross-breeding is a method used extensively by plant breeders in developing many garden plants. It consists in the crossing of a plant possessing certain characteristics with another plant. The cross is made in the hope of combining the desired characteristics of each in a single plant.

This has been a fruitful method for the breeder. He has used the hereditary variations or mutations of nature. These variations have been made available through careful observers noting rare and distinct types appearing abruptly among their plants. Many of these variations have been preserved and later used by the plant breeder as foundation stocks for a new variety.

When hybridization is to be undertaken it is essential to understand the structure of the flower. Many plants have both male and female organs in the same flower. Before crossing is attempted it is necessary to remove the male organs of the flower before the pollen is shed. The flower is then protected by a small paper bag until it is receptive to pollen. This prevents contamination from undesirable pollen. When the flower is receptive, pollen is then taken from another plant and placed upon the female flower. If pollination is successful seed will ripen and later produce the hybrid plants. These hybrids are usually very unstable. They must be grown several years and from them the desired type is selected. Further testing is necessary to determine when the type has become fixed and is ready to be offered as a new production.

The wonderful changes and developments among the garden plants of today are the accomplishments of the plant breeders and other plant workers working together to bring about these marvelous improvements. They are not satisfied but are ever on the alert for something better, working for something different, something more useful and more beautiful for man's needs and enjoyment. Let us not be unmindful that for every variety offered by the seedsman and grower, in many instances, years of painstaking time and effort have been spent in developing each new plant to its present state of perfection.

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BAMBOOS, THE TREE GRASSES.

By - Robert A. Young, U.S. Department of Agriculture
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We usually think of trees and grasses as representing plants of opposite extremes in height. There are, however, several distinct groups of the large family of grasses that contain members tall enough to entitle them to be called trees if height alone were considered, but a tree should be woody, have some sort of branches, and be capable of living for a number of years. In the grass family it is only in the group called bamboos that we find plants that fulfill all these conditions.

Not all true bamboos are of tree size or habit of growth. Some of the smallest grow only a few inches high and are really grass-like in appearance. Bamboos vary greatly in size, ranging from pygmies of 6 inches to super-giants of 120 feet in height. The tallest have diameters up to 12 inches.

More than 400 different species of bamboos are known. They are found mostly in the tropics and subtropics but there are hardy kinds that thrive in the milder parts of the temperate zones. Some endure temperatures slightly below zero without serious injury. All of them do best in a reasonably rich and moist but well-drained soil. The valuable ones are not swamp plants and will not thrive in poorly-drained soil. Nearly all bamboos are evergreen, those of the temperate zones gradually replacing their old leaves with new ones in the spring and early summer.

The hardier bamboos are mostly natives of China and Japan, and these include the smallest kinds as well as some that attain heights of 60 to 80 feet. Two are native to the southern United States. These are the canebrake bamboo and the smaller-growing switch-cane. There are no native bamboos in Europe and very few in Africa. Tropical America has many native species, but by far the largest number of bamboos are native to southeastern Asia and the Malay Archipelago.

TYPES OF BAMBOOS.

In habit of growth bamboos are of two general types: clump-forming and running. There are many differing groups within each type but time will not permit detailed mention. In the clump bamboos the culms, or canes, are usually very close together, because the buds which sprout from the base of the plant beneath the surface of the ground almost immediately turn upward to form a new culm. The bamboos of this type grown outside the tropics send up their new culms in midsummer or later. They do not usually extend their branches until spring and so present an odd appearance during the winter.

In the running type of bamboo, on the other hand, there are horizontal underground stems, or rhizomes, which often grow several feet in length in a season and it is from these rhizomes that the vertical culms are sent up, at irregular intervals. Culms arising from one of these horizontal rhizomes may be from a few inches to a number of feet apart. The rhizome usually ceases direct lengthening after one season and sends out numerous side branches, which in turn later send up vertical shoots to form new culms; thus a thicket of culms develops and, finally, a grove, or forest, if the bamboo be of giant type.

All the hardiest bamboos are of the running type and none can be grown in clump formation or other small area without artificially confining the rhizomes or continually destroying undesired shoots. The new culms of this type of bamboo sprout regularly in the spring and so have opportunity to harden somewhat before cold weather. In a warm region, new shoots may continue to appear until mid-autumn. The minimum area in which a running bamboo can be grown to its greatest height depends mainly on what that height is. Roughly, the diameter of such an area must somewhat exceed the height of the bamboo.

The length of time required by any bamboo to produce culms of maximum height, after being started from a small plant, will again depend upon what the ultimate height is and also on the soil conditions and the cultural care given. Under favorable conditions of soil and moisture some of the medium-sized bamboos will produce culms of maximum height in 4 to 7 years, while larger ones require up to 15 years or longer.

Propagation of the clump bamboos is commonly effected by division of the clumps or by the rooting of stem cuttings in warm wet soil. The running bamboos do not root readily from stem cuttings, but most of them are easily propagated from rhizome cuttings taken in late summer or early spring. They are also propagated by small plants with pieces of rhizome attached. Most bamboos flower only at intervals of many years and some of these even then rarely produce seed. For this reason we must in general resort to vegetative propagation.

The seed, or fruit, of bamboos varies in form and size among the different groups of species. In most types it bears a general resemblance to some of our ordinary cereals, such as rye, oats, and wheat. One of the rather large bamboos of India, however, produces a peculiar-looking fruit 4 inches or more long and nearly 3 inches in diameter. Bamboo seed when produced in quantity in the Orient constitutes an important food of the people.

RATE OF GROWTH OF NEW CULMS.

The bamboo culm, whether large or small, has the same diameter when it first comes above the surface of the ground that it does when fully grown. It is a most interesting sight during its growth in height, especially when of large size. The great sheaths which at first envelop the culm usually soon fall off or are pushed off later as the branches develop. In some groups of bamboos, however, these culm sheaths remain attached for some time. The sheaths are characteristic for each species, and by closely observing their markings and external structural features one may rather easily learn to identify many of the better-known bamboo species from the sheaths alone.

The individual culms of the bamboos grown in the United States complete their growth in 4 to 6 weeks from their first appearance above ground. The rate of growth is determined largely by air temperature and soil moisture. The daily increase in height varies directly with the air temperature, and on a very chilly day growth almost ceases. With sufficient moisture and high temperature, culms 3 to 5 inches in diameter have been observed to grow as much as 24 to 36 inches in twenty-four hours.

The hard, relatively durable wood of the timber bamboos does not become fully mature until the end of the third season of the life of the culm, but the culm does not increase in any of its dimensions or change its general appearance except for a gradual fading of the original color. While the wood becomes mature in 3 years, the culms usually live considerably longer. Those of the hardy giant timber bamboo (Phyllostachys reticulata) are known to live for 12 or more years.

BRANCHES AND LEAVES.

The branching of bamboos is variable in different groups of both the clump and running types but a detailed discussion would be of interest mainly to the specialist. It may be said, however, that the number of branches at a node, or joint, may be one, two, or more. In some common clump bamboos there are dense tufts of 20 or more branches, mostly rather small. Giant culms of the running type often are without branches for 20 feet or more above the ground.

The leaves of bamboos usually are borne on small branchlets arising from the branches. Sometimes, however, the branch from the culm bears the leaves directly. On ordinary branches that live as long as the culm, or for several years, the branchlets usually die back and new branchlets with leaves are put out from dormant buds near the bases of the old branchlets. This is repeated each year until the culm or the branch dies, and it shows how bamboos are able to live for a number of years without increasing in size. The approaching death of a bamboo culm is indicated by the dying first of the topmost branches.

Much of interest could be said concerning the leaves of some of the various groups of bamboos but it can only be touched upon here. All the leaves are parallel veined, but there is one practically constant difference between the leaves of the clump bamboos and those of the running type. With a hand lens there are easily visible very numerous cross veins in the leaves of nearly all of the running bamboos, while none are seen in the leaves of the clump bamboos. Thus, cross-veining of the leaves seems to be associated with hardiness in bamboos.

As in other kinds of plants, the leaves of bamboos are extremely variable in size and somewhat so in shape. One Japanese dwarf species has an ovate leaf, which does not suggest in form any ordinary bamboo or other grass leaf. Some other very dwarf species have leaves up to a foot or more long and 2 to 3 inches wide. On the other hand, the largest of the hardy bamboos of China and Japan, which sometimes towers to a height of 80 feet or more, has adult leaves only about $2\frac{1}{2}$ inches long by a quarter of an inch wide.

USES OF BAMBOOS

When we come to look at the uses of bamboos we have quite as varied and interesting a field as when considering the habits and structures of the growing plants. Bamboos as a whole are conceded to contribute in a large way to the welfare of more people in the world than any other single group of plants. To hundreds of millions of people throughout the Orient, bamboos furnish materials for shelter and other structural purposes, for food, clothing, implements, utensils, and other necessary and useful articles almost without end. Bamboo is to the Orient what other woods and iron, steel, and copper are to this country. This, of course, is because bamboos always have been easily available there. When we have grown them for a longer period and more widely we too shall doubtless utilize them more generally.

In the United States the bamboos thus far have been utilized almost solely for their ornamental value. The giant clump bamboos, of which five species are at present fairly well known in southern Florida, are of value for use in parks and on rather large estates. The best of these are Dendrocalamus latiflorus, growing to about 75 feet high, and a smaller one known by the horticultural name Bambusa thouarsii. The latter attains a height of 40 to 50 feet. These two handsome bamboos withstand temperatures down to 20 degrees F., and should be grown much more generally in localities that do not experience lower temperatures.

The most common giant bamboo in southern Florida is Bambusa vulgaris, a very tender species and one that spreads rather more rapidly than any other we have of the clump type. It is unfortunate that this bamboo should have been planted so widely, and out of its proper climatic range, when there were better ones.

What is probably the tallest bamboo in this country is a magnificent clump of Bambusa arundinacea, a very thorny giant bamboo, on the shore of Lake Ariana, in Polk County, Florida. Several years ago this was estimated to be 80 feet high. The species is somewhat more hardy than Bambusa vulgaris but suffers at times from cold in central Florida. Dendrocalamus strictus is a non-thorny giant bamboo of about equal hardiness. It should be planted more in localities having temperatures not lower than about 27 degrees F.

The medium-sized clump bamboos grown throughout Florida and the northern Gulf region are horticultural varieties of one species, now correctly called Bambusa multiplex. The names of these varieties at times have been erroneously used in botanical and horticultural literature as if they were true botanical names. The varieties are generally known, respectively, as follows: The variety Argentea, with plain green culms and leaves, Argentea-striata, with green culms, and part of leaves striped with white, and Alphonse-karri, with golden culms and green leaves. This variety has also been called Bambusa verticillata in Florida. The fourth variety and one of the best known is Disticha, the fern-leaved form. It often grows as a dwarf or semi-dwarf variety but may also grow 20 feet or more in height. It often reverts in part or entirely to the ordinary type of foliage. When entirely reverted in foliage type the variety Disticha practically ceases to be and becomes indistinguishable in appearance from the variety Argentea. The latter probably represents the original form of Bambusa multiplex. The varieties Argentea-striata, Alphonse-karri, and Disticha withstand a minimum temperature of about 15 degrees F., while Argentea is apparently a few degrees less hardy.

COOPERATIVE EXTENSION WORK
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Ornamental Gardening in Florida
Radio Series

Talk No. 27
March 14, 1934

WHENCE CAME FLORIDA GARDEN PLANTS?

M.R. Ensign, associate horticulturist,
Florida Experiment Station.

The origin, pedigree or line of descent of individuals, whether man, plant or animal is a subject of considerable fascination. In fact, the study of genealogy and the building of family trees amounts to an obsession to some minds. This pastime is, of course, a harmless one so far as plants are concerned, for desperadoes, feeble-minded and other despicable characters, happily, do not exist in the plant world.

So far as I am personally concerned, the ancestry or nationality of a plant or animal (including man) is really of very minor interest or consequence. The thing that does matter, however, is how the individual fits into the present scheme of things - is it intrinsically useful or beautiful - does it add to our pleasures or our necessities? Obviously, we cannot judge the need for ornamental garden plants except from the aesthetic point of view. I have accumulated a few facts regarding the history of the origin and introduction of some ornamentals commonly found in Florida gardens, and will discuss these according to certain groups:

First, the rose: When a trading station was established by an English concern known as the East India Trading Company, in Canton, Southern China, near the close of the 17th Century, no one would have guessed that it would have had such a profound influence upon the development of horticulture in general, and upon the broadcasting or disseminating of the rose in particular. Garden and plant enthusiasts, therefore, owe a real debt of gratitude to the pioneers of this purely commercial undertaking who waged an extended and difficult struggle to maintain a foot-hold in China. As early as 1696 some dried specimens of the rose were sent to England and nearly a century later living plants were carried by company officials and found their way into private gardens. Later the Royal Gardens, the Kew and other public gardens acquired such plants. These early roses were the China Monthly, Tea and Rambler roses - all parents of the modern rose.

Early in the 18th Century, roses were introduced into India from the same source which later gave rise to some confusion since they were regarded as native of India as indicated by the name "Bengal Rose", really a synonym for the China Monthly Rose.

Just when the rose was first introduced into America does not appear with certainty. But the Cherokee Rose (another China Rose) has become naturalized and grows wild in the Southern States. In fact, Michaux in 1803 firmly believed it to be native to this country and named it.(R. laevigata)

Japan has also contributed a number of rose species that have formed the basis for breeding the modern roses.

As soon as these plants began arriving in England, they attracted the attention of botanists and patrons of horticulture so that men were dispatched to the Orient to find novelties. This search was continued not only by Englishmen, but plant explorers from nearly every country have searched for desirable plant materials that have in many instances become lasting monuments to their efforts. So, today our modern Killarneys, American Beauty, Mrs. Chas. Russell, Lady Hillingdon, Rambler, and others are hybrids whose ancestors may yet be seen in the raw in some of the remote parts of China and Japan. It is of interest to know that only those roses indigenous to America that have yellow flowers have been utilized in the breeding program of rose fanciers.

The origin of our lilies presents a similar story. There are over 200 different species of lilies and to merely recite their names would take more time than I am allotted. Suffice it to say that some of the finest types of lilies have come from the Arid Valleys of Tibet where in winter it is excessively cold and in summer unbearably hot and dry. Others have come from the valley of the Yellow River of China, others from Japan, while many are found native to various geographical areas of the United States. Thus, there is a great variation in the growing conditions necessary to successful lily culture. Exotic species are intolerant to manures, cultivation or too much moisture. They grow best among herbs or low shrubs. For this reason, lilies may be grouped into two classes: (1) Swamp lilies including most of those native to America, and (2) Dry-land lilies which would include most of those common to Japan and China. There are two kinds that have become commercially important in Florida, namely, the Narcissus and the Hybrid Amaryllis.

From whence came the chrysanthemums? The earliest and basic varieties came mostly from China through the same avenues that the rose was introduced, although the Alps, Morocco, Dalmatia, Persia and even the Arctic regions in Siberia have contributed to our modern assortments. The number of species of chrysanthemums is large, and from them plant breeders have developed hundreds of varieties that show wide variations in size, color and adaptability. By exercising some care, fine specimens can be grown in Florida during the late summer and fall.

We also should mention the azalea. As here understood the group Rhododendron includes all of the azaleas, although gardeners habitually separate them. A surprisingly large number of azaleas have come from China, the Himalaya Mountains, and some from the Caucasian Highlands. There are many species native to America, both in the warmer regions of the South and the more bleak areas of the Rocky Mountains and Labrador. Most of those common to Florida gardens are native to the South.

Among the shrubs of particular interest, the Pepper Bush (Clethra)may be mentioned. It blossoms from mid-July on during the summer and has the advantage of being a native of Florida. At least one of the species also may be found along the coast in swampy places as far north as Maine.

Turning to the vines we find that many common and desirable kinds came from far-away countries. Vines long ago proved their attractiveness to man, especially the proverbial clinging kinds, and there are some rare specimens in Florida. The colorful Bignonias are some of the best known. Some of these are native to Florida, while others have been introduced from Brazil and the Argentine. The Bougainvilleas are no less attractive and likewise some of them come from a number of South American countries, while others are native. All of them are easily grown for they are adapted to Florida growing conditions.

We do not know who first brought Clematis from Japan, nor the so-called Bag Flower or Glory Bower from Africa. To whomever it was we are grateful.

When we come to the honeysuckles we find three well-known kinds. The Coral Honeysuckle, or Woodbine, is a native of Florida; the Cape Honeysuckle as the name implies originated in South Africa, while a third species was introduced from China or Japan. The Passion Flower, probably a sequel to the Clinging Vine, is a gift from Brazil, while the Smilax is commonly found in Florida and tropical America. The most common species of Wisteria came originally from China. The more important annuals have come to us from a wide variety of sources. It may be easier to follow if these are grouped according to the country or region in which they were originally found.

The Argentine produced the Petunia and Marigold, the latter is also found in Mexico and many of the other South American countries. From California the Poppy, Lupine and Larkspur have been broadcast. The two latter are also found in many of the Western and Rocky Mountain States. China gave us the Larkspur, Chinese Forget-me-not and Baby's breath. The latter is also found in Europe, North Africa and in the Himalaya Mountains. Brazil was the home of the Moss Rose, and Morning Glory. The latter is found quite generally also in tropical America.

The Corn Flower came from Southeastern Europe in the vicinity of the Pyrenees, Sicily and east to Persia. Lupines are also common to the Mediterranean area. Pinks are scattered from Russia, Finland and Denmark on the north to France, Italy and Egypt on the south. Snapdragons are also natives of the Mediterranean region. They were brought to America at an early date and escaped from cultivation in the eastern part of the United States where they have become common wild flowers. The Sweet Pea is a native of Italy, also is the Candytuft. Our Stocks come from Southern Europe, while the Marguerite Carnation emanated from Denmark, Russia, Rumania and as far east as Greece.

To Mexico we are indebted for Ageratum, Zinnias and the Nasturtium. In North America, which is a very large area, originated some of the more common things grown in most gardens. We might mention Sunflowers, Verbena, Phlox, and some species of Corn Flower, Lupines and Larkspurs. Of the 100 or more species of Verbena all but one are native to North America.

South Africa yielded the Strawflower and the Lobelia. The well-known Calendula originated in the Canary Islands and east to Persia, while the Florists Paint Brush comes from the tropics of the Old World.

The list of delightful garden plants would not be complete without the Iris, the White Spider Water Lily and the Royal Fern, all of which are found native to Florida and the Southern States. Also we must mention several species of crotalaria which are very well adapted to Florida soil and climatic conditions. This plant has been thought of chiefly as a soil-building legume, and it is admirable for that purpose, but some of the other lesser known varieties are very enduring and have most attractive spikes of yellow flowers.

There are many rarer plants that could be mentioned, but the purpose of this talk has been largely accomplished in parading before you the list of more common plants and where they came from. Thus, it is evident that there has been a very wide dissemination of plant materials, chiefly in the last century, many of them coming from remote and inaccessible places on the globe. Plant scouts or explorers have been sent out by the United States Department of Agriculture to all parts of the world, one of the best known perhaps being David Fairchild who has adopted Florida as his home. In Cocoanut Grove, near Miami, he has a beautiful garden of several acres where rare plants from many climes are being tried out. His book entitled "Exploring for Plants" is very worth while since it gives in a very informal way many experiences of a plant explorer in all parts of the world. But all the plant treasures have not been collected by any means, and the plant breeder has only begun to show forth his handiwork. By using the numerous wild things from various places on the earth, he can cross them and select for desirable colors, sizes, and odors. It was Burbank who made the statement that the human mind could not conceive of a color, odor, taste, shape or size of plant but what it could be produced by careful breeding methods. Mother nature has already made an excellent start in this direction. There is no excuse now for bare uninviting grounds about the home, especially in Florida.

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Ornamental Gardening in Florida
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ZEPHYRANTHES -- FLOWERS OF THE WEST WIND.

H. Harold Hume, Assistant Director,
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Zephyranthes, (Zeph-yr-an'-thes) derived from two Greek words -- Zephyros, the west wind, and anthos, a flower; therefore meaning literally "Flower of the West Wind" -- is the name given by Dean William Herbert in 1821 to a lovely group of bulbous plants found in the southern United States, in the West Indies, Mexico and parts of South America. Mature plants consist of a bulb, a few leaves, narrow or strap-shaped, gray-green or bright green, with flowers white, pink, red, cream, yellow or copper-colored, according to variety or species. They are borne singly on stems usually varying in length from six to twelve inches. The flower habits of different Zephyranthes species differ materially. In one group they open quite flat; in another the petals are bent back at the tips, lily-like; while in still another group the petals do not open widely, but remain rather upright like those of a crocus. The spread of the petals in some instances appears to be influenced by light and perhaps by temperature and humidity. Several common names, most of them based upon peculiarities in their flowering habits, are given to them. In some parts they are known as rain lilies, in others they are called Easter lilies, in other sections they are fairy lilies. In India they are known as Thunder Flowers, while in China one species is referred to as the grass lily. From gardening literature here and there the name Zephyr lilies can be added. These common names relate to time of flowering, the character of the foliage, the scientific name, to the dainty beauty of the flowers and to their interesting habit of coming into bloom very quickly under certain conditions. It is probably most fitting that the name Zephyr flowers be adopted as a common English name.

Perhaps no garden plants are more easily grown than these. They are suited to our soil and climate and may be grown throughout all Florida. Bulbs adapted to given conditions in suitable areas are commonly easy to handle, but the Zephyranthes surpass many other bulbs in requiring so little care and attention and giving much of dainty beauty in return. Since most gardeners are looking for plants that are easy to grow, they should be much more common in Florida gardens than they now are. It is true the flowers are not long lived, two days or so at most, but it may be that because their beauty is so fleeting they are all the more interesting and desirable.

Florida has three species of Zephyranthes native within her borders. These are Zephyranthes Atamasco (At-am-as'-co), Zephyranthes Treatiae (Treat'-i-e) and Zephyranthes Simpsonii. (Simp'-son-i) The first, Zephyranthes Atamsco, is found in west Florida and is fairly common along the banks of the Apalachicola. Zephyranthes Treatiae, named for Mrs. Mary Treat who collected it near Green Cove Springs, is quite common in the northern and northeastern parts of Florida, although it extends well down the state as well, while Zephyranthes Simpsonii is native far south in the state. All bloom early in spring, sometimes in autumn as well, and all have pink or reddish colored flower buds, though the flowers are

white when open. The pink coloring is confined, as a rule, to the three outer parts of the perianth. Most of the flowers fade away with a pink tint. The flowers of Zephyranthes Atamasco and Zephyranthes Treatiae open wide like those of a lily, while those of Zephyranthes Simpsonii are crocus-like. This last is one of the finest of the white species, and as many as four flowers have been noted from a single bulb at one time.

Over on the other side of the Gulf of Mexico four other Zephyranthes, by name, Zephyranthes longifolia, (long-if-ol'-i-a), Zephyranthes pulchella, (pul-chel'-la) Zephyranthes Texana, (Tex-a'-na) and Zephyranthes chrysantha (chry-santh'-a) are to be found. All of them are native in parts of Texas, though some are known to extend beyond the boundaries of that state. Of this group the one most common in cultivation is Zephyranthes Texana and it is a particularly lovely plant. The flowers are a deep golden color within, shaded on the outside with copper and reddish copper. The flowers are small, borne on slender scapes and do not open widely. Good bulbs produce several sets of flowers during the summer season.

Here and there in Florida gardens, not nearly so common as they should be, three introduced species are to be found. These are Zephyranthes carinata, (car-i-na'-ta) from Mexico, Zephyranthes rosea (ro-se-a) from Cuba and other islands of the West Indies, and Zephyranthes candida (can'-did-a) from the Argentine. Of these the first, Zephyranthes carinata, is probably the most common. It has large flowers, opening quite flat, three to four inches across, dark pink when they open first, changing to a much lighter shade as they fade. The flowers of Zephyranthes rosea are much smaller, a bright, sprightly pink, darker than in Zephyranthes carinata, and the color becomes darker as they fade. The leaves are bright green, strap-shaped, blunt pointed, and lie quite flat upon the ground. It is one of the daintiest and loveliest of all the group. It is native in Cuba. Zephyranthes candida is an interesting species with upright rush-like leaves and white flowers. It is stated that the Rio de La Plata, the Silver River, was so named by the Spaniards when they sailed up it because of the profusion of glistening white flowers of Zephyranthes candida along its marshy banks, and perhaps the name of the Republic of Argentina, through which this river flows, traces back to this same delightful plant, because the word "Argentina" also means silvery or silver. Zephyranthes carinata flowers in northern Florida during the latter part of May, with a wonderful flush of bloom, and this is followed by scattering flowers throughout the rest of the season into October. Zephyranthes rosea blooms in late August. Zephyranthes candida also comes late in the season and continues to flower in autumn and though it sometimes does not bloom profusely, it is a very desirable sort.

Other kinds of Zephyranthes, so scarce that they are seldom seen, are Zephyranthes citrina,(cit-ri-na) Zephyranthes robusta, (ro-bus'-ta) Zephyranthes Ajax, (A'-jax) and Zephyranthes tubispatha (tub-is'-path-a). All are particularly fine. Zephyranthes citrina bears deep yellow, almost golden flowers on eight or ten inch stems and blooms several times during the summer. Zephyranthes Ajax is a hybrid between Zephyranthes citrina and Zephyranthes candida. Its upright leaves resemble those of Zephyranthes candida in habit and its flowers are light yellow. Its blooming habit is that of Zephyranthes citrina. It is a good variety. Zephyranthes tubispatha is a white flowered species. The flowers are green at the base and they do not open widely. It is one of the finest whites, though not so free in flowering as Zephyranthes Simpsonii.

The propagation of Zephyranthes is accomplished either from seed or by offsets or small bulbs developed from the bases of old bulbs. Seeds are not produced freely from all sorts. So far as I have observed Zephyranthes carinata does not produce seed in Florida and apparently this is its behavior in many other places. In one instance, however, it has been reported as forming seed. Likewise, Zephyranthes candida, under Florida conditions usually does not produce seed. On the other hand, Zephyranthes rosea, Zephyranthes tubispatha, Zephyranthes Ajax, Zephyranthes robusta, Zephyranthes citrina, Zephyranthes Simpsonii, Zephyranthes Atamasco and Zephyranthes Treatiae all produce seeds, most of them quite freely. Seeds germinate readily and bulbs are quite easily grown. A good mixture for planting seeds is one composed of good building sand and peat, one-half each by bulk, or screened woods mold alone may be used.

In the production of offsets the different species of Zephyranthes also vary considerably. They are produced freely by Zephyranthes candida, Zephyranthes tubispatha, Zephyranthes Ajax, Zephyranthes rosea, and in certain instances by Zephyranthes Atamasco. They are produced less freely by Zephyranthes carinata and Zephyranthes robusta, and are seldom seen in Zephyranthes Treatiae, Zephyranthes Texana and Zephyranthes citrina. The offsets may be separated when quite small and established as independent plants.

As already indicated, the culture of the various kinds of Zephyranthes is comparatively simple. This, however, does not mean that they should not receive some care and attention. The best in any plant or in any garden cannot be had without putting something into it, something of thought, of planning, of food, of water, of care and attention. More flowers, more bloom, more interest and more joy are the rewards of loving care. Let Zephyanthes have some of these things and the reward will be greater. On the whole, best results are secured by planting bulbs of this group in a sandy loam, well supplied with vegetable matter obtained from peat or woods mold. Well rotted dairy fertilizer can be added, but it is best to use it as a surface dressing and not incorporate it with the soil. Commercial fertilizer such as one would use in growing white or Irish potatoes gives very satisfactory results as a source of plant food. Two applications yearly will suffice. Water, too, they must have. It is true that bulbous plants, because of their storage facilities, do not show distress from a shortage of water so quickly as do many other plants, but if too little is furnished their growth and flowering will be reduced ultimately. Zephyranthes candida is a swamp species; our native Zephyranthes Treatiae and Zephyranthes Simpsonii grow in the flatwoods that are usually moist at certain seasons and these three respond to copious waterings. Indeed, apparently none of them but that appear to be greatly benefitted by goodly supplies of moisture at all times. In those sections where bulbs pass through the winter season uninjured by cold, as in all parts of Florida, they may be planted at any time of year. In the bazaars of India, the stored bulbs of Zephyranthes carinata are sold, guaranteed to bloom within three weeks after planting. If this be true, by taking up bulbs from time to time and keeping a supply on hand it might be possible to force them and so bring them into flower at will. It would be worth trying though I have never done so.

Zephyranthes bulbs should be planted quite close together and in considerable numbers. A single bulb here and there falls far short of the effect that may be

secured with numbers planted together. Nothing can surpass in their fresh beauty a mass planting of Zephyranthes, of carinata, rosea or citrina, for instance. The interesting part of it is that all these bulbs will come into flower together, a burst of bloom not possible with many kinds of plants. They may be used along the edge of the shrubbery or perennial border, they may be planted in groups of a dozen or more here and there along the edges, or they may be given a section of the border. They are also used for planting along the edges of walks. Planted close together the foliage of many of them, Zephyranthes candida, rosea, tubispatha, Ajax and Atamasco, for instance, covers the soil well and so serves as a ground cover.

It is said that when Lord Kitchener was resident at Simla in India, Zephyranthes carinata was frequently used as a table decoration and certainly when placed in suitable vases or holders this species and others are very fine and dainty as cut flowers. They should be gathered just as they open and used in the house for that day only.

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Ornamental Gardening in Florida
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FLORIDA'S NATIVE FLOWERS.

By - Erdman West, mycologist,
Florida Experiment Station

Spring is here! The season when Florida sunshine seems particularly benevolent. The birds are singing gayly and gardeners are digging, raking and planting. Flower beds are being planned or revised. Nursery and seed catalogs are being searched carefully for attractive plants and flowers. And out in the woods and the fields and the marshes, old Mother Nature is quietly beginning another twelve months' display of Florida's wild flowers.

"But", someone remarks, "you can't grow wild flowers in your garden. They just won't grow." And another, a devotee of roses and carnations, says; "Why! they are only weeds. You wouldn't expect me to plant such trash near my rose garden, would you?" And the answer to these objections is this: Give our native plants a situation comparable to their native habitat and a background suitable to their color and form and you will find Florida's native flowers just as amenable to garden conditions and just as attractive as many of our cultivated plants.

Let us see what native plants we may find suitable for our gardens. As many native shrubs and trees have been used frequently in the landscaping of Florida homes, we will consider chiefly herbaceous plants in this discussion. If we consider these in groups arranged according to the use or situation for which they are intended, it will make our labors still easier.

Perhaps the easiest group of all - from the cultural standpoint - is the vines. There are a number of native Florida vines that make excellent cover material for fences, arbors, trellises or pergolas. I am sure that you have seen and admired yellow jessamine in the woods in the Spring. Have you ever thought of it in the garden as a cultivated vine? Strong roots are easily obtained and grow readily under a wide range of conditions. The plant is a rapid grower and responds to good treatment including fertilizer. If you plant it where it gets full sunshine, it will bear a solid mass of deliciously sweet-scented flowers in March. The remainder of the year it supplies a graceful evergreen blanket of leaves. Its only bad habit is its tendency to spread over the surface of the ground from its base. However, these long runners are easily persuaded to climb. If you want to restrain its activities, it can be cut back severely at any time, but if you wish flowers in Spring, do your pruning in early summer.

Another nearly evergreen vine, that is very attractive is the woodbine, Lonicera sempervirens (lon-i-ce'-ra sem-per-vi'-rens). In its natural habitat, it is seldom an attractive object; but put in good soil with a moderate supply of fertilizer and moisture, it will soon cover a trellis with a verdant blanket

of a peculiar yet pleasing blue-green tint. All during the Spring and early Summer, the ends of the gracefully protruding branches bear clusters of orange-red flowers very attractive to butterflies and humming birds, as well as the human eye. And this is not all, the flowers are followed by clusters of bright red, translucent berries.

Another perennial vine with orange-red flowers is the cross-vine (Bignonia crucigera) a relative of our exotic Bignonias. It is useful in covering a wooden arbor or trellis, but is less attractive than the foregoing plants.

There are several other climbers that can be used in suitable positions. The Carolina aster (Aster carolinianus) thrives under cultivation and will clamber over low walls and tresslises. If care is taken to obtain large flowered types, very attractive results can be obtained.

Two closely related vines, Clematis (Clem'a-tis) and Viorna, (Vi-or'-na) furnish a very light feathery cover for a pergola or arbor. The Virona's have purplish, leathery, pendant flowers in Summer, while the Clematis has a mass of fragrant white blossoms in early Fall.

The moon-flower is so widely grown that most folks have forgotten that it is a native vine.

The passion-vine or may-pop (Passiflora incarnata), a weed in some sections, can be used to advantage as a cover for fences in the summer.

Before we leave the subject of vines, let us not forget a spot of color for Winter. Smilax Walteri bears multitudes of red, holly-like berries in Fall and Winter, and is especially attractive when used with a deciduous vine such as Wistaria.

Now, how about a few of Florida's own flowers for the regular flower garden? Most of the plants that I have selected are hardy perennials that have been tried and found useable. Several of these are among the composites. There are several species of blazing star or Liatris (Li-a'-tris) that do well and create a different atmosphere in the garden with their tall spikes of rose-purple flowers. Just one suggestion when growing them in good garden soil -- the spikes grow so tall and vigorous that they can seldom hold up their own weight. They need support in the way of stakes.

Another hardy perennial that offers great possibilities is the native sunflower. Several species have very attractive yellow flowers and produce them in great profusion. They succeed in almost any soil provided they have full sunshine. They can be propagated by underground runners, dividing the crowns, or from seed. Good selections should be multiplied vegetatively, so that the desirable characters may not be lost.

Closely related to the sunflowers are the black-eyed susans or Rudbeckias, (Rud-beck'-ias) most of which are annuals or perennials. These plants reproduce readily from seed and several of the species produce a profusion of yellow flowers with brown centers.

Several of the goldenrods have attractive flower clusters and are nice enough to put in the garden. They show up best, however, among the shrubbery or along a fence.

One shrubby composite, Garberia fruticosa, (Gar-be' rea frut-ic-o'-sa) makes a low, dense mass of gray-green foliage. In Fall the plants are topped with a crown of the small pinkish flowers.

The woods will soon be splotched with the cardinal red spikes of the Cherokee bean (Erythrina herbacea). These dazzling spires grow from a large tuberous root that transplants readily to the garden. After the flowers, the green bean-like leaves appear on spiny stems and by mid-summer the long pods burst open disclosing the bright red beans.

There are three species of native lupines in Florida that have blue or bluish flowers. One of these, Lupinus perennis, (Lup-i-nus per-en'-nis) is well-known in gardens, especially further north, but our own species with unifoliate, fuzzy, gray-green leaves are less well known. None of these hardy lupines will transplant after they have passed the seedling stage. The seeds germinate readily, however, if they are nicked or scarified before planting. The masses of flowers produced by these plants repay a little extra trouble in growing them.

There are many other plants which may be brought into the garden. Among these are the white-flowered false indigo, (Baptisia leucantha); the poppy mallow, (Callirrhoe involucrata) with brilliant rose-red flowers; Gilia rubra and Lobelia cardinalis (Lo-be'-lia car-din-a'-lis) both with spikes of bright red flowers; the orange butterfly milkweed,(Asclepias tuberosa); and the native sages, Salvia lyrata (lyr-a'-ta) with blue flowers and Salvia coccinea (coc-cin-e'-a) with red flowers.

With the great increase in the interest in tropical fish and aquaria in general, several of Florida's water plants have come into great demand. The strange-appearing water lettuce (Pistia stratiotes) is often used on the larger of these. For submerged plants, Florida furnishes Cabomba, Websteria, Ludwigiantha, (Lud-wig-i-an'-tha) Potomogeton (Po-tom-o-te'-ton), Valisneria (Val-is-ne'-ri-a) and certain species of Sagittaria.

Lily pools and water gardens and popular, too. For these Florida supplies two excellent water lilies including the fine, yellow ones Castalia flava (Cas-tal-ea).

Another famous water plant is Florida's native yellow Lotus. This has a most peculiar distribution in the State appearing in scattered and unconnected lakes. Some of these have been drained during the past few dry years and the plant undoubtedly has been killed out in these locations. In favorable situations it spreads rapidly by under-water rhizomes and may be hard to control. The great pale yellow flowers are beautiful and these are followed by the decorative seed pods. The hard-shelled seeds, known as water chinquapins, do not germinate readily. Sections of rhizome transplant easily, however.

One peculiar water plant known as water fern or floating fern (Ceratopteris) is an attractive addition to the shallow, shady end of pools. It is not hardy north of Sanford, though.

Other attractive water plants that may be collected in their native habitat and used to advantage around pools, include the blue-flowered pickerel weed, (Pontederia cordata), golden club (Orontium aquaticum), and several species of Sagittaria and water shield (Brasenia purpurea).

Several of the native species of iris form attractive clumps of green foliage to mass around the edge of the pool. Their flowers on the whole are not as large as German or Japanese iris, but they are beautifully colored from white through various shades of blue to dark-violet.

Rock gardens are steadily gaining in popularity in Florida and many of our native plants are well adapted to this form of horticulture. For the sunny rock garden, cacti are usually an important element. The various native species of Opuntia (op-un'-ti-a) all have showy yellow flowers, although their protective spines are rather discouraging to the gardener. Several native cacti belonging to Cereus (Ce're-us) and related genera do well in the southern half of the State. Their large flowers are delicately colored and the bright fruits that follow are only a little less conspicuous.

Some of our Coontie or Zamias like the sunny rock garden, too, although other species prefer the shady end. These anachronistic plants have a dignity and beauty that is individual. No true Florida garden, rock or otherwise, should be without one or two at least of these handsome plants. The large fusiform roots transplant easily. Raising Zamias from seed is a rather slow process, but a high percentage germination can be obtained from ripe seeds.

Cuthbertia,(Cuth-bert'-ea) a pink-flowered relative of the Tradescantias (Trad-es-can'-ti-a) does well in the sunny end of the rock garden, too. The tufts of grass-like leaves bear many of the pretty pink, three-petaled flowers every morning during summer.

Pre-eminent among the candidates for the shaded rock garden are many of Florida's native ferns. Ranging from bold-leaved Tectarias (Tec-ta'-reas) to the lacy Adiantums,(Ad-i-ant'-ums) we have a vast variety of forms to choose from. Many of these native ferns require no further care after proper transplanting. Certain species, such as the royal fern, require a constant supply of moisture, but most species of Dryopteris (Dry-op'-te-ris) and Asplenium (As-ple-ni-um) transplant easily and grow vigorously in the ordinary, shaded rock garden.

Other plants useful in the rock garden include violets, trilliums, peperomias (Pep-er-o'-ni-as) and phlox.

Nearly all of the above plants listed for the several purposes have been tried in various places and found to be suitable materials for cultivation. There is one group of wild plants, containing many attractive and even gaudy flowers, that does not yield so easily to the desires of the gardener. These are the flowers of our flatwoods. Included in this attractive group are several orchids such as the fringed orchids, both white and orange, and the grass pinks; the Sabbatias (Sab-ba'-ti-as) with their large pink, starry blossoms; the butterworts, blue and yellow; the milkworts in various colors from white through yellows and pinks; the Rhexias (Rhex-i-as) with their short-lived pink blossoms;

COOPERATIVE EXTENSION WORK
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Ornamental Gardening in Florida
Radio Series

Talk No. 30
April 4, 1934

ANNUALS FOR THE SUMMER FLOWER GARDEN

W. L. Floyd, professor of horticulture
University of Florida College of Agriculture

How can we in Florida have flowers during the summer? That is a problem that gardeners are facing right now. There is always a demand for cut flowers for the home, and no garden is complete without its bold masses of colorful flowers blooming here and there. The annuals, those that must be planted each year, are an important group for these purposes.

Many gardeners in Florida have failed in growing annuals during the summer, and yet there are gardens in every section of the state each summer that are made unusually beautiful by the proper use of annuals.

The main obstacles to growing annual flowering plants in Florida during the summer are heat, diseases like the wilts, blights and mildews and root-knot. Any method of spraying for the diseases or of treating the soil to get rid of the root-knot is usually more involved than the average home gardener will try, and yet these troubles thrive in the summer.

It is, thus, up to gardeners to select plants that will grow and flower in spite of these troubles; plants that have proven to be resistant or at least tolerant to these troubles and to the heat of summer. There are a number of such plants that are adapted to Florida gardening, and from this list we can pick annuals for almost any situation or location in the garden, annuals of a wide range of color, and some for almost any use. In a few moments we will suggest 15 such annuals with a short discussion about each.

You should, however, be familiar with these troubles so that you will know them when they appear in your garden. There are control measures, and many gardeners use them and grow flowers that would not otherwise thrive. Then too, on infected soils you should plant only the ones that are most resistant.

A good example of a disease prevalent during the summer is a fungus known as Schlerotium rolfsii (Skle-ro'-shium rolf-si'). If you have tried to grow hollyhocks during the summer you likely know it. During warm, moist conditions it attacks the roots and base of the stems at or just below the ground level and soon causes the plants to rot off at the ground. It attacks a number of plants, and is capable of remaining in the organic matter of the soil for a long time ready to at-

tack any susceptible plant that is planted. Some of the other diseases likely to pounce upon summer annuals are fusarium wilt, bacterial blight, and the mildews and leaf spots.

Among the insects, the root-knot nematodes do much damage to summer gardens. These nematodes or worms thrive best in sandy soils, and they live over the winter in old roots and decaying leaves. When the soil warms up they increase rapidly, feeding on the roots of tender plants. This causes the characteristic enlarging or knotting of the roots. These nematodes draw sap from the plants, and sometime they become so abundant that the susceptible kinds of annuals turn a sickly yellow and die.

And now for that list of suggested annual flowering plants for your garden this summer. These have proven successful at the flower gardens of the College of Agriculture in Gainesville, and in numerous flower gardens over the state and are recommended over a large area in the state. They should be planted now, and many wise gardeners will make another planting in about eight to 10 weeks to insure continuous bloom into the early fall.

As native asters are found here, it is reasonable to expect introduced forms to do well. The natives are small flowered perennials, while the introduced are annuals, which raises some doubt as to their adaptability. The annual asters coming to us from China produce larger, brighter colored, more graceful flowers than native varieties. They are rather hard to grow in our soil and climate, being subject to serious soil diseases quite difficult to control. Yet by using wilt resistant strains and growing in partial shade one has a fair chance of succeeding with them.

The old favorite touch-me-not or balsam is easily grown and attractive with its irregular shaped, bright colored flowers of pink, red, purple and other tones, and its seed pods which when ripe burst on being touched. It thrives in sun or partial shade and deserves a place in every garden.

Blanket flower or Gaillardia is surely worth a trial. The yellow, orange and dark red flowers are borne on long, stiff stems, suitable for cutting. It seems to delight in sandy soil and sunlight. It often reseeds itself.

Another flower for the summer garden is Calliopsis or brown-eyed Susan. The most common color of the flowers is yellow with brown centers, though some varieties have maroon or red centers. It is showy, free flowering, and blooms all summer.

Cockscomb, which grows like a weed, is fine in that it adds brilliant color to the garden. Some of its red and yellow flowers are compact like a cock's comb, others more loose and plume like. It is attacked by root knot and because of this may prove disappointing in old infected soils.

Summer Cosmos is an annual we should mention. There are several colors of this easily grown, popular plant, such as white, pink and various red shades. The flowers are suited for cutting. There is an au-

dwarf flowering group, which produce large plants, and abundant yellow or orange flowers, some recent introductions of which are double and contain other colors than yellow.

Annual chrysanthemums of several species planted after all danger of cold is past will by summer produce quantities of small yellow, white or mixed colored flowers fine for cutting. They branch and spread so as to cover more space than many annuals, so should be given a distance of 20 to 25 inches apart.

A plant which may be sown in succession from late winter through spring and thus be kept in bloom vigorously well into summer is floss flower or ageratum. The most common color is blue of which there are different shades, there are also whites and pinks, all of which may be had in tall and dwarf forms.

There are three or four quite different plants known as bachelor buttons, one of the most desirable for cultivation is globe amaranth, which thrives in warm weather. It produces small clover like heads in white, red and orange. They are rather harsh and woody and may be cut and dried for permanent bouquets.

The most popular for dried bouquets is strawflower (Helicrysum) which grows tall, producing gayly colored flowers. They should be cut when about half open, the stems stripped of leaves and the flowers and hung down in a shaded place till dry. They add variety to the garden before cutting.

The marigolds are old favorites and have been greatly improved in recent years. Some are the double African and double French varieties in various colors, often with combinations of color in one flower. The Orange Prince and Lemon Queen African varieties are fine and showy. They bloom in late summer and autumn. Guinea gold is a new variety of merit.

The petunia is probably the most grown annual in Florida, and may be seen in bloom through winter, spring and summer. In addition to the common single bedding varieties in many colors, there are the large double, giant fluffy-ruffles and others which are striking illustrations of what breeding and selection may do in originating new and beautiful forms.

Portulaca is a little plant, thriving in almost any soil, provided it gets plenty of sunlight. It makes a fine border plant in summer; blooms profusely in red, pink, orange, white and other colors. There are both double and single flowering varieties. Its flowers close in the afternoon. It is of greatest value as a low edging plant.

Summer gardeners will also do well to try pincushion plant. The flowers are borne on long, slender graceful stems. Colors are white, pink, yellow, blue, red and other shades. The rounded shape and projecting stamens suggest small pincushions. They last well, and are attractive as cut flowers, as well as for garden decoration. They bloom through spring and early summer.

It seems hardly necessary to mention the sunflower but we have

such attractive chrysanthemum flowered, double globe, new red, dwarf double and others, that are desirable. Some of the newer, small flowered varieties are excellent for cutting.

Verbena is a worthy perennial which may be treated as an annual. It is a trailing graceful plant with bright foliage, and large heads of flowers in a great variety of colors. It stands summer sun and rains quite well.

Last, but not least, the zinnia is one of the most showy, easily grown, and satisfactory annuals for summer. It is especially popular in the rural districts. No flower has been more improved by breeding. We now have giant double, Dahlia flowered, curled, crested, picotee pompon and others, with new varieties appearing in our catalogues almost every year. Zinnias give a fine effect when several rows of different colors are planted.

No attempt has been made to include all that may be grown. One in doubt about a kind which is desirable is advised to get a small packet of seed and try it out. If one succeeds well, let us know about it so that in the future we may tell others.

Seeds of the summer annuals usually germinate readily in warm weather. It is best to protect them from the direct rays of the sun for the first two weeks. If they are planted in flats or boxes this is easy by moving the flats to the north side of the house or by shading them with cloth or slats. Careful watering of the plants is vital. The summer rainy season furnishes liberal amounts of water, but between now and its beginning is a critical time in the life of the young annuals and often rain is very scarce.

Damping off is one disease that gives gardeners a lot of trouble, and it is one they can control. Plants with this trouble simply get weak at the ground level and topple over. It is best prevented by using one of the organic mercury compounds, such as Semesan, according to directions on the soil before the seed are planted and once or twice soon after they are up.

Keeping these points in mind, there's no reason why every gardener in Florida cannot have masses of beautiful annual flowering plants all summer. Simply plant the kinds that will resist heat, diseases and root knot, treat the soil against damping off, and give the plants regular waterings and attention. Of course, a good soil and fertilization is necessary.

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Ornamental Gardening in Florida
Radio Series

Talk No. 31
April 11,1934

IRIS FOR FLORIDA GARDENS.

H. Harold Hume, assistant director, research
Florida Experiment Station

In the gardens of most parts of America, iris plants are highly prized and freely used. There are groups of these plants adapted to wide use in plantings along streams, beside pools and on the drier soils of perennial and shrub borders. Their colorings vie with those of the rainbow for which they were named. Long years of exploration, culture and hybridizing have resulted in many gorgeous forms. Groups based upon species secured in foreign lands and named for different countries have been developed, and so there are German, Japanese, Dutch, Spanish and other irises. Iris societies interested in the development and promotion of this favorite flower have come into existence and have done much to awaken a gardening interest in a truly wonderful genus of plants. But unfortunately the groups as commonly known and developed have little value for Florida gardens. Their planting in the hope of securing permanent dependable subjects have commonly ended in failure. Some success has been had with bulbous forms to be grown for a winter season and then discarded, and in the northern sections of the state the old Iris florentina (flo-ren-ti'-na) has found a place -- introduced long ago and passed from hand to hand by the comradery of gardeners. Here and there a few others have been grown but usually they do not look happy, and in the gardens of Florida the iris is almost unknown.

However, there is hope, for irises of several species are native Florida plants found here and there where conditions suit them or where for one reason or another they have gained a foothold all the way from the northern boundary to the area known as the Big Cypress southeast of Fort Myers. Seven species are listed for the state and since they have been studied with fair thoroughness these are probably all that are native within our boundaries. This list of seven is as follows: Iris savannarum (sa-van-na'-rum), I. hexagona, (hex-ag-o'-na), I. tripetala, (trip-et'-al-a) I. Kimballiae, (kim-bal-ee) I. Albispiritus (al-bi-spi-ri-tus) I. virginica (vir-gin'-ic-a) and I.rivularis (ri-vul-a'-ris).

Before describing them briefly and telling where they grow, it will be best to say something about the structure of an iris flower. Its parts are arranged in groups of threes. At its base is a three-celled ovary in which the immature seeds may be seen. Later this develops into a seed pod. The outer parts of a flower consist of three sepals, narrowed below into the "haft" attached to the top of the ovary, widened above, drooping or curved backward. Gardeners call these the "falls." Upright and between the falls and more centrally placed are three narrow petals called the "standards." Usually they are paddle-shaped. Directly

overlapping the three sepals are three style branches, each tipped with a divided appendage that is commonly fringed or toothed. Beneath the three style branches are the three stamens, each consisting of filament and anther. On each sepal or fall there is usually a definite marking in gold, yellow or greenish yellow, bearded in certain species, plain in others, known as the "beard" or "crest". Perhaps no other flower has had its parts divided and named in the language of gardening as well as in that of botany.

All our native irises are moisture-loving plants found along streams, ponds and lakes in different parts of the state. Iris savannarum is the most abundant species occurring in great fields along the west side of Lake Okeechobee and westward from the ridge between Arcadia, Wauchula and Avon Park toward Bradenton, Sarasota and Fort Myers. In lesser numbers it is found along the St. Johns river as far as Jacksonville and on the west to the Suwannee. It is a vigorous species with sword-like leaves 30 inches or so in length and flower-stalks that may measure as much as four feet. The flowers (usually four or five are produced on a stalk) are large and in color vary from pure white with greenish yellow crest through different shades of violet to deep, almost black, violet. Sometimes forms with standards of one color and falls of another are found. It is a noble species of great value as a garden plant.

Closely related to it is Iris Kimballiae, a smaller plant in all its parts with narrower petals and upright, rapier-like leaves. It is known only from one limited area in the vicinity of Apalachicola. Several other plants not known elsewhere are to be found along the same river, so it is not strange that this iris should be added to the list of localized species.

Far south in Florida white iris are often seen mixed with the colored ones growing here and there. From among the white forms Dr. John K. Small selected one found in the vicinity of LaBelle and described and named it Iris Albispiritus. It is a lovely, strong growing iris with pure white flowers, the sepals of which are marked with a striking golden yellow crest. To any garden it would be a noteworthy addition.

Iris rivularis is known only from the northeastern section of Florida where little streams make their way northward into the St. Mary's River. It is an iris of medium size, blooming quite freely even when small. Later than Iris savannarum, it is of value in prolonging the iris season.

For a long time, Iris tripetala was known in Florida only west of the Apalachicola River in the Gulf Coast area. More recently it has been located in the northwestern part of Duval County. The flowers of this iris are different from others found in Florida in that the three standards are so greatly reduced in size that only fragments remain and these can scarcely be seen. The effect is of an iris with falls only. The rhizomes are small, about the size of a lead pencil with swellings or enlargements at the flowering and dividing points. It is easily grown. It is a prize among irises -- small in stature (twelve to fifteen inches), dainty in form. In color three forms are known: a pure white, a good violet, and a very deep, violet purple. Usually it is not in flower before April 15.

Iris virginica is also widely distributed in the state. It is quite common along the St. Johns River from Palatka northward. It is abundant in northeast Florida and is found here and there along the streams of western Florida. It is

particularly plentiful along the lower reaches of the Escambia River. It is interesting that these west Florida representatives of I. virginica are light colored (pale violet) and sweet scented. In the northeastern area the colors are much darker as a rule and sweet scented ones are rare. This species may be separated readily from other Florida irises because it has rather thick fibrous rhizomes that are pink colored within.

Last of all to bloom is Iris hexagona. Late April into May is its season. It grows readily in the garden and blooms even when quite small. As a rule the flowers are a good dark violet with thick petals and wonderful substance. It grows in northeastern Florida and again in the angle area of the state where the coast line changes direction from north to west around the Gulf.

To these native sorts should be added as suitable subjects for Florida gardens that wonderful group of Louisiana irises discovered by Dr. Small. In size, in color and in form they are a marvelous collection worthy of the attention of any gardener. I have grown three of these, Iris giganticaerulea, (gi-gan-ti'-sir-u-lee-a) Iris fulva and Iris Thomasii and have found them very satisfactory. These three are blue violet, terra cotta and red-violet, respectively. There are many others in different colors. If all of them could be brought together in one place and all flowered at one time they would be as interesting as a bed of mixed pansies and almost as varied in color. Brownish-purple, orange-red, old-rose-lilac, lavender-violet, dark lilac, crimson-scarlet, royal-purple, white and yellow, are among the colors represented; nothing comparable to them in wild plant life is known in any other group of plants.

The crossing of these southern irises among themselves and with other groups has been undertaken by several iris breeders. Some of these new forms are now available in the trade. Others are sure to follow and doubtless before long there will be developed a well-defined group of American irises. To this group, Florida gardeners should look for their iris materials. Catalogues and lists should be watched for the new ones as they appear.

Two introduced species should be mentioned, Iris pseudacorus, (pseu-ac'-or-us) a strong growing yellow species native in Europe, is a handsome robust plant. It forms compact, upright clumps and the leaves are readily distinguished from those of our native ones by the presence of a well-defined rib down their centers. It blooms in late March and early April in this latitude. Iris unguicularis, (un-guic-ul-a'-ris) or stylosa, from North Africa is a low-growing plant that blooms very early. The flowers are hidden among the leaves and they are delightfully fragrant. It may be had in pure white and in bright lilac marked with white and yellow.

An acid soil is necessary and lime should be kept away from them. A study of many native iris soils made sometime ago showed that in Florida the native irises grow in soils with a reaction well below the neutral point. Hence soil secured from places where they grow naturally will be suitable for use in planting the iris garden. Soils well furnished with vegetable matter are much to their liking. An abundance of humus helps greatly in maintaining uniform moisture condition, provides food as it decays and is generally helpful in growing good plants. In preparing the soil, dig out a foot and fill in nine inches of this space with soil such as that in which they grow naturally or one containing woodsmold or peat and well-rotted dairy fertilizer. This will leave a depressed bed three inches below

the adjoining surfaces. Set the rhizomes close together with the growing tips at the surface. The best time to secure plants is when they are in flower. They are easier to find and selections may be made to better advantage than at other times. Cut back the foliage, leaving stubs six to eight inches only. Pack firmly in place. Water thoroughly. The advantage of the depressed bed is that it will hold water. Commercial fertilizer, one consisting of five percent ammonia, seven percent phosphoric acid and five percent potash, for instance, may be given from time to time at the rate of a quarter pound to a square yard of surface. Let them grow thick and close together. They may be planted to make good bold clumps by themselves or they may be set in the edges of the shrubbery border. They will grow in partial shade; it appears best, however, that they should be in sunshine continuously for at least half of the day.

As already stated, these native irises are moisture-loving plants. They grow in damp soil and usually for weeks at a time they are in standing water. Perhaps it is for this reason that garden makers have neglected them and refused to make use of them in their gardens. That they grow in wet places is not a good reason for failing to try them. Just because there is an abundance of water about them most of the time is no indication that they need so much. Indeed it is a safe assumption that soil inhabiting plants growing in damp places often have about them more water than they can possibly use; much less will meet their requirements. The principal thing in growing iris under garden conditions is to water copiously and fertilize generously. When watering other plants in the garden, give them a more generous supply and be certain that they do not suffer during their active growing season.

When an especially fine variety is found it may be increased by division, or by making cuttings of the rhizome. The rhizome, you will remember, is the running stem of an iris that grows on or just under the surface of the soil. When a native iris blooms, the flower stalk and the growing point from which it started both die. At the sides of the base of the flower stalk other shoots start out. There may be two or more. These may be separated or broken apart and planted as separate plants. Cuttings are made by cutting the rhizome into pieces about two inches long. When planted flat in the peaty mixture suggested for setting plants in the garden, nearly every one of these pieces will give a new plant that should flower in two years. Irises are easily grown from seed planted in a peaty soil made by mixing peat and sand in equal amounts by measure. Growing plants from seed is not likely to be used to any great extent except for the production of new varieties.

Native irises are worthwhile additions to our gardens, beautiful when in flower and good masses of green when not in bloom. The blooming season far south in the state will extend from late January through April. In the northern sections the season will last about as long, starting and ending later, however. Try them in your gardens and help to develop them as dependable Florida garden plants.

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Ornamental Gardening in Florida
Radio Series

Talk No. 32
April 18, 1934

INSECT FRIENDS OF GARDEN PLANTS

W. L. Thompson, assistant entomologist
Florida Experiment Station.

Whenever man attempts to grow plants, either for food or ornamental purposes, one of his main problems is the control of insects. You know how disheartening it is to grow a bed of fine flowers or some fine shrubs and then have insects destroy them.

Many times insect pests will gain headway before they are noticed, but in the same unnoticed way there are myriads of others that prey on these. There are beetles that eat scale insects, there are other insects that enjoy a nice meal of aphids or plant lice, there are robber flies, assassin bugs, mosquito hawks, there are insects that aid in pollination of plants and hundreds of others that are friends to every one who attempts to grow plants.

As a country becomes more settled and civilized, damage by insects increases for a number of reasons. First, in clearing the land the natural food plants have been removed so the insects take what man has planted, and, second, many pests have been accidentally imported from other countries into ours where they have no natural enemies to hold them in check. All that it takes to impress upon our minds the importance of friendly insects, is for some foreign pest to become firmly established in our country and then to watch the futile efforts of man against it. Invariably, he goes to the native home from which this little "bug" came in order to study and collect its natural enemies and to bring some back so that he may have at least a chance to hold it in check.

Many insects are valuable as parasites and predators, while others play an important part in their ability to carry pollen from one flower to another, thus enabling plants to bear fruit. Some insects in the larva stage may be injurious to plants but beneficial in the adult stage as carriers of pollen.

In almost every important order of insects some of them are predacious; that is, they feed on others, or suck the fluids from their bodies. Those that live within the body walls or inside the eggs of insects are commonly called parasites.

In the order to which grasshoppers and roaches belong, we have the praying mantids and soothsayers. These long slender insects derive the name "praying" mantids from the shape of their front legs which are enlarged and held in such a way as to suggest an attitude of prayer. They are by no means praying, but waiting

patiently until some soft-bodied worm, moth, bee, or fly comes their way. The victim is caught and held between the two front legs until eaten. The mantids do not restrict their diet to injurious insects, as they devour bees and other beneficicl forms.

Dragon flies are among our most beneficial insects but are seemingly much misunderstood. Such names as snake doctors, snake feeders, and mule killers are used. These flies are also often called mosquito hawks, which is more appropriate, as they do consume great numbers of mosquitoes as well as many other insects. The dragon fly adults secure their food while flying, but the larvae live in the water and feed on many kinds of aquatic animals.

One family that especially interests gardeners is the lacewing flies, or aphid lions. The adults, as a rule, are rather fragile, having lace-like wings and some have golden colored eyes. The adults are very attractive but it is the larvae that we are more interested in, since they are feeders on plant lice, mites and scale insects. The green lacewings are quite common in Florida. The adults deposit their oval shaped eggs on long, hair-like stalks that are attached to the leaf or stem near the host. The larva is rather flat, the body tapering boward both ends, giving it the appearance of a miniature alligator. It has sharp grasping jaws with which to catch and suck the body jices from its prey.

The trash bug larva, another of the lacewing flies is an interesting little fellow to watch. After he has sucked the fluid from the body of his victim, he tosses what is left of the unfortunate insect on his back where it sticks. By the time the larva is mature, it looks like a tiny trash pile moving over the leaf.

Doodle bugs, or ant lions, another interesting family, feed largely on ants. The larvae are rather fierce looking fellows, resembling the aphid lions in general appearance, except they are larger and have broad bodies, with jaws or mandibles that are long and sharp. They make a funnel shaped pit about one and one-half inches in depth in loose sand to trap the ants. The doodle bug stays just under the surface of the sand at the bottom of the pit, and when an ant falls into the trap, this insect at once starts throwing sand to prevent the ant from crawling up the side of the pit and at the same time sticks long piercing jaws to the surface to catch the victim. If he is successful in catching his prey, he pulls it down out of sight and devours it. Many of these small pits may be seen in the garden, under trees, shrubs, or almost any place where the sand is dry and loose.

Among the true bugs, which have piercing or sucking mouth parts are many beneficial species which prey on other bugs, as well as beetles and soft-bodied insects; such as caterpillars and worms.

The assassin bugs, long and very slender individuals, lie and wait for their prey. They feed on aphids, leafhoppers, and other bugs, worms, butterflies, and bees. The usefulness of these bugs is somewhat questioned since one of the favorite foods is bees. The ambush bug is another predacious insect.

Although many true flies are great pests, there are quite a few families that are beneficial. One of the most common of these are syrphid flies. The adults of some species resemble honeybees but we are not so much interested in this stage as we are in the predacious larvae, which consume many aphids, or plant lice, The larvae, maggot, or grub-like individuals, may be observed in the midst of an aphid colony. A hungry larva can eat an aphid in less than a minute and often consumes over two hundred in one day. There are several species common in Florida. These are found feeding on aphids infesting turnips, eggplants, peppers, rose bushes, and many other garden and shrub plants found around the home. They are more common in the fall, winter, and early spring months. During the early spring months, I have often observed a small colony of aphids starting, with one small syrphid fly larvae in its midst; a week later the colony of aphids was gone. Had this colony of sphids escaped the watchful eye of the adult syrphid fly that deposited an egg in their midst, it would have increased many times during the next couple of months.

The Tachinid flies are a large and beneficial family but they work in quite a different manner from the syrphid flies. Again it is the larvae in which we are interested. They are commonly known as parasites, because they live inside the body of the host and are not visible, consequently the good they do is often overlooked. The fly deposits her egg or eggs on the body of the host. After the young maggot hatches, it bores into the body of the insect and at first feeds on the body fluids, but later attacks the vital organs, the host dying about the time the parasite larva has matured. In many species the matured larvae crawl out of the host and pupate or change from the maggot to the adult stage in the ground or under some trash.

In Florida at least two species of this family live on the green pumpkin bugs. The adult of one species is sometimes called the "feather legged fly" because of the fringe on its hind legs. They feed on nectar and may often be seen where plants are blooming. The adult of another species attacking pumpkin bugs resembles the house fly but is somewhat larger. Many of our leaf eating worms and caterpillars are parasitized by various species of this insect. They also kill grasshoppers, cane borers, and a host of other injurious insects.

Another family includes the robber flies which are considered both injurious and beneficial as they prey on bees as well as other insects. Both the adult and larva stages are predacious. The adults are rather large, slender flies, catching their prey on the wing and feeding on them by inserting their bill or feeding tube, into the body and extracting the body fluids. The larvae feed in decaying wood and are also predacious on other insect larvae.

Among the beetles are the ladybeetles, probably the best known friendly insects. The ladybeetles belong to a rather large family and the good they do is hard to estimate. Their value to the fruit grower and gardener is so great that experts are often sent to foreign lands to collect and introduce new species into this country. In Florida the different species range in size from the head of a

small pin to one-fourth of an inch in diameter. The adults are usually hemispherical in shape, the color varying greatly with different species. The adults, as well as the larvae, are predacious. The eggs, are cigar shaped, and deposited in groups or singly; those deposited by aphid feeders are usually yellow in color. The larvae, as a rule, are rather hairy fellows, slender in shape, and, as mentioned with the lacewing larvae, resemble, somewhat, a miniature alligator.

Some years ago the cottony-cushion scale was infesting citrus trees to a great extent and was found to be very hard to control by spraying. The Vedalia ladybeetle was introduced from California but formerly California had introduced it from Australia. By liberating a small colony of a dozen or more of these beetles in a heavily infested grove, the cottony-cushion scale was destroyed in a few months. This one species of ladybeetle has saved the fruit grower many millions of dollars. The cottony-cushion scale does not limit itself to citrus but infests other trees and shrubs. So this little beetle is not only of great value to the fruit grower but to any one who has shrubs around the house.

The ground beetles are predacious on cut worms and a number of caterpillars. They are found under logs, or boards and in the soil, and come out mostly at night to feed. They vary in size from one-fourth to one and one-half inches in length. The most common ones are black but some are marked with gold, green, and purple tints.

The blister beetles are usually considered injurious, but some species feed on the eggs of grasshoppers, and in some instances do a great deal of good.

There are many species of very small wasp-like insect parasites. Some of these insects are so small they are almost microscopic. Instead of a stinger, as in the true wasps and bees, they have a very long ovipositor, or egg tube, which enables them to deposit their eggs within the body of the host. In a few days the egg hatches and the young grub starts feeding on the body fluids but usually does not at first destroy the vital organs of the prey, for it grows, often reaching maturity and sometimes pupating. By the time the host has reached maturity, the parasite is also full grown. Some species pupate inside the body wall of the dead host and emerge as adults while others crawl out and attach their cocoons to the outside of the dead host. It is quite surprising sometimes to find a cocoon and take it in, expecting to have a beautiful moth or butterfly emerge, but, instead, a large number of minute wasp-like insects come out. There may be one parasite to an individual, or there may be many, depending on the species of parasite and also the size of the host.

There is a group of tiny insects that parasitize aphids, as well as certain grubs, web worms, and other caterpillars. One can form an idea how small these insects are as they can grow and develop as an adult in the body of an aphid. Aphids killed by these parasites turn a brownish color, and upon close examination, a small round hole can be seen in the abdomen of the dead aphid where the adult

parasite has emerged.

There are other species in this order that parasitize the eggs of other insects. The pumpkin bug eggs are often parasitized so that instead of a young pumpkin bug hatching out a minute adult parasite emerges.

Although the bees are not predacious, they are real friends of garden plants, as they are instrumental in pollenizing many flowers that would not bear fruit were it not for the bees carrying the pollen from one flower to another. Bumble bees were introduced into Australia to make it possible for clover to mature and seed. The bees, of course, are not responsible for all the pollen that is carried, for many other insects feeding on nectar also carry it.

Here in Florida we are bothered with many injurious insects, but we are blessed with many that are beneficial, too, and for almost every injurious one there is one or more to hold it in check.

It should be understood, also, that although we have many friendly insects,we cannot depend upon them to always control the injurious ones, as they too have parasites and predacious enemies. Nature has seen to it that one family, or one kingdom, cannot entirely eradicate the other, but merely hold each other in check so that all might taste the fruits of the earth.

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Ornamental Gardening in Florida
Radio Series

Talk No. 33
April 25, 1934

HIBISCUS, ITS PLACE IN FLORIDA GARDENING.

W.M. Fifield, assistant horticulturist
Florida Experiment Station.

The late Charles Torrey Simpson, one of Florida's most beloved naturalists, describes the cultivated hibiscus as "easily the Queen of Flowers in South Florida". Certainly it is found growing nearly everywhere in the lower portion of the peninsula and in many places as far North as Jacksonville. Introduced into Florida from Asia, probably China, it has woven itself into a permanent place in our landscape design. It is built of sterner stuff than many of our more delicate, pampered ornamentals, and has adapted itself to a wide range of soils and cultural conditions.

The Malvaceae, or Mallow family, to which it belongs, is divided into a number of genera familiar to most of us. The genus Gossypium contains the cotton plant and another, the genus Malvaviscus, includes the red flowered ornamental called Turks Cap, or the Wax Mallow. A third member of the family is the genus Hibiscus, from which the cultivated hibiscus gets its name.

It must be remembered that in botanical classification, a genus is further subdivided into one or more species. For instance in the genus Gossypium, we find sea-island cotton, and upland cotton. Likewise the genus Hibiscus is divided into species, of which there are about 200 distributed throughout the world. Several species of wild hibiscus are found growing in Florida, where they are native. Others are used for food. One is the common okra, or gumbo. And another is the roselle. Its succulent tissues contain much mucilage, acid, and coloring matter, all of which combines to make an excellent jelly. Another species is the well-known Rose of Sharon, or Shrubby Althea, hardy as far North as Connecticut. The only one of the group which is commonly called by its genus name, however, is Hibiscus rosa-sinensis, the common cultivated form known generally as the Chinese Hibiscus, Rose of China, or the Shoe-black Plant. It gets the latter name from the fact that the natives of the Orient sometimes use the dye obtained from its red petals for darkening their hair and eyebrows, and also for blackening shoes.

Recent years have changed this setup somewhat, however, and a few other species of Hibiscus have been introduced into Florida for ornamental purposes. Lacking any other common name they have all been included in the term hibiscus. In fact these species have been frequently crossed with rosa-sinensis, and so much so that the resulting progeny have so many new characters, and such a mixture of ancestry, that it has so far been too difficult to classify them into any systematic key that will aid the gardener.

Hibiscus schizopetalus (schiz-op-et'-al-us) comes to us from East Africa, and is a very beautiful contribution, differing from rosa-sinensis in that it has slender, drooping branches, and long-stemmed, pendulous flowers whose reflexed petals are beautifully fringed. H. tiliaceous (til-i-a'-ce-ous) comes from the Hawaiian Islands, although it no doubt occurs scattered throughout the Old World tropics. Its blossom is tubular in form, and yellow. Exotic varieties of H. mutabilis (mu-ta'-bil-is) commonly known to us as the Confederate Rose, have been brought in from the South Seas and added to our collection of large, beautiful blossoms. It has pale flowers in the morning that become pink later on in the day.

The present day forms of Hibiscus, then, are quite varied. While there is an almost unlimited variation observed in shades of color, there are only three primary colors in addition to white which are concerned in the color pattern. These are red, yellow and orange. Petals vary from linear to almost round. Some have wide bases and others very narrow ones. In width the variation may be from a half to three inches, and in length from one to five inches.

The leaves of different varieties vary even more. All forms from long and narrow to almost round are found, some with entire margins and some with deeply lobed and serrate margins. Some are hairy and rough, others softly pubescent and others smooth and shiny.

In size of plant, varieties range from low, dwarf shrubs to tall trees with whip-like growth. In some forms most of the foliage is grown near the tips of the wood while the rest of the wood is naked. Others are densely covered with foliage throughout. While the hibiscus is strictly an evergreen shrub, some varieties have less leaves at certain seasons than others.

No artificial key has been prepared for identifying the varieties. The forms have merely been grouped for convenience according to the color of the flower into pinks, whites, salmons, yellows and reds, and a few trade names have been assigned to the better known varieties based on this system of classification.

There are three general types of shape assumed by hibiscus flowers. The coral hibiscus, as exemplified by the schizopetalus varieties, the ones from East Africa, and all hybrids from this parent have more or less recurved petals with wavy, scalloped edges. In the vast majority of varieties, which now number six or eight hundred, the flower, when fully opened is salver-formed, or saucer-shaped. The third group, containing many of the newer varieties, has flowers that remain funnel-shaped until they wilt.

Nearly all hibiscus flowers open early in the morning, and begin to wilt in late afternoon. The great majority are one-day bloomers, although a few varieties will retain their blossoms in good condition several days. It has been observed that in cold weather blossoms will usually last longer than during the hot summer days. The blooming season for most varieties is nearly year round, although blossoms are most plentiful during the rainy season, and after the new growth, on which the blossoms are borne, is formed.

There seems to be very little difference in response of hibiscus to the various soils found in Florida. It grows equally well on sand, muck, marl and rockland, provided sufficient nutrition in the form of fertilizer is provided. It is a moisture-loving plant, and requires plenty of water for its best development. A more important factor than soils seems to be climate. In South Florida, particularly along both seacoasts, it grows continuously. Since it is usually killed back above ground by temperatures below 28 or 30 degrees F., its use in North Florida must be governed by this limitation. Even when killed back by frost, it usually comes out again in the spring and blooms very well on the new growth within a few months.

Hibiscus adapts itself well to a number of uses in the landscape. It may be used as an informal hedge, as individual specimens, or set in rows to obtain a loose hedge effect without obstructing the general view. While the plant itself is a sunlover, some varieties tend to fade their blossom color a little when exposed to direct sunlight, and this should be born in mind when fitting the various varieties into the landscape. As a rule the more delicately colored varieties, such as pink and yellow, fade more than the reds and salmons in bright sunshine. This change in shade of color is not always attributable to sunlight alone. In some varieties it has been observed that the shade of color in the flower may change somewhat as the plant grows older, resulting sometimes in a darker flower and sometimes in a lighter flower by the time the plant reaches an age of 2 or 3 years.

When planted to a hedge, care should be used to obtain varieties that are similar in character of growth and in general appearance of leaves. Too much contrast in this respect will produce a very ragged and unpleasing effect. Naturally varieties of dense branching nature are best suited for this purpose. The hibiscus hedge cannot successfully be closely trimmed. Pruning to keep back the longest shoots and to provide plenty of new growth for the blossoms is all that is necessary. This of course holds true whether plants are used in hedges or as individual specimens around the house. Plants should be watered immediately after pruning to insure prompt growth of new shoots.

Where a variety of types is desired it is suggested that the plants be placed about the grounds as individual specimens. In this manner tall rank growers can be used effectively where the more dwarf forms would be out of place. In the far south some very pleasing effects are obtained by interplanting hibiscus in the row with coconut and royal palms. Mango trees are also effective in this combination, and no doubt many other evergreen trees would work into the plan equally as well. Such a layout would permit much more leniency in selecting a number of varieties than a strictly hedge formation, and also provide some shade for the delicate blossoms.

The ease of propagation varies with the variety. Generally it is fairly simple. Hibiscus can be budded and grafted, propagated by both hardwood and soft-wood cuttings, by mossing or chinese layering and in some instances by seed.

Hibiscus does not seed readily outside the tropics, although many varieties do seed in South Florida, and some very excellent crosses have been made as a result. It seems unfortunate that most of the varieties which seed most readily are the least valuable from an ornamental standpoint. Of course seed very seldom come true to the variety from which it was obtained, and so for most purposes, asexual propagation is by far the best plan. Propagation by seed usually requires about 18 months for the production of blossoms.

A very successful method of securing new plants is termed "mossing" or Chinese layering. It consists of cutting a ring of bark from the lower portion of a branch and carefully wrapping the wound with sphagnum moss, held in place with a bandage of burlap. Roots will be formed in the moss usually within six or eight weeks if the operation is performed in the Spring. The branch can then be cut off below where the roots have formed and set as a new plant. Of course the moss must be kept moist during the period of root formation. Plants thus started will often blossom within a few days if buds were present before severing from the parent plant.

Hardwood cuttings will usually root in about six weeks, if made early in the Spring, and when set in the garden will generally come to blooming age in about nine months. For this purpose the cuttings selected should be about a half inch in diameter, five inches long, and must include at least two leaf scars, or nodes. Pushing the cuttings into coarse sand, kept well watered, is the usual procedure.

The whip graft is used principally for growing one variety on another. Ordinary paraffin impregnated into bleached muslin has given as good results for a wrapping medium as the more expensive beeswax combinations. The graft should be made as far down on the plant as practical to provide some top shade for the healing surfaces. Budding, like grafting, has given best results in the early Spring, and is done by the shield method. Both buds and grafts usually come into flower in the fall if the operation is performed in the spring.

The most troublesome pests of Hibiscus are the scale insects. They are generally controlled by spraying with an oil emulsion. Two applications, applied in the Spring about ten days apart are usually sufficient. Sometimes aphids or plant lice give trouble. They can usually be killed by two or three applications of a nicotine spray or dust made at three day intervals. Hibiscus are also more or less subject to nematode injury, and should not be planted on ground known to contain this root-knot organism. Some varieties are more susceptible than others. One grower has obtained good results by grafting the more susceptible varieties onto the common red, which seems to be more resistant than some of the others.

Hibiscus deserves consideration in the Florida garden, because of its ready adaptation to most conditions found here, and because it fills such a variety of demands for a flowering, evergreen shrub of a tropical nature. New and more beautiful varieties are constantly being originated, and the possibilities in that direction seem unlimited. Crossing with some of our native wild Hibiscus offers a chance, perhaps, to develop varieties more hardy and adaptable to the colder sections of the state than those we now have. Experimenting with rootstocks of different varieties may open up another field of adaptation. The Garden Clubs of Florida could do much toward spreading the popularity of the new Hibiscus varieties in the state by familiarizing their members with the new forms.

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Ornamental Gardening in Florida
Radio Series

Talk No. 34
May 2, 1934

PREPARATION AND MAINTENANCE OF LAWNS.

By - W.E. Stokes, agronomist
Florida Experiment Station.

A good lawn consists of a nice, even sod of fine, closely mown grass. Such a lawn usually surrounds the front and sides of the house and where possible should completely surround the house and extend to all parts of the grounds not otherwise used by supporting landscape material. A good lawn can be grown any where in Florida and can be kept nice and green the year round. Such a lawn adds dignity, grace and charm to the home and surroundings and has actual and substantial money value in addition to its esthetic worth.

Before a person can establish and maintain a really beautiful lawn there must come the desire, the ability and the means to do it, along with the determination to keep everlastingly at it. If you do not have these prerequisites you may accidentally establish a good lawn if you happen to have a favorable location but the chances are your lawn will sooner or later go to pieces through lack of proper care which is absolutely necessary under any and all conditions.

Any one of the following grasses can be used for lawn purposes in Florida: Bermuda, St. Augustine, Centipede and Carpet. St. Augustine grass is the best of the lot for shady places and it will stay green under low temperatures better than any of the others. St. Augustine grass is the only one of the four subject to chinch bug attack. All of these grasses are subject to attack by the brown patch fungus. Centipede grass sometimes turns yellow due to lack of iron in the soil and an application of iron sulfate in solution usually satisfactorily relieves this trouble. There are satisfactory methods of control of chinch bugs and brown patch, details of which can be had by writing to the Experiment Station at Gainesville for the bulletins dealing with lawns, lawn insects and disease. Very detailed information on the grasses available for lawns in Florida can be had by sending to Gainesville for Lawn Bulletin 209.

All of the four above mentioned lawn grasses are subject to frost damage as evidenced by browning of the leaves soon after frost. No harm, however, is done to the stolons, runners or root system and these grasses soon green up again with the coming of warm weather.

Bermuda grass is the finest textured of the grasses which can be used for lawn purposes in this state and due to this fact will make what is generally considered the most beautiful lawn if given proper attention. On the other hand Bermuda grass lawns usually give more trouble with weed growth than lawns of the other grasses due to the fact that the ground cover produced by this grass is not as dense and complete as that produced by the others. The more dense the sod and the more compact and complete the ground cover the less chance weeds

have of entering and surviving. There are two strains of Bermuda grass used for lawns, one is the common Bermuda with both surface stolons and underground stems or root stocks. This one is well known to most folks. The other Bermuda is a strain without underground runners and is known as St. Lucie Bermuda. Usually the St. Lucie strain of Bermuda grass has a little shorter, broader leaf blade with not quite so deep a green color as the common Bermuda grass. Both of these Bermudas make quite satisfactory lawns. The St. Lucie strain of Bermuda is best suited to the warmer section of Southern Florida and has done particularly well on the muck lands of the Everglades. The common Bermuda is of course adapted to all sections of the state. Remember that Bermuda is not as well suited for growing in shade as is St. Augustine grass.

Carpet and Centipede grass are similar in general appearance and growth habit but quite readily distinguished when seeding. The Centipede grass has a single spike borne on a stem three to six inches long while the Carpet grass has two to three small seed spikes on a fine wiry stem eight to twelve inches long. Under natural conditions Centipede grass will thrive better on dry soils than will Carpet grass. Both grasses produce a very complete, dense mat of grass and once established are little troubled with weeds. The leaves of both grasses are quite alike and are about twice as wide as those of Bermuda grass but not as wide or as long as those of St. Augustine grass. Plenty of seed of Carpet grass is available in the market but no seed of Centipede grass is available; however, most nurseries of Florida now handle vegetative planting material of Centipede grass. The Experiment Station has several strains of Centipede grass under observation but none seem superior to the strain now commonly available.

St. Augustine grass also known as Charleston grass is probably more commonly used for lawns than any of the other grasses mentioned. Despite its susceptibility to chinch bug attack, which usually occurs during hot dry spells following rainy periods, St. Augustine grass has remained very popular because of its wide range of adaptability to varying soil and climatic conditions and because of its ability to stand more cold, more shade and more abuse than any of the others and still remain fairly presentable. There are two strains of St. Augustine grass growing in the state. The common St. Augustine grass, well known to most people, is of course by far the most widely used. The other strain has a variegated color leaf being striped green and white. This strain is little used and is not near so hardy and vigorous as the common St. Augustine grass. St. Augustine grass does not produce any quantity of viable seed, hence vegetative material is used exclusively for propagating purposes. Planting material is available from Florida nurserymen.

Since all of the permanent lawn grasses of Florida are browned by cold in the fall or winter except when growing in the southern part of the state the common practice is to plant seed of some quick growing, short lived, winter hardy grass right on top of the permanent lawn grass in October or early November to make sure of a nice green lawn all during the fall and winter months. The best grass for this purpose is Italian rye grass, seeded at the rate of about six pounds of seed per one thousand square feet of lawn. Italian rye grass does no harm to the permanent lawn grass provided the rye grass is kept closely mowed especially in the spring when the Italian rye grass tends to stool considerably and to make rather heavy, tall growth which if not kept clipped off often, will tend to smother out certain of our lawn grasses, especially Bermuda.

Now as to the preparation for a lawn and the actual establishing of lawns; first, thought should be given to enriching the area by the addition of plenty of well rotted manure, leaf mold, rich soil and commercial fertilizer. Second, if you are able, put in some kind of water system, since the measure of success you have in maintaining the lawn is largely determined by the nearness with which you come to keeping the grass adequately supplied with water at all times and the more convenient and efficient your system for watering the lawn the easier it is going to be to get the job done quickly and efficiently.

After you have enriched your soil and put in the water system, care should be taken to level the ground before actual planting of the grass is started. The best practice is to give the ground a gradual slope away from the building in all directions. If terraces are desired, make them gradually sloping and avoid abrupt edges upon which it is always difficult to establish good sod and difficult to mow in such a manner as to avoid injury to the grass. Needless to say all building material waste, such as sticks, stones, plaster and the like should be removed in the preparation of the soil preceding the planting of grass.

Now you are ready to plant the grass. Centipede and St. Augustine grass both have to be established by planting vegetative material, that is rooted runners or sods since no seed is available. Carpet and Bermuda grass can either be established by planting seed or the use of vegetative material. Bermuda is usually more readily established by planting vegetative material, while Carpet grass is more readily established by sowing seed.

If you decide on using one of the grasses which has to be planted vegetatively get plenty of planting material, wet the lawn soil down thoroughly, open up shallow furrows about four inches deep, four inches wide, and twelve inches apart, place the rooted runner or pieces of sod in these furrows and almost but not entirely cover the planting material by pulling the dirt removed by the opening of the furrows back into place. After planting the grass, smooth the ground as best you can and again water the lawn thoroughly and after this water often enough to keep the soil reasonably well supplied with moisture.

If you decide to use a grass, seed such as Bermuda or Carpet grass, be sure to get pure seed of high germinating ability and figure on at least four pounds of seed per one thousand square feet of lawn area. Plant one half of the seed broadcast in one direction and the balance broadcast in the opposite direction to insure even distribution. After seeding, rake the seed in and water the lawn thoroughly, being careful not to wash the soil and cause uneven distribution of the seed. Keep the ground moist at all times. While the grass is coming up and getting established, take out objectionable weeds by pulling, hoeing or mowing.

Begin regular mowing as soon as the grass starts putting out runners, as this induces vegetative growth which in turn causes a more rapid sod formation. Objectionable weeds that cannot be controlled by the ordinary mowing of the lawn will have to be pulled out by hand, however, mowing and the thickening up of the sod as growth progresses will automatically control most weed growth.

Once you have your lawn thoroughly established, if you will control insects, diseases and rodent pest your principal problem is to keep the lawn grass adequately fed and properly mowed. This means you are going to have to fertilize the lawn two to three times a year, once with a complete fertilizer

such as a 5-5-5 or 5-7-5 and twice or more often if necessary with nitrogen alone, using such materials as sulfate of ammonia, nitrate of soda, calcium nitrate or cotton seed meal. There is nothing magic or mysterious about the fertilization of lawn grasses. Commonly, grasses respond more to nitrogen than to phosphorus and potassium, though all three elements are needed, hence the reason we say fertilize once a year with a fertilizer containing all three plant food materials; namely, nitrogen, phosphorus and potassium, and two or more times a year with some fertilizer material carrying mainly nitrogen. The complete fertilizer can probably most advantageously be applied in the fall, winter or early spring and the nitrogen alone fertilizer sufficiently often during the growing season to keep the grass a vigorous deep green color. Remember cotton seed meal is good but slow acting, while nitrate of soda, sulfate of ammonia and calcium nitrate are readily soluble, quickly available and will leach out of open sandy soils during periods of heavy rainfall. Remember that none of the fertilizers can give their plant food materials to the lawn grass except as these materials go into solution which simply means the soil has got to be kept reasonably moist at all times.

If you will remember and act on these two things, nine tenths of your lawn troubles will be over: Grass does best on a rich moist soil and sod forming grasses of Florida thrive best under rather frequent mowing, all of which simply means keep the lawn well fertilized, well watered and mow often enough to keep the grass a desirable height.

Summing up then, we may say lawns are desirable because they are useful, beautiful and profitable. Good lawns can be had in Florida the year round if there is the desire, the ability, the means and the determination to have the lawn.

The grasses available for permanent lawn purposes are Carpet, Bermuda, Centipede, and St. Augustine. The best grass for greening up lawns in winter is Italian rye grass. A rich moist soil naturally or made so and care and attention to fertilizing, watering, mowing and the control of rodents, insects and disease will give desired results which is a beautiful year round lawn.

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Ornamental Gardening in Florida
Radio Series

Talk No. 35
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HARVESTING AND STORING BULBS.

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Florida Agricultural Experiment Station

At the outset I may say that the term "bulb" is used here in its broad sense as explained and defined by Professor H. Harold Hume in an earlier talk of this series. Used in its technical and restricted sense, the word bulb refers to a special plant part usually developed under ground consisting of a short stem, roots, thickened leaf bases and one or more buds. Its special purpose is to act as a storage place for food and in most instances it serves to carry the plant over periods unfavorable to active growth. The true bulbs are either coated with tight overlapping thickened leaf bases, as in the onion or amaryllis, or scaly with loose scale-like leaf bases, as in the bulbs of the true lilies. In every day usage, however, the word bulb commonly includes many other plant parts that are not true bulbs but serve the same purpose, and in garden work they are handled in much the same way. The corms of gladiolus and watsonia, the tubers of caladiums and callas, the swollen roots of dahlias and the rhizomes of ginger and iris are often, and indeed usually, included among bulbs. It is in this wider generalized sense that the term is used in this discussion.

The harvesting and storing of the various kinds of bulbs is a problem of much diversity and complexity, due to the large number of different kinds of plants in this group; and also to the fact that commercial practices often differ radically from those best suited to the "Ornamental Gardener".

In regard to their requirements for harvesting, bulbs may be divided into three main groups: (1) Those in which the tops die down each year at the end of the growing season, -- these are best dug (lifted) annually; (2) Those which behave better if taken up every two, three, even up to five years; (3) Those which are allowed to remain indefinitely in the ground.

When we mention bulbs many think of the Narcissus group. This member of the flowering bulb group is one of the oldest of cultivated flowers and enjoys a much deserved popularity. Due to the climatic and soil conditions, many of the most successful and popular varieties in other parts of the country are rather unsatisfactory when grown under Florida conditions.

The greater part of the narcissi grown in Florida consist almost entirely of varieties belonging to the Polyanthus or Tazetta group. These are highly thought of in Florida because they bloom during the winter months. The most important varieties in this group are: Paperwhite, Chinese sacred-lily, Grand Soliel d'Or, White Pearl, and Grand Monarque. The commercial growers dig each year, which is necessary in order that the stock may be properly sized and spaced to produce market qualities. For the ornamental gardener, however, this is not

always necessary and will be determined to some extent by the way in which the bulbs are being used. In general though, it is true that best results are obtained with the Polyanthus type of narcissi when they are lifted annually. When left to naturalize they are allowed to remain undisturbed indefinitely. The trumpet narcissi and the jonquils (Narcissus odorus) give best results if taken up every two, three, or even up to five years.

It has been found that Grand Monarque is very satisfactory if left to grow on for a number of years but the statement here is otherwise all right. The bulbs can be dug from the time they begin to turn yellow until the tops have completely died down. However, they should be dug before the tops have disappeared so that the clumps can be located without difficulty. They should be lifted before the summer rains start the bulbs into second growth, or their vitality is likely to be seriously impaired. The bulbs should be picked up immediately after digging and placed in the shade, as exposure to the sun for as much as an hour will often produce sunburn, which is followed by a dry rot in storage.

Narcissus bulbs are usually kept out of the ground for three or four months after they are dug. Therefore, considerable care should be exercised in their storage. The bulbs should be stored in a place that is dry, cool and well ventilated. This is best obtained in an open shed especially made for the purpose, which has shelves that will hold a number of shallow trays or bins in which the bulbs are placed. If it is not possible to have such a building some place that meets as nearly as possible the conditions given above should be used. This may be an attic or a room in a house, a cellar, or the seed room in a barn. At this point, I might mention that rats and mice are very destructive to narcissi stored in this manner, injuring and carrying away many, so care should be taken to put them in a place that will protect the bulbs from the ravages of these rodents. During the first two or three weeks of storage the bulbs should be examined daily to determine if heating is taking place and, if so, they should be stirred in some way to alleviate this condition.

After the bulbs have been in storage for six or eight weeks they should be cleaned; this consists in taking off the outer loose husk and roots, and separating the slabs from the mother bulbs. The bulbs are then put back into their containers and kept until planting time.

Another fine group of bulbs is the gladioli. This flower is becoming increasingly popular each year. Their popularity is deserved because of their beauty and also because the proper choice of varieties makes it possible to have them practically every month during the year.

The commercial grower of gladioli in Florida digs his bulbs at the end of every growing season, just as soon as the average tops are yellowing and ready to die down. Probably the best practice for the ornamental gardener is to handle them in the same manner. In most cases the home gardener will have only a small number of bulbs as compared to the commercial grower, and it would be well to leave them in the ground until all have matured. At this point I would like to state that there may not be any necessity to dig the bulbs every year. There are numerous cases that might be cited in which the bulbs are left in the ground for three or four years and still produce an excellent bloom. This practice would be much more satisfactory on the better types of soil.

After digging, the bulbs and surrounding soil should preferably be screened so that one will be sure to get all of the cormels out of the soil. After screening, the bulbs are taken to the curing shed or some convenient place and spread out in shallow trays or bins to dry, after which they should be separated and cleaned. At this time the old bulbs are detached from the new ones and discarded. In cleaning, the outer husk should be taken off but enough husk must be left so that the bulbs will not dry out to an excess.

The bulbs should then be put in the trays or bins and stored under conditions comparable to those needed by narcissi. During storage certain definite changes take place in the bulbs -- this is known as curing. The length of time for this varies, but is usually from six weeks to four months. The best way to tell when this process has been completed is to watch the buds for signs of growth, and when the buds show evidence of growth the bulbs should either be planted or placed in cool storage so as to prevent further development. The same precautions in regard to preventing the ravages of rats and mice should be practiced as recommended for narcissi.

Many home gardeners have Easter Lilies. The Easter Lily may be left in the ground all summer, but, if dug, this should be done just before rooting starts which is usually late in August or September. The principal reason for digging is to prevent root binding in clumps; therefore, it is only necessary to lift them every two or three years when they may be divided and replanted. They may be rebedded immediately, or put in some cool dry place away from air currents which will dry them out, causing them to wilt and shrivel and lose their vitality.

Turning to the Amaryllis, as has been pointed out by Professor Hume in an earlier talk in this series, the plants that are commonly called Amaryllis are not Amaryllis at all but really Hippeastrums. The ones most commonly found in Florida are the small ones with bright red flowers and the large flowered hybrid Amaryllis.

These bulbs may be left in their permanent location from year to year, the only reason for lifting them being the wish to change them to another desired location, or to give them new soil that better growth may be secured.

Maybe you are wondering when to dig day lilies. The clumps can often be left undivided for four or five years without loss in size or number of flowers. The only object of digging and replanting is to divide them, thin them out, and furnish the bulbs with plant food, and a better soil. They should be replanted immediately after being dug.

Another group that may be left indefinitely in their permanent location is Veltnums. This group consists of several species which are commonly found in Florida, all of which are evergreen.

Montbretias or Blazing Star may be dug when foliage dies down in the fall, and stored the same as gladioli; or they may be left in the ground for two or three years until the clumps become root-bound, when they should be lifted and divided. Snowflakes are best allowed to remain undisturbed for a number of years. Freesias sometimes at the end of four or five years clumps become so densely matted that it is necessary to lift them for the purpose of division and subsequent thinning.

The canna after being placed in its permanent location, whatever that may be, can be left there indefinitely. After a few years there is a considerable increase in the amount and concentration of the underground root-stock, making the group very dense. If the concentration of plants becomes too great in a given area, it may be necessary to dig that particular area and reset in order to thin out to the desired concentration. This should best be done in the spring before active growth has started. They should be reset immediately.

Watsonia is another of the bulbs similar to the gladiolus. Its requirements for harvesting and storing are the same. The Calla Lily is a plant not related to the lily family at all as it is a tuber instead of a bulb. However, it is usually classed or grouped with the flowering bulbs as its manner of growth and flowers is somewhat similar. It produces, after a time, a dense mat of tubers. These should be left undisturbed unless it is wished to start the plant in some new location.

Briefly summing up, specially as when the different kinds of bulbs should be dug: In general narcissus are dug each year after they begin to yellow and before the summer rains. They should not be left in the sun after being dug, and should be stored in a cool, dry, well ventilated place.

Gladioli and Watsonia are usually dug when the tops begin to die down, but may be left in the ground for several years. Easter lilies need to be lifted only every two or three years, but the job should be done before rooting starts in late August or September, and they should be bedded immediately.

Among the bulbs that are left undisturbed unless it is desired to move them to new locations are Amaryllis, Day lilies, Crinums, Cannas, and Calla lilies. Snowflakes are usually left undisturbed for a number of years, and Montbretias are best left in the ground for two or three years. Freesias should be moved every four or five years.

Thus, we can see that the different bulbs require quite different conditions, and that it is up to gardeners to learn these requirements if they are to be able to properly dig and store or otherwise handle bulbs and have them ready for abundant bloom the next blooming season.

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Ornamental Gardening in Florida
Radio Series

Talk No. 36
May 16, 1934

THE LILIES OF A DAY

By H. Harold Hume, assistant director, research
Florida Agricultural Experiment Station

By way of introduction it is worth noting that the eastern parts of Asia -- China, Japan and adjacent areas more particularly -- have contributed greatly to the beauty of Florida gardens. Indeed if we were to remove from our state all those plants that have come directly from the Far East or that trace back to that source, the orange, rose, chrysanthemum, azalea, pittosporum, camellia and many others would disappear. So, too, would go the daylilies, a lovely group of herbaceous perennials that we are to consider at this time, for they or their progenitors came from the same region. In that portion of the world they have been highly regarded since long ago as garden and food plants.

To the botanist they are known by the name Hemerocallis (He-mer-o-cal'-lis), which literally means "beauty for a day," and are often referred to as "The lilies of a day" in reference to the fact that the individual flowers last but a single day or thereabouts. In our gardens are many ornamentals that we refer to as lilies that really do not belong to the lily family, but the daylilies are classified in the lily group.

The first we know about them dates back to a book published in Europe in 1570, when one of them was illustrated in "Historia," a work on plants written by Pena and Lobel. This particular variety is the yellow daylily. A period of 183 years passed by until Linnaeus (Linn-e'-us), the father of modern systematic botany, gave it a botanical name, Hemerocallis flava. In the meantime it had gone into many gardens, and being nameless undoubtedly it was known by such designations as "the lily from Berlin, "the one that Aunt Mary gave me," or "that yellow thing that I have in the garden," -- just as plants of different sorts are known to many even to this day.

Linnaeus, who gave a name to the yellow daylily, also described and named another, Hemerocallis fulva, the tawny daylily. This is a remarkable perennial, for though under all usual conditions it never produces seed it has been known in gardens for centuries and has made its way about the world simply through being divided into pieces. In abandoned American gardens it has persisted and it has become established as a wildling from material cast aside in garden making. For many years these apparently were the only daylilies known, but as time went on and contacts with the Orient widened other kinds were introduced and by the year 1900 eleven species and varieties were listed by the Cyclopedia of American Horticulture. Today thirteen wild forms or groups of forms have been recognized and described by botanists. In recent years, to be more definite, since 1900, several plant breeders -- Betcher, Farr and Stout, in America, and Yeld and Perry

in England, and others elsewhere -- have interested themselves in the daylilies to such an extent that through cross-breeding and selection there are now more than 150 named sorts, dwarf, medium and tall; pale yellow, golden yellow, copper-colored, tawny, mahogany brown, pink and red; with petals of different shapes and sizes, variously marked -- a truly wonderful assortment of lovely varieties. Beautiful though the varieties we have now are, the future without doubt holds new combinations of colors and new forms that will surpass them. Here at the University of Florida many seedlings resulting from crosses made by John Watkins are now ready for the test grounds. The collection in the Agricultural College garden numbers about one hundred at this time.

Daylilies are dependable garden plants for Florida gardens. They may be grown all the way from the Georgia boundary to the areas south of Miami and east and west throughout the state. This is remarkable because they are also at home in the cold climate of parts of Canada and the various northern states. Not all are likely to be equally adapted and some testing and selection will need to be done.

The daylilies may be divided into two groups, one evergreen throughout winter, those of the other group losing their leaves with the coming of cool weather. Preference with us will be given to the evergreen sorts, for the deciduous ones may not be adapted as widely through where they do succeed they are valuable because they are usually low-growing and bloom very early.

With a proper selection of varieties, daylilies may be had in flower for many months. Here at Gainesville they begin in March, reach their peak in June and end in August or September. For different parts of the state, the time of flowering will vary, earlier or later depending upon the seasons, heat and moisture.

Evergreen daylilies, when not in bloom, furnish good compact green masses that rest upon the soil and rise to a height of several inches, even to two feet or more. So they have value in the garden that for many purposes makes them just as valuable as evergreen shrubs of many sorts. As low or medium-sized plants they can be used in the shrubbery border very satisfactorily.

In considering the height of daylilies, two features should be taken into account, the height of the mass of leaves as they grow in clumps and the height of the flower stems when in bloom. As a rule, the early flowering deciduous varieties have leaf masses and flowering stems of about the same height while the later sorts as a rule produce flower stems that rise well above the leaves. It is necessary that these features be studied as it will not do to set low ones behind tall varieties when arranging them in the garden. Fortunately it is very easy to take the clumps up and rearrange them. With this in mind such varieties as Orangeman, Apricot, Gold Dust and Sovereign are dwarf or low-growing; WauBun, Mikado, Vesta and Cinnabar grow to medium height; while The Gem, Queen of May, Aurantiaca major (Au-ran-ti'-a-ca) and Fulva are tall-growing sorts. The height to which daylilies will grow is dependent in some measure upon the amount of plant food provided.

In color it will be noted that the color range is wide. Perhaps this can best be indicated by reference to certain varieties. Modesty is very pale yellow, Vesta is a good deep orange-yellow, Gold Dust is reddish brown on the

outside, yellow on the side of the flower, Fulva rosea is rose-colored, Mikado is orange with red brown markings, Aurantiaca is deep orange with orange red shading, Brownie is mahogany brown, and Fulva is orange copper-red. The shades are many and they vary with the lighting. All are bright and attractive in suitable light.

Most daylilies have open flowers during daylight and those who know only the older varieties may think that day-blooming is characteristic. But this is not so, for there are daylilies that open their flowers at night. There is quite a little variation in the time of opening and fading of different varieties. Some last approximately twenty-four hours from the time of opening while others remain open for a shorter time. Most of the day-blooming sorts are in good condition until about midnight.

Most gardeners are looking for flowers and garden subjects that are dependable and satisfactory but which at the same time require but little care. When these things are considered, there are few herbaceous perennials that are so free from insect and disease troubles and so easily grown as the daylilies. It would be hard indeed to find ornamentals so little subject to the troubles that befall many garden subjects.

They may be allowed to remain where planted for several years and all that is called for is a few handfuls of fertilizer or a few shovelfuls of stable manure from time to time. Even without these plant foods they will give returns, but best results are secured by giving them food and water as needed. Good care through the summer is repaid in abundant bloom the following season. At least once a year the dead leaves should be cleared away and when the flower stems have finished their crop of bloom they should be cut away. Sometimes, too, and particularly in small plantings, the removal of faded flowers from day to day improves the appearance of the flowering stems.

Daylilies may be grown from seed without any particular difficulty but specimens so obtained cannot be depended upon to reproduce true to type or form. Consequently they are not usually grown from seed except by those interested in securing new and different varieties. The common method for increasing the supply of a variety is to dig up the clumps and cut or break them into smaller clumps. They may be divided so as to separate all the individual shoots with a few roots attached and each of these will make a new plant. This is best done during the dormant period in winter. Shoots with leaves and even roots sometimes develop on the flower stems; these may be taken away and established as new plants.

While it is true that daylilies may be taken up and set out at any time of the year it is really best to move them in winter before growth starts. When setting them out, the soil should be enriched with a handful or two of commercial fertilizer for each plant and they should be watered well until established. Many of the daylilies have enlarged or swollen roots and as these doubtless hold a considerable amount of moisture they are helpful in establishing plants when newly set as well as in tiding them over periods of dry weather.

Here is a list of good sorts most of which should succeed in Florida gardens: Amaryllis, Aurantiaca major, Brownie, Calypso, Cinnabar, Cressida, Flava, Florham, Fulva, Fulva rosea, Gold Dust, Gypsy, Margaret Perry, Mikado,

Modesty, Mrs. A.H. Austin, Rosea, Shirley, Sir Michael Foster, The Gem, Vesta, WauBun.

Within recent months Dr. A.B. Stout, of the New York Botanical Garden, Bronx Park, New York City, who for a long time has been interested in this group and who has produced many beautiful sorts, has given us a book on daylilies, published by the Macmillan Company, in which the varieties listed and many more are described. It is delightfully written and should be in the hands of everyone interested in these plants.

In China and Japan, daylilies are a source of food. The flower buds and young shoots are cooked while the petals of several sorts are eaten raw or dried and used in soups. Indeed in parts of China daylilies are grown in quantity to supply flowers for food. Dried daylily petals, put up in pound and half-pound packages, imported from China, may be purchased in Chinese shops in the larger cities of America. The fresh petals have a slightly pungent taste. Why not make a salad that would catch the eye at the same time it would please the taste -- green lettuce, deep yellow daylily petals and red tomatoes! What a color scheme!

As cut flowers daylilies are valuable. The blooms of a single variety may be used alone, or since through them all something of the same color runs, in different shades, several varieties may be used in a single decorative composition. Used in large masses, in suitable containers, properly lighted, there are few flowers that can surpass them in a show that while striking and gorgeous is at the same time pleasing, delicate and refined. In beauty of color, in curve of petal, in grace of carriage they are distinct.

The statement will have been noted that the flowers of daylilies last for only a day. For that reason some may think that they are not worthwhile; they pass too quickly. But if a scape or flowering stem is examined it will be noted that there are a large number of buds. There may be a dozen and a half, for instance, each good for one bloom; so there are flowers for eighteen days. Since all the flower stems do not come at once, the flowering season from a clump of one variety may last for several weeks. There is something of value in the short life of a flower that is replaced day by day in that the blooms are always fresh, bright and gay. There comes to mind a glorious sight, seen but once, never forgotten -- white fleecy clouds in an azure sky on a sunlit Florida day, a field covered with a mass of dark green, grass-like foliage over which danced myriads of glistening, golden flowers, swaying on wandlike stems, changing in shade as light chased shadow across the scene -- daylilies in bloom! And then to think that all that beauty faded and disappeared before the rising of another sun, only to be replaced by a scene just as lovely, just as bright, just as golden, yet not a single flower was carried over from one day to the next.

"It is not growing like a tree
In bulk, doth make man better be;
Or standing long an oak, three hundred year,
To fall a log at last, dry, bald and sere:
A lily of a day
Is fairer far in May,
Although it fall and die that night --
It was the plant and flower of Light.
In small proportions we just beauties see;
And in short measures, life may perfect be."
-- From Pindaric Ode, - Ben Jonson.

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Ornamental Gardening in Florida
Radio Series

Talk No. 37
May 23, 1934

SOME NEW AND OLD PLANTS OF FLORIDA GARDENS

W.L. Floyd, professor of horticulture,
University of Florida College of Agriculture.

According to an old jingle a bride should wear on her wedding day

"Something old, something new
Something borrowed, something blue".

Most of this applies equally well to gardens. It unquestionably adds variety and interest to have the garden contain old favorites and new creations.

The old ones have associations and memories attached to them; grandmother's, a favorite aunt's, or some very dear friend's garden, perhaps in a distant State. It is pleasant to be reminded of these as we wander in the late afternoon amid the beauty and fragrance of our own garden. I have some that are constantly suggestive of the choice plants of a grandfather, some of whose characteristics I am said to have inherited. Many old plants are interesting because of their history, some because of the name of the discoverer or introducer, others because of the place from which they came, or the Old World region where they have been grown so long that they seem a part of it.

The rose is probably the oldest cultivated flower. It was crowned queen of flowers in Athens more than two thousand years ago, and long before that it had been grown and admired. References to it are found in many ancient writings, both secular and religious. It is grown today in every civilized country of the world.

Helen Fox in her book "Garden Cinderellas", a treatise on lilies, says: "Since the dawn of culture among the people of central and western Europe lilies have been known and cultivated. Among the Greeks and Romans they were favorite flowers". In the oldest book in Arnold Arboretum, published in Auchburg in 1475, is a figure of the Madonna Lily, which shows that this variety was appreciated centuries ago.

Miss Fox pays this tribute to them. "At the twilight their fragrance calls us into the garden; as the roses, petunias and other colored flowers gradually fade out in the gathering dusk, the white lilies stand out like friendly ghosts".

Florida has many varieties of lilies introduced from various parts of the world. Some coming from the Tropics will thrive out-of-doors in Florida as nowhere else in the United States. There are many lily-like plants, often called lilies -- as Crinum, Eucharist (Yu-cha-rist), Amaryllis, that are favorites here.

The Oleander, so abundant and easy to grow, almost continuously in bloom, contributing its bright hues to our winter landscape, is a native of the Mediterranean region where for centuries it has been a source of beauty and enjoyment.

The Jasmines with their fragrant, star-like flowers, are abundant in our foundation plantings, borders and gardens. Many of them came from Arabia, we know not how long ago, showing how the uttermost parts of the earth have contributed to our attractive and varied ornamental plantings.

The Camellia, more often called by its specific name, Japonica, in the South is named after Camellus, a Moravian Jesuit who travelled in Asia in the seventeenth century. How long it had grown where he found it and brought it back to his people, we do not know. It has been grown since Colonial times in South Carolina and Georgia, and was early introduced into Florida where it thrives in unsurpassed vigor and beauty. Every native Southerner feels that this is a plant of true Southern memories and associations.

One naturally thinks of the evergreen Azaleas along with Camellias, as they are so generally planted together in old Southern gardens. The varieties coming from India are our oldest forms and give us a wealth of pink and red bloom in late winter and early spring, to which we have later added new kinds of striking beauty, from Japan and China.

There are several old woody plants, that have a place in Florida gardens. Spirea or Bridal Wreath is one of them. It comes from Greece, where the name Spirea (meaning band or garland) was given because of its use in crowning heads of beauty or valor.

Another is hibiscus or Rose-Mallow. It is like the Oleander, almost continuously in bloom, and contributes wonderfully to the brightness and color of Florida in Winter.

Still another, hydrangea, a rather coarse but colorful old plant, is well suited to partial shaded positions.

An old English book on garden flowers that I have been reading recently calls hardy perennials 'old fashioned flowers'. This is more true for the gardens of England and those in this country established in New England and other colder climates, than in Florida, probably because where there is snow, ice and frozen ground during the winter, the plants store up, during the summer, nourishment in fleshy parts underground. They protect the eyes or buds with hair-like, downy or scaly coverings, and allow their more exposed tender parts above the ground to die at the close of the growing season. After the long winter rest the buds awake, and drawing on the stored food in nearby parts, grow rapidly and produce the first tender leaves, which are soon followed by flowers in early spring. We have perennials in Florida, but they behave differently and give us summer and fall flowers usually.

The most conspicuous new flowers of Florida gardens are among the annuals, because it is so much quicker and easier to make crosses of varieties which have promising characters and may give new and desirable combinations if blended, -- the first step toward the goal may be made in one season. Each year the catalogues bring to our attention new forms of old and well-known favorites, much improved by breeding and selection over the familiar ones.

An illustration is what has been done with the Zinnia. One does not have to

be very old to remember when Zinnias were just Old Maids with a cone-like center surrounded by a single circle of colored petals. One after another have appeared Mammoth, Picotee, Curled and Crested, Dahlia Flowered, Cactus Flowered, Pompon, Mexicana, Early Wonder, and others.

The Aster, an old favorite, has added new colors, sizes and more disease-resistant strains to Baby's Breath, new rose and carmine colors has been added to the original white. To the golden-hued California Poppy has been added creams, whites and reds. Larkspur has new double flowered varieties of different colors. Lupine, now has larger flowered, longer spiked forms.

To keep posted regarding new kinds one must examine carefully each winter the current flower catalogues and, lest some recent introductions be overlooked, read regularly a good garden magazine.

Suppose we run through the seed catalogues for the last two years and pick out some of the new gardening plants they offer. In the catalogues of last year there are a number of new and improved varieties that we might try.

One of these is the Guinea Gold marigold. It grows up like a pyramid and is 2 to 2½ feet tall. It bears semi-double flowers that are 2 to 2½ inches across. They are broad, have wavy petals and are orange and gold in color. The flowers have a less pungent odor than other sorts of marigolds.

Golden Gleam nasturtium is one of the 1933 introductions that has proven popular. This variety of nasturtiums has large double flowers that are from 2½ to 3 inches across. They are very fragrant and are golden yellow. Among the asters, we could mention the new wilt-resistant and peony-flowered kind. And, if you grow lupines, you should try the new Hartwegii giant kind. They grow 3 to 4 feet tall, have base branching habits, and bear 4 to 6 long spikes to the plant. Each spike has many more blooms than the regular kind.

Then, there is a new Dianthus, the hybrid Sweet Wivelsfield, and other hybrids much superior to the old forms. Among the pansies, there is the Swiss Alpenglow (Al-pon-glow) and several new giant forms. The verbena is an old garden favorite, and Lavender Glory is one of the newer kinds. It often has flowers that are an inch or more in diameter. Then there are the Beauty of Oxford Hybrids with many shades of large blooms in round trusses.

Another gardening plant that we might add to the 1933 new introductions is one from South Africa. It has rich orange, daisy-like flowers and goes by the name of Venidiam fastuosum (Ve-nid'-i-um fas-tu-o-sum).

If you will pick up a 1934 catalogue you will find a still greater array of new flowering plants. I can't help but mention several of the new hybrid petunias. The California Rose is one. It is a heavily ruffled petunia that is rose colored and veined with white. The Mauve Queen is another one that is beautifully frilled, and it is mauve with a center of purple. Pink Pearl is a large pink type with strongly veined centers, and the Pink Empress is a new one that is deeply fluted, heavily fringed, and one that is a rose pink with a golden throat. Another with rose pink fringed flowers is the Setting Sun, and this type grows as compact plants.

Among the newer double fringed petunias there are three that we should mention. The Madonna with deeply fluted pure white flowers, the Bizarre with a combination of rose-pink and white in striped effects, and the Rose Queen, a large deeply fringed rose pink kind.

The Calendular has grown to be one of our most planted annuals, and the 1934 catalogues brought us several new kinds. One is the Chrysantha or Sunshine with large double flowers of golden canary yellow that are borne on long stout stems. The petals are long, broad and drooping which gives the flower a globular form. Another new Calendula is the Sun Gleam. It has a tangerine-orange color with a brown eye, and the petals are slightly edged with brown. Then, there is the Topaz with double, whitish flowers that have sulphur yellow tips.

Another new annual well-worth your trial is the Chrysanthemum flowered poppy. It is salmon pink, large, and lasts well. If you want a double bloom that is a rich crimson carmine you might add the Carmine Queen variety of Eschscholtzia (Esch-scholtz'-i-a).

Among the well liked scabiosa we find a couple of new types. One with large, attractive flowers that are rosy-lilac is the Grandiflora Cattleya (Gran-dif-lo'-ra Catt-ley'-a). Another is the Double Tall Blue Cockade. The flowers are a deep azure blue, and they are so deep as to be almost conical in shape.

Those who like Delphinium should welcome the new pure white Iceberg, a variety that comes true from seed. And those who have been growing the white Baby's Breath or Gyphsophila (Gyp-soph'-il-a) should try the rose pink variety. It is a little later than the white.

For a large steel blue flower one of the newest is Linum narbonense (Li'-num nar-bo-nen'-se). Among the Gaillardia varieties, there is Sunset with large fine yellow flowers. This is an unusually beautiful variety of this well adapted flower. And, last but not least we might mention the Purple Beauty, a new variety of Sweet William. It is a bright deep purple and is a new color in this favorite flower.

When you have selected from this large array of old and new plants you will have something old, something new in your garden; old ones for their quaint beauty and historical values and new ones with all their unusualness and striking colors.

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Ornamental Gardening in Florida
Radio Series

Talk No. 38
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VINE-CLAD WALLS, TRELLISES AND ARBORS

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Could we but roll back the eons of time, it indeed would be interesting to review the development and spread of plant life. Were the large trees of today always huge specimens or did they in the course of survival find it necessary to gradually reach higher and higher to obtain the sunlight needed for existence? And are the so-called shade-loving plants adapted to shady situations because they were compelled to seek shelter, or was it forced upon them? And the vines - were they originally small shrubby plants that had not the strength of stem to compete with trees and larger shrubs for their share of the sun but, nothing daunted, developed the ability to climb by twining or weaving so that their strongest competitors later were forced to become their means of support? Great trees may be the monarchs of the forest but at the same time they are slaves to the apparently weak vines that reach to the same great heights, in much less time, by utilizing the tree trunks for support.

Vines, in their habit of growth, cannot be compared to shrubs nor to trees, but occupy a distinctive place in the plant world. Mother Nature, when she developed the great groups of plant life, gave us in vines a type of plant growth for which there is no satisfactory substitute. Some vines may be effectively grown as low shrubs, some shrubs may be trained as small trees, and some trees kept pruned to a shrub-like appearance, but few indeed are the other plants that may be trained in the habits or appearance of vines.

The art of landscape gardening has been quick to recognize the merit and place of vines in ornamental planting and they are now included to no small degree when suitable subjects are available. Their habit of growth makes them well suited for situations where neither trees nor shrubs are adapted or are satisfactory. When properly selected vines tend to lend contrast and character and supply a finish to plantings that can be attained in no other way.

There is now no question as to the desirability of shrubbery plantings about the home, but there is still the question as to what, how, where and when to plant. It has been most aptly stated that the first tendency in home planting was to plant only a wreath of greenery about the house foundation, which in some instances gave the appearance of a house set on a feather bed. Slight alterations in placing the foundation materials, coupled with a judicious use of vines and trees adapted to the conditions involved can change such an unsatisfactory situation immeasurably.

The old, severe, box-like type of house with ornate trimmings in wood or iron, wherein fancy scroll work at gables, eaves, verandas, and all other places where such could be fitted in or tacked on, has given place to those of simple but decorative outline. Greenery, in the form of shrubs and vines, is used to improve

the appearance of the new type home, and care in planting must be exercised that architectural features are neither hidden nor emphasized in too great a degree. Vines here play their part and can be included to advantage; the tightly clinging sorts that may be closely clipped will accentuate desirable lines, and vigorous, rampant growing varieties will tend to obscure harsh features.

With observation and some study, it is not difficult to become acquainted with the growth habits of vines, including their virtues and faults, and to thus determine those best adapted to the situation and the effect desired. It is well to bear in mind not only the desirability of the vine itself but as well the effect it will produce on the building or other support in the place wanted. Monotony and lack of naturalistic appearance of plantings can be relieved to a great degree by the inclusion of vines. Some of our most attractive homes owe no small part of their charm to the free-flowering varieties for which Florida is justly famed. It is true, of course, that some of the strikingly flowered varieties may not be in harmony in many situations and with all types of buildings, but each of them has a fitting place in combination with the different styles of architecture and the many and varied garden needs.

Vines are especially suited to ornamental use on arbors, trellises, fences, pergolas, verandas, and certain places on building walls. Tree trunks are well adapted as supports for some varieties; rock, stucco or concrete walls for others; and heavy wire netting of coarse mesh is particularly suited for the heavy, woody kinds. Vines climb by means of twining, weaving, tendrils, and direct attachment, so that regardless of the type of support there is a variety available that will be found admirably suited. By the use of properly adapted varieties, division fences or garden walls may be transformed from the appearance of unsociable barriers to decorative objects, back lot enclosures can be made to lose their unattractiveness, and unsightly objects may be hidden from view.

Usually, the beauty of vines is enhanced when the plants have an immediate background, and the better effect is more likely to be attained when the supporting trellis is closely adjacent to a building than when placed as a detached object somewhere on the lawn..

Trellis materials and construction are highly important since a weak trellis will be near a state of collapse at about the time the vine has covered it, and repairs then will be difficult if not impossible without major damage to the vine. Simple but strong trellis work is usually preferable to a complicated pattern. In placing, it should be free of the wall to permit ample circulation of air, and at the same time clear of the drip from the eaves. Many woods are satisfactory for trellis construction but, where available, cypress is usually preferred. All underground parts should be thoroughly soaked in creosote or other wood preservative, and the exposed parts well painted. If of metal construction, only galvanized materials should be used as rust will soon destroy unprotected and exposed iron.

Vine-covered pergolas are becoming more common, and in their construction it is needless to say that they must conform to the style of the house. The usage of pergolas is mainly as a connecting or a terminating decorative feature; they may connect parts of a garden or act as a covered passage from building to garden but should not be expected to serve as an isolated and disconnected garden ornament. It probably is unnecessary to add that, generally, only vigorous growing, rather heavy vines should be planted; a small weak vine in its attempt to climb and cover a pergola of fairly large dimension is more grotesque than ornamental.

Transplanting of vines from the open ground is usually done during the winter months although potted plants and some of the more tropical kinds may be moved at any season. Thorough preparation of the soil prior to planting will be of material help in securing and maintaining a vigorous growth in the plants. Soils should be thoroughly spaded, not only deeply but over a wide area, that the root system may easily spread and develop. Incorporation of muck, compost or other litter is recommended for sandy soils. Commercial fertilizers may be used freely and to advantage. Mixtures, derived in part from organic sources, with an analysis approximating 4 to 5 per cent nitrogen, 6 to 8 per cent phosphoric acid and 3 to 5 per cent potash will be satisfactory in most cases. Steamed bone, guano, or tankage, alone or in combination, will also be found beneficial.

With most vines comparatively little pruning is required other than to keep them within bounds. Rampant growing varieties may need trimming back occasionally and especially so when growing over a porch or on the walls of a building. Too much or too heavy vine growth in such instances may tend to give an appearance that is not pleasing and an impression of lack of balance in the plantings. Most flowering varieties are pruned shortly after the blossoming period is over since late pruning, with some species, will remove wood that produces the flower buds of the next season.

Some of the less hardy vines are not adapted to statewide planting because of the difference in minimum temperatures experienced between the nortnern and southern sections. No definite lines separate the climatic zones of Florida but in the selection of varieties it must be borne in mind that many of them cannot withstand prolonged low or freezing temperatures. The hardiness of the plant in question and the location in the state where it will be planted should be considered. Several local factors, other than latitude, have a moderating effect on temperature so that in many localized areas tropical varieties are grown that are not generally adapted to the area as a whole. The loss of a vine by freezing, however, is not usually of serious consequence if the roots are not killed for it will come back quickly and there is no impairment of symmetry as may be the case with cold-damaged ornamental trees.

There is an exceptionally wide choice of vines for Florida planting, not only of those adapted to a given type of support, but among the vines themselves there is a great variety of both foliage and blossom in size, color and general appearance. During any month of the year there are vines in bloom in some part of the state. Most of the species are evergreen which makes them doubly valuable in that their beauty and utility are not seasonal but present throughout the year. Some deciduous sorts, however, because of their striking blossoms or other very desirable characters, are worthy of space in many plantings.

Those parts of the state which are less subject to heavy frosts are especially fortunate in having a climate that will permit the growing , under out-of-door conditions, of many varieties, that are not known in more temperate regions except as greenhouse specimens. Included in this group of tropical species are some which have very striking and unusual foliage and bloom. The less common varieties are always a source of interest and favorable comment and the opportunity of including them in the garden planting should not be neglected in the only area in the United States where they can be grown.

The choice of varieties for ornamental planting is almost unlimited, there being over 75 species or sub-species of perennials in the state as well as numerous annuals that are ideally adapted. Lack of time does not permit the naming of these many varieties, much less describing even a few of them. The available kinds extend over a wide range of evergreen and deciduous sorts. They vary from dainty twiners to heavy woody types; from those with small foliage to ones having huge leaves two feet in length; and from miniature-flowered plants to climbers whose blossoms are six inches across. The range of color in the blossoms is unusually great; it includes various shades of orange, red, crimson, pink, white, blue, lavender, violet, buff, yellow and brown. The exceptionally wide variety of ornamental vines available to the Florida gardener provides a suitable climbing plant for nearly any situation where a climber is desired.

Bulletin 188 of the Experiment Station lists numerous perennial species of ornamental vines and furnishes information as to their appearance, growth habits, adaptability and culture in Florida. Those interested in the subject may obtain a copy from their county agent.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF FLORIDA

COLLEGE OF AGRICULTURE
UNIVERSITY OF FLORIDA
AND UNITED STATES DEPARTMENT
OF AGRICULTURE,
COOPERATING

AGRICULTURAL EXTENSION SERVICE
COUNTY AGENT AND
HOME DEMONSTRATION WORK

Ornamental Gardening in Florida

Talk 39
June 6, 1934

THE SIMPLE THINGS IN GARDENING

H. Harold Hume
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In the making of our gardens, we so often overlook the simple little things. Many who profess to be great lovers of a garden, of growing and flowering plants, have very little conception of the constant details necessary in the having of these things. Gardening is far more than the setting of a little grass or the planting of a few seed. We humans have to eat, drink and dress regularly, and we should expect no less of the living plants in our garden. These little, simple details make the difference between many a garden of joy and beauty and similar spots that are failures. They are like the pennies that make dollars; they add up, and one by one, day by day they make gardens.

For many years correct information has been available and has been given out on the simple subject of how to plant trees. And yet, in Florida this past winter every rule of proper and right handling has been broken along the highways of the state. Roots have been unduly exposed, tops left unpruned and undefoliated, trees have been set loosely and too deep. If there was anything that could be done wrong, it was so done. Go into our towns and villages and note the tree butchery that passes under the name of prunning. We wonder whether the simple rules of how to prune a tree will ever get home to those who have such work in charge. It is just as badly done as though those doing it had never seen a tree before, and the worst of it is that it is no more costly to do the job right than it is to do it wrong. Valuable trees are being damaged in ignorance and their lives shortened. Why shouldn't this necessary job be done right? Why shouldn't branches be removed without splits, with smooth clean cuts, close back to the branch or trunk from which they start? Why shouldn't the cut surfaces be painted with a good, cheap asphalt paint, to preserve the wood, to keep water out and to prevent decay? Maybe some day we will realize that pruning is not a job for those who are ignorant or careless.

Along the same line, what about the trees and the pruning in our own gardens. The pruning of shrubs of different kinds is woefully neglected. Usually it is too long delayed. From time to time beginning a few months after planting, shrubs should be pruned to keep them within reasonable bounds. They should not be barbered by rounding them off, or making them flat on top. They should be allowed to grow naturally and to this end they must be pruned so as to preserve their natural form or habit. This can best be done by cutting off the

branches down in the heads of the shrubs, taking them out here and there in such a way as to leave the tops natural and irregular in outline.

The care of the garden should begin before it is planted. Good soil is the foundation of all good gardens and things may be done to the earth better before plants are set out than can ever be done afterward. When the garden is planted the work put into soil preparation does not show. Two areas, the one poorly prepared and poorly done, the other with soil well supplied with humus, well dug and fertilized and properly drained, may look exactly alike. The difference between the two shows up afterward. The well-made garden will make its way in spite of unfavorable seasons; it will grow and thrive, look well and give satisfaction; it will require but little attention except for water; it will be a joy and a pleasure. But if the ground has been poorly prepared, if it is lacking in humus and fertility, the plants placed in it will become unthrifty and will require much more labor and expense to maintain. The garden will not reach a state of satisfactory development. Then prepare the soil well giving particular attention to the incorporation of vegetable matter in the form of peat, rotted leaves, leaf mold, and thoroughly decayed stable manure. For our soils, an application of three or four inches of such materials as these, well mixed with the top eight inches of natural earth, will work wonders. If the soil is very light and poor, more will be advisable. It may be desirable to remove the original soil and replace it with a made-up soil of good composition.

Watering is a simple operation and yet how frequently neglected, how niggardely done. You must remember that all the food and all the materials that a plant gets from the soil are taken up in liquid form. It follows then: no water, no food; no food, no growth. There must be water in the soil that the roots may take it up to fill out the Plant's cells and to carry into the plant, through the roots, plant food for growth. In wateringgarden plants, water thoroughly. Water an inch deep applied to the lawn, to a shrubbery border, or to a planting of roses or zinnias or anything else will do a lot of good during a dry season. But if that same inch of water is split into eight parts and applied on eight different days, it may be entirely useless.

There is no general rule to be followed in applying water to outdoor plants. The gardener must learn to know his plants and their behavior, and to watch for the first symptoms of distress. Wilting may be checked by merely sprinkling the tops, but if the soil is dry, permanent relief can be secured only by soaking the soil thoroughly. Plants recently set should be watched carefully, and in the case of trees and shrubs more water than usual will be needed during the first summer following transplanting, because their root systems are limited in extent. When these require water, it is best to provide a basin in the soil about them, fill this with water several times and allow it to soak in. In addition, the tops of broadleaved evergreens, transplanted with part or all their foliage left on, should be sprinkled or syringed frequently. In fact, it is a good plan to keep them damp almost constantly until they are established. This checks transpiration and evaporation and keeps their moisture-content at or near normal.

Water applied late in the evening or at night is more effective than if given during the day because transpiration from the plants and evaporation from the surface of the soil do not proceed so rapidly as when the sun is shining. It has been said that plants are damaged by being watered when the sun is on them. If this were true, there would be few plants left in Florida. Sprinkling in sunshine may be injurious at times to tender species, but thorough watering can result only in good.

For good root development, for holding water, for retaining and furnishing soluble plant food, humus formed from decaying vegetable matter is a necessity and no garden soil is ever satisfactory without it. Plants have to be fed from time to time and it is difficult to secure full results from the use of fertilizers if the soil is lacking in vegetable matter. Maintaining a good compost heap made up of leaves the prunings of shrubs and trees, mold from the woods, and stable manure, is well nigh indispensable. Do not waste good vegetable materials. The amounts of these materials that go to waste in the towns and cities of Florida every twelve months is appalling and yet a glance at plants and trees that are city property indicates how vitally vegetable matter, that could be supplied from this source, is needed.

In relation to care, the daily inspection of the garden is very important. If the area is small, it is possible to inspect all parts, every plant in it, once every day. How often does it happen that good plants are lost because they have been overlooked! In an interval of a few days they have suffered for lack of water, insects may have gained headway and destroyed them. It is often just as important that a certain piece of garden work be done on time as that it be done at all. Then keep a careful eye on the garden -- water, feed, spray on time.

Finish in the garden is important. It should be trim and neat, free from withered flowers, dead leaves and branches. How often is it the case, following the cold periods that sometimes come, that dead branches or whole plants, their leaves withered and unsightly, are left standing for days and weeks. In the interest of the finish of the garden, they should be removed and all signs of distress removed quickly. Then, too, walks and edges should be trimmed and the grass mowed. You and I need a haircut now and then -- so does the lawn.

If it has not been done yet, the lawn should have its spring application of fertilizer right away. Put on a good application of a balanced fertilizer rich in ammonia or of cottonseed meal; Put it on at the rate of a half ton to the acre, which means two and one-half pounds to one hundred square feet, and wash it down into the grass. Water as needed and when the lawn is mowed do not cut it too closely. It is not good for running grasses to be mowed so as to expose the prostrate stems.

It must be emphasized that the care given plants at one season of the year is reflected in their behavior many months later. The price which we must pay for flowers and growth in the spring of 1934, for instance, is the food, water, protection and care that we give the plants now. If there is good growth and good food storage

during the summer and fall of this season in perennial plants, then reward will come in wealth of bloom the following spring. Again, in handling bulbs in the garden, gladiolus or narcissus, for instance, gardeners too frequently fail to realize that the care and attention must not cease with their flowering. After that time they should have needed water and plant food, potash and phosphoric acid in particular, until they have fully matured and their leaves die down. What you get out of your garden, of interest, of health, of joy, of plants, of flowers, will be in direct proportion to what you put into it of planning, of thought, of study, of comradeship with your plants, of yourself. If you give little, your reward will be proportionately small; if you give abundantly, your return will be ample. You may fool yourself, but you can't fool plants.

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Ornamental Gardening in Florida
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NATURAL BEAUTIES OF FLORIDA ROADSIDES AND THEIR CONSERVATION

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Over the highways of Florida there has come a tremendous change in recent years. Indeed, the present system of roads is a development of a short period of time, as the years are measured. One may travel over paved highways into almost any part of the state, and journeys to many points may be made by any one of several different routes. We are approaching the time perhaps when rebuilding and maintenance may be of more importance than new construction. As a rule the roadbeds are well graded and well drained, the berms are protected by grasses or other low-growing ground covering plants, the ribbon-like pavements lying between strips of green present a pleasing appearance. The highways of the state are a basic asset; they have assisted greatly in the state's development, and they can be made of still greater value by enhancing and preserving the beauties of adjoining areas.

The beauty of any highway is affected very definitely by the country through which it passes, by what adjoins it on either side. There are certain roads in Florida that must be classed as unusual -- perhaps they should not be classed as beautiful in the ordinary sense, but they are most interesting. The beauty of Florida roadsides depends not upon lofty mountains or rolling uplands or turbulent streams, but upon views of placid lakes and smooth flowing streams fringed with trees and shrubs and lowly-growing plants, upon stretches of marsh or flat pine forests gay at certain seasons with a riot of bloom peculiar to Florida soil and climate, upon glimpses here and there of the windswept ocean or the rolling Gulf. More than anything else there enters into the beauty of Florida's landscapes the varied plant life for which the state is justly famous. It adds height to hilltops, it fringes lakes and ponds and rivers, it covers marsh and higher ground, it floats upon the surface of placid lakes and streams, it covers trunks and branches of widespread trees, it hangs in festoons from swaying branches, it covers with dense impenetrable growth the lower, moister lands and shades the higher areas with open, parklike growths of pine and other trees. Because of these special features, Florida is a beautiful and an unusual state. Its flora makes it so. To the maintenance and enrichment of this natural beauty the best thought and action of the citizens of the state may well be directed, and particularly is this important as related to areas adjoining our highways.

It is a fair statement that in laying out and building the highways of the state much of natural beauty has been sacrificed and, I regret to add, a great deal of it needlessly so. Few roads have been projected, surveyed and built with the scenic beauty of the route definitely in mind. If proper con-

sideration is given to the basic value of beautiful roadways and roadsides to the state, then in all future road building this feature must receive the attention to which it is entitled. Every proposed right-of-way should be critically examined to determine what of beauty and interest may be made accessible, what of noteworthy features may be preserved. We may well consider a curve in a road to preserve a beautiful group of trees, we may well put a bend in a ditch to save a specimen, we may well bring a road up to the top of a hill, that a distant view may be secured, we may well swing a road to the margin of a lake or the border of a marsh that something of its beauty can greet the eye of the traveler. In the past these features have not been valued at their true worth, and a distinct change of viewpoint becomes necessary. Railroad engineering and construction has been the background of highway development. In all seriousness there is need of a change of viewpoint, and we must have a highway engineering viewpoint separate and distinct from that of railroad building. The ideal would be the vision of a landscape engineer, the next best would be the opinions and views of a thoroughly trained landscape architect worked into the plans. That there is developing a more sympathetic attitude toward our landscapes is exemplified in some instances of road building, but there is need for more of it. It is of primary basic importance to the welfare and future development of Florida that these ideas be given full consideration.

But, these suggestions cannot help us fully with roads already built. To the planting and improvement of them much thought, discussion and effort have been given. To this date I must say, and I say it with regret, very little has been accomplished. Moreover, I have the feeling that attempts along present lines are futile and little of value will come of them. We have planted trees and shrubs along the open highways of the state, and what is there to show for the effort, time and money expended? As compared with the great extent of our road system, nothing. For one reason or another we have failed. Why? Because we have set trees and failed to give them necessary plant food. We have put them in the ground and have gone away and forgotten them. We have planted them and failed to protect them against fire. Cattle have used them for scratching posts; one thing or another has befallen them until, in the main, we have nothing to show for what it was hoped might result in great improvement.

Before much can result from roadside planting adequate protection must be afforded against fire. There must be ample provision for proper maintenance after planting, at least until thoroughly established. Water may be needed, fertilizer is required. It must be someone's job to give necessary care. In the interest of highway beautification and safe travel as well, cattle must be excluded from the highways. I do not blame the cattle; the road berms afford the best grazing at hand. The system and the general point of view, instead, are at fault. Unless the conditions indicated can be corrected, unless adequate provision is made for maintenance, unless protection is afforded, we may just as well discontinue our efforts along present lines until these untoward conditions are corrected.

Viewpoint and treatment must change and they will change. In the meantime, that is until the results from plantings of one kind or another become more dependable, much may be done. Much may be accomplished by putting into execution plans that I have advocated, talked and written about for many years.

These plans involve the widening of right-of-ways. How wide should they be? That depends upon a forecast of how much traffic a given highway will carry in the future years. They must be wide enough to permit of widening the paving in the future. They should be wide enough to provide for strips of land along each side back of the ditches to carry, in the main, native plant life. In many instances, these strips are already planted by nature with trees, shrubs and other plants peculiar to the areas through which the highway passes. From these areas, fallen or dead trees and stumps should be removed. Some thinning may be necessary, not too much, and shrubs and herbaceous perennial plants as well as trees should be allowed to remain in place. These strips need not be continuous. Areas that are now bare and unplanted may be allowed to remain so; they may be planted or they may be protected and left to nature to plant. And nature will do just that. Wherever there is soil, plants of some kind grow naturally in Florida. If any piece of land is stripped of its native vegetation, and the surface layer of soil itself carried away, in almost every case, unless it is hard, steep and constantly washed, a new crop of plants will cover the bare surface in a few seasons. No piece of ground is so poor, so wet, so dry, so shaded, so swept by winds of the sea or drenched by ocean spray but it will grow native plants of some sort. These should be given first consideration. They may not be the most beautiful, they may even look straggly and unkempt, but no plants are beneath notice and most of them improve in appearance and increase in beauty as they grow older. The widening of right-of-ways should be sufficient, wherever advisable, to include little parks or beauty spots. These may take in areas near lakes or rivers, they may include groups of trees or spots where unusual vegetation grows. Picnic and camping areas should be provided at suitable locations. Outlooks to beautiful views in the distance should be opened up.

When bare areas are planted, care and knowledge need to be applied. The materials used should suit the plan, they should fit the soil, they should be adapted to the particular environment. From city streets we have borrowed again. This time it is the idea that trees must be planted in straight rows, spaced just such and such a distance apart. It is high time, generally speaking, that the street plan of planting be discarded. It may have its place here and there but straight rows of trees in the open Florida country, backed by the miscellany of our landscapes, are, on the whole, not desirable. The better plan is to plant the trees in groups at suitable locations, three or four in one place or a dozen or more in another. No greater number need be used to the mile than if planted in rows. The effect will be immeasurably better. Needless to say, the materials used, preferably native, should be so selected as to introduce no strange or discordant note. Along the back of the areas so planted, a fire guard would have to be made and maintained.

The planting of low-growing flowering plants, mostly annuals, adds much to the beauty of our roadsides. There are splendid examples here and there throughout the state. Phlox, coreopsis, gaillardia, argemone, verbena and vinca are suitable. Seeds may be secured from plantings already in existence or small quantities may be purchased, grown for their seeds and these sown in due season. All that is necessary is to scatter them along the grass-covered roadsides. Some, not all, will take hold and their numbers will increase from year to year. Late October or early November is about the right time. It will be noted that only a few have been mentioned. The list is made up of sorts that are self-perpetuating. Once started on suitable soil, they come up from year to year to give color to the roadside.

The roadside advertising sign nuisance is ever in evidence. Unquestionably the roadsides in the broader sense belong to the people, they are for all, and not for the advantage of the few. The removal of all advertising signs from our roadsides would greatly enhance their beauty. If anyone with an open mind, perhaps there are few such, will check a road such as the one that runs east and west through the Ocala National Forest, where signs are absent, against one cluttered with signs, I shall not say where, he cannot but be impressed with the quiet, restful beauty of the one and the discordant note introduced by the other. How can this nuisance be reduced or abated? Wider right-of-ways will push them back, suitable legislation will help, but above all an awakened consciousness of the eternal fitness of things on the part of the public is necessary. Here and there communities have succeeded; much more can be done. We need to become roadside-minded and plant-minded.

In Florida there are many beautiful roadsides and to a few of these attention may well be called. Drive the Tamiami Trail from Miami to Fort Myers, get out on it by sunrise and see the bird life of that region. Take to the road from Starke to Green Cove Springs in April and reach a point three miles west of Green Cove Springs by 8:00 A. M. on an April day to see the windflowers in bloom. If you are too late they will have gone to sleep for the day. Follow the Ocean Shore Boulevard from St. Augustine to Daytona Beach and you will see one of the most unusual plant compositions and one of the most unusual roadsides to be found anywhere in the world. On the one side, the vast stretch of the Atlantic, calm and smooth or disturbed and wave-broken, and on the other a sea of innumerable palms, trees and shrubs smoothed and flattened down by the shearing winds, a veritable mosaic of colors in shades of brown, gray and green. Farther south in the Jupiter section where the road traverses the rolling ocean dunes of long ago, much the same appearance is presented. Go along the John Anderson highway and see the wonderful palm groves of the Halifax country. Take a trip over the road from Port St. Joe to Apalachicola. Here the Gulf of Mexico, calm and placid perchance, comes in sight. And then drive up along the river. Here, too, are sand ridges and palms. Here in places some sympathetic engineer left the cabbage palms standing on the roadsides fairly close to the paving and in the ditches as well. Drive from Kissimmee to Haines City and note the giant, centuries-old cypresses that have been left in places where trees are not commonly left. They are splendid, magnificent. Would that we might have many more of them along our roads. And when you look at them you cannot help realizing how puny are the efforts of man and how much preservation means. I might go on, but time is up.

I have spoken in the interest of a more beautiful state. Will not all who have heard me help in bringing this about?

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