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ROSES IN FLORIDA

G. H. BLACKMON, J. V. WATKINS, W. L. FLOYD

Fig. 1.—Antoine Rivoire, a hybrid tea with creamy-white blooms delicately tinted with pink, is usually very dependable.

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COOPERATIVE EXTENSION WORK IN
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ROSES IN FLORIDA

By G. H. BLACKMON, J. V. WATKINS and W. L. FLOYD

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INTRODUCTION

The rose probably enjoys the greatest popularity of all flowering plants and is extensively grown for both pleasure and profit. It has been cultivated for as long a period of time as any ornamental plant and the flowers are acceptable for decorative purposes on all occasions. Its history is quite romantic and it has figured in the literature of all languages and nations down through the ages.

In Florida the rose is of great importance and hundreds of thousands of bushes are planted annually by amateur and commercial growers. However, many factors affecting growth must be taken into consideration if there is to be abundant flower production. Varieties available have been introduced from locations outside the state and many are not suited to the climatic and soil conditions here. Consequently, one must select varieties with care to obtain beautiful flowers in great numbers. Nevertheless, it can be safely said that the growing of roses is not so difficult if suitable precautions are taken in the selection of varieties and planting stock and providing conditions for adequate growth.

Some of the stronger growing varieties, with proper care, will give fairly satisfactory results in permanent planting but only a comparative few will produce the abundance of bloom in subsequent years that will be obtained the first season after transplanting. This situation has given rise to one type of rose culture in which the plants are treated as annuals. By this method new stock is purchased from the nurseries each autumn for the cutting garden and the plants are kept in a vigorous, thrifty condition so as to give maximum flower pro-

1Blackmon: Horticulturist, Florida Agricultural Experiment Station; Watkins: Assistant Professor of Horticulture, College of Agriculture; Floyd: Formerly Assistant Dean, College of Agriculture, University of Florida, now Emeritus Professor of Horticulture.
duction throughout the growing season. At the end of the blooming season, in early fall, the plants are removed and the soil is made ready for setting the new stock. When roses are grown in this manner it is possible to increase the variety list greatly, as many will produce blooms for one season that would not be satisfactory over a period of several years. However, this method cannot be successfully followed unless strong No. 1 stock is secured with which to make the annual plantings.

The growing of roses as permanent plants seems to be the natural method of handling the garden and is desired by amateurs wherever possible. Varieties must be selected that can be successfully carried over several seasons to justify their place in the garden. This can be done but it will require careful attention to the spraying program, for the control of insects and diseases and the nutrition of the plants if flowers with long stems are to be provided in abundance.

ROSES IN THE LANDSCAPE

When a plant demonstrates its adaptability in a new country so well that it naturalizes without aid from the hand of man, that plant deserves consideration when we plan our gardens. It seems to be a gardening tradition to seek the exotic, the unusual, the rare plants for one’s garden, and this trait is commendable in that it sets one’s garden above the commonplace, giving it distinction and charm. But all too often, in our seeking for the unusual, we overlook the very excellent plant material that is growing at our very doorsteps. These tried and true materials should be used as the firm foundations upon which the weaker growers, the temperamental garden plants, should be allowed to lean for stalwart support.

The roses that inspire this tribute to dependable naturalized plant material are, of course, the Cherokee rose (Rosa laevigata), that native of China that has found a congenial home in Florida, and the Macartney rose (Rosa bracteata) that contributes so magnificently to the spring garden picture.

In addition to these naturalized oriental species, any garden-conscious person is well acquainted with certain other members of this great genus, Rosa, that, although not naturalizing themselves, show remarkable tenacity of life in our trying semitropical climate. First place in this class might be given to Yellow Banksian (Rosa banksiae). This robust, evergreen, thornless climber exhibits an adaptability that is positively
astounding when one thinks of the very short lives of some of our most popular cutting varieties. An important position must be given, perhaps, to that comparative newcomer to Florida gardens, Belle of Portugal. This hybrid of *Rosa gigantea* is almost assured of success in the deep South and the vigor with which it grows and the myriads of huge pink flowers that it produces each spring should satisfy the most critical of rosarians.

Next in this class of persistent garden roses for the lower South we might list the interesting Noisette group (*Rosa noisettiana*) which contains that long-time favorite, indispensable in every garden of the old South—shade-loving Marechal Niel. In this group that was originated by John Champney in Charleston we find also Reve d'Or and Lamarque, two other very tenacious varieties.

These rampant climbers and some of their descendants can be depended upon to contribute very definitely to the garden ensemble year after trying year, while cutting roses are succumbing to the ravages of blackspot, brown canker and the upsetting influences of light sandy soils and not enough rest. The rampant climbing forms, always excellent material for background for enframement and definition, are so well adapted to the Florida climate that they are very long-lived and seldom need replacing, while the temperamental bush hybrids that are demanded today for flower arrangements can be grown in closely planted beds in front of the climbers and discarded and replaced when necessary.

If the garden design calls for a fence or trellis one or more of the striking climbers can be trained on the structure. The planting interval should be about eight feet. Very often a vigorous vine can be used to climb up that narrow space on either side of the garage doors and, when tied to horizontal wires, it can be encouraged to cover, and thus soften and add a great deal of interest to the gable end. The yellow Banksian is beautifully adapted to this use.

Most of us have seen the delightful effect that can be attained by planting vigorous climbing roses by pine trees so that the canes may be secured to the tree trunks as they grow. Members of the Noisette group are charming when grown in this way.

One of the most popular of garden appurtenances is the combination gate and arbor with seats on either side. This structure, in its many variations, lends itself beautifully to the planting
of attractive climbing roses. It shows them off well and it allows for their easy maintenance.

In a garden of formal design nothing is more attractive than pillar roses. Posts of material and color that reflect the feeling of the garden are set at strategic accent points, and on these posts are trained climbing roses. By judicious pruning and careful tying, these pillars are kept neat and compact and when in bloom the roses are very telling in the garden picture.

In the modern mode for white houses of brick or concrete block, some certain climbing forms are very effective components of the garden when they are grown espalier-wise against a garage wall.

A rose that persists in many older northern Florida towns is Marie van Houtte. This old fashioned tea rose assumes picturesque shapes, develops a great deal of character as the years pass and these old, gnarly plants are often used effectively in patio plantings. If they are selected and transplanted with forethought and care they can create a most attractive picture.

Bush roses in close bed formation should not be used in the foreground or as a main feature of the landscape plan. When the plants are dormant (modern cutting roses need a specific rest) and properly and closely pruned, they leave a great deal to be desired from an aesthetic point of view. Roses that are wanted for the house must be cut as the first or second petal unfurls, and this cutting of the immature flowers precludes any garden value that the rose plants might have.

For these reasons the writers believe that the rose bed should be in an enclosed portion of the grounds, preferably as a part of that screened utilitarian area that designers call the cutting garden.

CLASSIFICATION

Roses are ordinarily classified according to the original species from which they descended. The lineage has become so complex through years of hybridization that the classes overlap considerably, and no one can say definitely, for example, whether or not a modern cutting rose should fall into the Tea class rather than in the Pernetiana or the Hybrid Tea classification. However, the list herewith presents the horticultural classification usually accepted by most students of rose pedigrees. This is intended for use by Florida gardeners and does not include many other groups of roses successfully grown in Northern states but of doubtful value in the Gulf Coast region.
TEA.—This class of garden roses is indigenous to the warmer parts of Asia and comprises many of the varieties most cherished in old gardens of the deep South. The plants are rather vigorous growers when good conditions are provided, although they are easily injured by low temperatures. The tea-scented flowers are usually of delightful form and exhibit a wide range of colors. Continuous blooming is characteristic of this group unless dormancy is induced by low temperatures. Among the best of the Tea roses for Florida might be listed the following well known varieties: Duchesse de Brabant, Lady Hillingdon, Mme. Lambard, Marie van Houtte, Minnie Francis and Safrano.
HYBRID TEA.—In this group is found the great majority of sorts that are offered to meet the present day demands for fancy cutting roses. Pedigrees of Hybrid Tea roses are very complex and varieties that really should fall into other classes are often placed in this group. Hybrid Tea roses are more nearly perpetual bloomers than are members of the Hybrid Perpetual group. They combine nearly all of the colors possible in the genus *Rosa*, are usually characterized by long pointed buds, strongly scented of tea. Some few of the scores of Hybrid Tea roses successfully grown in Florida gardens are Antoine Rivoire, Dainty Bess, Editor McFarland, Etoile de Hollande, President Hoover, the Radiances, Talisman and others.

PERNETIANA is a term used to denote many of the highly colored roses originated by the great French hybridizer Pernet-Ducher. In this class the yellow pigment is occasioned by a strong infusion of blood of the Persian yellow rose. Generally speaking, Pernetiana roses are extremely short-lived in Florida.

NOISETTE.—John Champney originated this class of climbing roses in Charleston, South Carolina, early in the 19th century. Many have shown remarkable adaptability to conditions of the Lower South and some are closely associated with the charming ante-bellum gardens that have become so famous through restoration during the past decade. Chromatella, Marechal Niel, Lamarque, and Reve d’Or are members of the Noisette group.

POLYANTHA.—As the name implies, roses of this group bear many flowers in clusters. The plants are dwarf in habit, more or less everblooming, exhibiting a wide range of warm colors. For corsage use no rose can surpass Cecile Brunner, the Sweetheart rose. It is found listed in this Polyantha group along with Baby Rambler, Chatillon, Miss Edith Cavell, George Elger and Tip-Top.

HYBRID PERPETUAL.—Large flowers borne on stiff, upright stems characterize this class of garden roses. With the outstanding developments in the Hybrid Tea group, Hybrid Perpetuals are rapidly vanishing from the Florida scene. Practically the only survivor of this one-time great class of roses is Frau Karl Druschki. This old fashioned white flower is of such size and charming form and grace that it will be difficult to surpass as a white rose for cutting.

VARIOUS SPECIES.—Several species of the genus *Rosa* have representatives that are part and parcel of Florida garden-
Roses in Florida

Roses in Florida

ing, and these are listed herewith for want of better classifica-
tion.

*Rosa chinensis* is represented in the gardens of the lower
South by that remarkably tenacious plant that is so widely
distributed, Louis Philippe. Demonstrating a marked ability
to persist in spite of the high temperature and high humidity,
this old fashioned red-flowered variety has earned for itself
a place in the hearts of Florida gardeners. *Rosa laevigata,*
which we call the Cherokee rose; *Rosa bracteata,* the Macartney
rose; *Rosa banksiae,* the Banksian rose; and *Rosa gigantea,*
represented by Belle of Portugal, are all outstandingly beautiful
climbers that are firmly established as excellent garden plants.

Fig. 3.—Paul's Scarlet
Climber is a profuse
spring bloomer in West-
ern Florida.
All are capable of multiplication by cuttings or layers and this, together with their extreme persistence, adds greatly to their usefulness.

*Rosa wichuraiana* is the forebear of many of our best climbers but, in Florida, none will prove satisfactory except in the extreme northern and western parts, where many gardens are glorified by members of this class as they blossom each spring. Among the excellent sorts for this extreme northern section are American Pillar, Paul’s Scarlet Climber and Silver Moon.

**VARIETIES**

The following varieties are given for the guidance of those who may desire to select a few well chosen ones for home and commercial plantings. There are many others listed in various nursery catalogs and new ones are being constantly introduced. Many growers desire particular varieties for special purposes and these are planted repeatedly, while others occasionally change at least a part of their requirements in order to test out some of the many varieties being offered for sale.

**Bush Roses**

Antoine Rivoire. HT. Creamy white tinted with pink.
Briarcliff. HT. Rose pink.
Dainty Bess. HT. Pink.
Duchesse de Brabant. T. Pink.
Editor McFarland. HT. Pink.
Etoile de Hollande. HT. Red.
Kaiserin Auguste Viktoria. HT. White.
Lady Hillingdon. T. Apricot yellow.
Louis Philippe. C. Red.
Mme. Lambard. T. Rosy salmon.
Marie van Houtte. T. Creamy white.
Minnie Francis. T. Dark pink.
Mrs. Aaron Ward. HT. Yellow.
Mrs. Charles Bell. HT. Shell pink.

President Herbert Hoover. HT. Shades of orange.
Radiance. HT. Pink.
Red Radiance. HT. Red.
Saffron. T. Yellow.
Talisman. HT. Golden yellow and copper.
Tip-Top. Poly. Tri-color.

**Climbers**

American Pillar. HW. Crimson.
Belle of Portugal. H. Gig. Pink.
Cherokee (*R. laevigata*). White.
Macartney (*R. bracteata*). White.
Paul’s Scarlet. HW. Scarlet.
Reve d’Or. Nois. Buff yellow.
Silver Moon. HW. Creamy white.
Yellow Banksian (*R. banksiae*). Yellow.

**PROPAGATION AND HANDLING**

Roses are easily grown from cuttings and a few varieties, such as Louis Philippe, Banksia, Cherokee and Macartney, do well when so grown; other vigorous kinds do fairly well, but
most of the other varieties are propagated by budding and grafting onto rootstocks grown solely for this purpose. Many understocks have been used for roses, including Mme. Plantier, Cherokee, *Rosa multiflora*, *R. canina*, *R. fortuneana* and *R. odorata*. For many years *R. canina* was the principal rootstock used, until *R. odorata* took its place. However, in late years *R. multiflora* has largely replaced all others until now most nurseries are growing a thornless strain of this species as a rootstock for varieties which are budded and grafted.

The stocks are grown from cuttings which are made during December and January of each year. Well matured, one-year dormant canes are selected and cut into pieces six to eight inches in length; all buds are removed with a sharp knife except the top one or two from which the new top growth is to be produced. The cuttings may be placed in a callousing pit, but in most cases are immediately lined out in the nursery row with just the top bud exposed. In lining out cuttings it is important that the soil be pressed firmly about them their entire length, either with the feet or by using a wooden tamp made especially for the purpose.

*Rosa multiflora* cuttings root readily if made and handled properly, and will make suitable growth for budding during July and August. The shield budding method is the one employed in rose propagation. The buds are inserted just below the surface of the ground and tied in place. Several materials may be used for this but in recent years thin rubber strips cut especially for this purpose have been used extensively. After budding the stocks receive no further attention until late in the dormant season, except to remove those ties which cause injury, when they are cut back to the bud to force it into growth. After the bud has forced and attained five to six inches in height, all suckers are removed to insure strong, vigorous growth in the new top.

Only a small percentage of field-grown roses are grafted, all by the whip-graft method. The soil is removed from around the stocks and the scions are inserted below the surface of the ground and tied in place with waxed string. The soil is then replaced about the scion, leaving only the top bud exposed.

When the plants are fully mature and most of the growth has hardened in the fall they are ready to be dug and graded. Some nurseries will undertake to supply stock the latter part of September but generally this is too early for best results and it
would be safer to allow the plants to remain in the nursery until late October and November before shipment. The bulk of this stock is moved during December, January and February.

Fig. 4.—Miss Edith Cavell is a desirable blood-red Polyantha.

Digging is accomplished either by hand or with a digger drawn by horses and mules or a tractor with a high clearance. Some nurseries practice puddling the roots as soon as the plants are lifted; this is an easy method of keeping the stock in good condition. Clay and water are mixed until a thick, muddy material results that will adhere readily to the roots as they are dipped.

After digging, the plants are graded and designated as Nos. 1, 1½, 2 and 3. Number 1 is strongest and No. 3 smallest, with 1½ and 2 sizes intermediate. Number 1 stock is the best to plant, although 1½ and 2 are sometimes used because of their low price; the Number 3 grade should never be set in the garden for flower production.
Orders for large quantities of rose plants are frequently filled direct from the nursery but most small orders are taken from the heel yards in which the plants are being constantly renewed from the field as the supply becomes exhausted. In such storage grounds the plants are placed in trenches and covered with soil to at least five or six inches deeper than the ground line on the stem. The soil is wet thoroughly so as to settle it about the roots and, by handling in this manner, the plants are kept in thrifty condition.

Several points must be taken into account in selecting the locations for the heel yards. They must be well drained and the soil of such a type that it will readily remain moist so that the roots will stay fresh and vigorous. The soil must be one that can be handled easily, otherwise it will be difficult to protect the roots of the plants completely. A good loam of some one of the sandy soil series will be found to be best for convenience in handling, as it can be easily shoveled regardless of moisture content.

**TRANSPLANTING**

Several weeks before the plants are ordered from the nursery the bed should be thoroughly prepared, its location having been more or less predetermined by the design of the grounds. It should not be situated near trees or large shrubs whose roots will rob the soil of plant food and water and whose foliage will intercept the sun's rays. Trees far enough away to allow not less than five hours of sunlight a day, preferably in the morning, may be tolerated provided plenty of plant food and water are given to supply what the roses need after the trees have taken their toll. A root restricter, made by burying galvanized roofing vertically along the edge of the garden nearest the trees or shrubs, will be beneficial in keeping out the roots for a year or two. The sheets must overlap several inches. It is advisable to dig down to the bottom of this metal at least every two years to ascertain whether or not any of the roots have gone under or between the plates.

An abundant supply of water is necessary and some provision must be made for proper irrigation of the rose garden. On the other hand roses cannot stand wet feet, so a well drained location should be chosen. If this is not possible, raised beds should be used to assure the passage of standing water.
In laying out the rose garden narrow beds, preferably not over five feet in width, are recommended so that weeding, pruning, dusting and spraying, and the gathering of the flowers can be accomplished from walks on both sides. Tender new growth is easily broken off by gardeners if they are required to walk between the plants when working. Nothing surpasses turf for garden walks. The grass, if properly grown and sheared, makes well-nigh perfect enframement for beds of roses.

It is considered good practice to arrange trellises for climbing roses as a boundary around the rose garden to protect the more delicate bush varieties from winds. Dwarf Polyantha varieties may well be used as an edging next to the walks.

For climbing and pillar roses, six feet is a satisfactory planting distance. Hybrid Perpetuals and strong growing Hybrid Teas should be planted two to three feet apart, while the less robust Teas and Hybrid Teas succeed well in checks of either 18 inches or two feet. Polyanthas may stand as close as 14 inches in the row. Close planting is desirable because the shade cast on the ground by the foliage is of benefit in keeping down the soil temperature.

If the soil is loose, poor sand, remove it to a depth of 15 to 18 inches and replace it with a compost of rotted leaves, cow manure, and good hammock earth. The older this compost is the better. It is necessary to add large amounts of organic matter if the soil is a light sand. In western Florida, if the garden be on a clay or clay loam soil, this preparation is not necessary. The addition of cow manure to the soil, about three inches deep, and turning it deep, is sufficient preparation usually.

**PLANTING**

The best planting time is when the plants are completely dormant; this is usually December to early February but may vary, of course, in either direction as much as several weeks. It is a good plan to obtain the bushes as soon as possible after they become dormant so that the root systems may be well established by spring. Choose an overcast day for planting if possible. The plants should be carefully pruned back to four or five eyes, and all broken or bruised roots should be cut off clean and smooth.

The holes for the plants must be sufficiently large to accommodate the root systems without crowding. In the bottom of each hole drop two handfuls of bone meal, and cover it lightly
with topsoil. Dip the roots of each plant in a bucket of water just before planting. This is helpful in making good contact with the soil particles. Insert the new bush so that the root system maintains its former shape and position, and so that the bush will stand at the same level that it grew in the nursery row. With plenty of water, work the soil about the roots, filling the hole to the ground level. Pack firmly by trampling with the feet, and build a large saucer of earth about the plant to hold water. Fill this saucer every four or five days unless there is sufficient natural moisture available in the soil.

**CARE OF THE GARDEN**

The mulch system in the rose garden is preferred to clean cultivation. Most organic materials such as weeds, leaves, and grass clippings which accumulate about the home grounds make a satisfactory mulch. Oak leaves are excellent for this purpose and generally can be easily obtained during the period of heavy leaf shed; at that time they can be gathered and placed in the garden, covering the soil to a depth of from four to six inches. Cow manure applied two or three inches deep over the entire garden soil is a most excellent practice and will give good results.

**Fertilizing.**—Under practically all conditions it is necessary to apply commercial fertilizers if the plants are to make vigorous growth and maximum flower production. In preparing the bed for a new planting an application of some good source of phosphoric acid and potash should be made and spaded into the soil. If superphosphate and sulfate of potash are used they can be applied at the rate of four to six pounds and three to four pounds respectively to each 100 square feet of the rose garden. Where the application was not made and in old gardens it is recommended that a fertilizer containing 4 to 6 percent nitrogen, 8 to 10 percent phosphoric acid and 6 to 8 percent potash be applied during February. The amount of this mixture to use will vary somewhat under different conditions but, generally, 15 to 20 pounds per 100 square feet or about one-half pound per plant will prove satisfactory.

Fertilizer during the growing season should consist of nitrogenous materials applied on several different dates. Three applications—about April, June and August—will generally meet the requirements of the plants if the organic material has been maintained in the soil, but they can be applied at shorter in-
tervals if necessary. The amount to apply each time will depend on the source of nitrogen used; in most instances from one to four ounces per plant, depending on the percent nitrogen in the materials, will be sufficient.

Watering. — Watering is important, as the plants should never suffer a setback due to a dry condition of the soil. Where there is no competition in the garden from roots of nearby trees, about two or three thorough waterings each week during dry weather will suffice. However, if roots from other plants penetrate the soil of the rose garden, it may be necessary to water oftener and some soils may require a daily application. With certain clay soils that have a high water-holding capacity and no outside root competition, one or two thorough waterings each week may meet the requirements of the plants. The grower must study the plant and soil conditions and apply moisture as often as necessary to maintain adequate growth and an abundance of bloom.

In applying water it is better to flood the soil if possible, otherwise use a good sprinkling system so as to give an even distribution over the entire garden. Where the latter method is used a good type of ordinary whirling lawn sprinkler will give satisfactory coverage if it is set so as to water the entire area. It will be found convenient to follow the practice of turning on the water in the morning after the buds are cut, allowing it to run for as long a period as required.

The care of climbers does not differ greatly from that of the roses in the cutting garden, except that the wood growth

Fig. 5.—The Silver Moon, a hybrid Wichuraiana, is a desirable white climber for Northern and Western Florida.
is for a different purpose. With climbers the flowers are produced for show and are borne on short stems on the canes, which are directed over and along some type of support, while in the cutting garden the aim is to grow buds with long stems to be used for decorative purposes and the plants must be fed constantly to maintain vigorous growth and development. Organic materials and commercial fertilizers should be applied to meet the requirements of the climbing types at all times.

**Pruning.**—The pruning of plants at time of setting has been discussed already and during the first year very little additional pruning will be required. In cutting the flowers there will be a certain amount of canes removed and the stubs which are left should contain not less than two or three vegetative buds and healthy leaves. If there is a tendency for the plants to grow too rank, a certain amount of judicious heading back can be practiced by pinching out the terminal buds.

After the first year, plants will continue to require adequate pruning to produce growth suitable for satisfactory cut flowers. This pruning, which should be done during late January or early February, consists in removing about half of the wood by cutting back the canes to an outside vegetative bud at the proper location on the stem. All dead and diseased canes should be cut out completely and under no conditions should they be left in the garden. As a matter of precaution in the control of diseases in general it will be found helpful if all wood cut from the plants is carried out of the garden and destroyed.

Some disbudding will be required with certain varieties, if stems containing a single flower bud are to be had. This can be accomplished best by watching the growth of the canes and pinching or breaking off any lateral flower buds which may appear as growth progresses.

**LATE SUMMER TREATMENT**

The rainy season is attended by a flush of growth which produces a profusion of blooms. After the rainy season, which is often followed by drought conditions, the plants may be allowed to rest in preparation for a season of blooms in the early fall. During this rest period irrigation may be withheld and the plants may be pruned so as to make them shapely and compact. With the advent of cool weather an abundant supply of water and plant food will bring the rose bushes into a flush of growth which is necessary for the production of blooms.
Fig. 6.—Mrs. Aaron Ward is a hybrid tea with yellow blooms.

Climbers are never pruned severely except where it is necessary to renew certain of the old canes that are in poor condition. They are directed over some type of support such as a trellis, fence, or rockery, and the aim is to have a great show of flowers in season. Some growth will have to be removed occasionally but the amount is small, as the pruning is principally a thinning process and the removal of diseased and dead canes.
Shrub and bush roses are pruned only to cut out dead and unsightly canes and to eliminate diseased wood. Such plants are grown for their showy blossoms, which materially add color to the landscape when they are properly located.

Standards are used for special purposes in the well-arranged and organized planting and require only enough pruning to maintain their particular shape and effect. However, diseased and dead wood must be cut out and any exceptionally rank-growing canes should be headed in to keep the top in well-balanced proportions so that it will be pleasing and attractive.

**HANDLING BLOOMS**

Early morning, while the dew is still on the leaves, is the best time to cut roses. Select buds with two or more petals open and cut them with as short stems as possible. Cutting roses with long stems is sometimes necessary but this practice greatly reduces the leaf area and thus causes a serious check to the plant. A plant is dependent upon its leaves for its welfare and if it is to succeed it must not be defoliated. Small, sharp pruning shears are best for cutting roses. The cut should be made on a slant, just above an eye which points away from the center of the bush.

If there is evidence of rose canker, the wounds caused by cutting the buds should be protected by painting immediately with sulfur or bordeaux paste.

As soon as possible after the buds are gathered place them in a deep vessel of cold water and hold in a cool place for an hour or two before arranging them. Flower arrangements should not be placed in a draft, in direct sunlight or near heating appliances. Each day cut a half inch or so off of the end of each stem and renew the water in the container.

**COMMERCIAL GROWING**

Those living in areas where there is a demand for blossoms to be used for decorative purposes often develop a profitable local market for well formed bloom buds of good quality on long, stiff stems. The plants are grown for only one year, when they are discarded and new stock is planted just as early in the fall as it becomes dormant enough to be dug and handled safely by the nurseries.

The Radiances are the most satisfactory as a rule, the Red Radiance being the variety most extensively grown for this
purpose. Other varieties planted to a less extent to produce cut blooms for the market are Charles K. Douglas, Talisman, Golden Ophelia, Kaiserin Auguste Viktoria, Briarcliff, Editor McFarland and Etoile de Hollande.

A fertile, well drained location is important. It should be well manured and prepared before planting. Cow manure in

Fig. 7.—Frau Karl Druschki, often called White American Beauty, is difficult to surpass as a white cutting rose.
liberal quantities or, if it is not obtainable, cottonseed meal or tankage broadcast and plowed or disked in at the rate of one to three tons per acre at least two weeks before planting is a good preliminary preparation.

It is best to set the plants in rows three feet apart, spacing them one and a half or two feet in the rows, mixing bone meal with the soil in the bottom of each hole prior to placing the roses. Mulching is not practicable for large areas, and so abundant fertilizer and a limited amount of shallow cultivation should be given. Cultivation may begin when signs of new growth appear and continue at intervals, only as often as necessary to keep down weeds and grass.

When flowers begin to form, an application of 1,000 to 1,500 pounds of fertilizer, already described, may be made and cultivated in lightly to increase growth and bloom production. During the rainy season apply one to two tons of raw bone meal per acre and occasionally chop down all weeds with a hoe. In the hot, dry period following the rainy season, prune lightly, removing all weak wood and cutting back very long stems.

About the middle or latter part of August fertilize with nitrogenous material and cultivate as in the spring and irrigate if possible, if rains are infrequent. This will stimulate growth on which the last blooms will form.

Some growers, especially on the lower East Coast, are succeeding with roses on muck lands. As such soil is usually rich in nitrogen, this element is reduced in the fertilizer but phosphorus and potash are used liberally. Well balanced fertilization, careful attention to drainage, cultivation and other factors important in sandy land growing will insure success.

**INSECTS**

Rose aphids, or plant lice, at times are serious pests in the rose garden. They may gather in great numbers on the tender new growth and about new buds. Stunted shoots and imperfect blooms are the result if the insects are allowed to go unchecked. Nicotine and soap sprays or nicotine dust are efficient controls.

Rose beetles occasionally feed on the tender buds. It is important that thistles be destroyed because they are hosts to rose beetles.

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3By Prof. J. R. Watson, Entomologist and Head of Dept. of Entomology, Florida Agricultural Experiment Station.
Flower thrips are extremely troublesome during dry seasons. They are tiny, light-yellow insects that infest the blooms in numbers beyond estimation. Brownded petals and balled buds that fail to open (similar to the injury caused by rose canker) often result from attacks of thrips. Some varieties of roses are more seriously injured than others. All roses should be gathered as soon as they open sufficiently, and frequent applications of nicotine should be made if these insects are numerous. As weeds and flowers of many kinds harbor thrips, a careful cleanup program is recommended.

Pumpkin bugs often attack roses, especially during the fall, and punctured buds of abnormal shapes result from their feeding in the rose garden. Knocking them off into a pan containing a little kerosene may be practiced. Spraying is of little or no value. Thistles harbor pumpkin bugs, so they should not be allowed to grow near the rose garden. Catch crops, such as sunflowers, may prove of benefit if the bugs are systematically collected from them.

Cottony-cushion scale, when found feeding on the under sides of leaves or on the canes, is best controlled by colonies of Vedalia, a small beetle which is a specific predator. A citronella spray, if applied under very high pressure, will give an effective check. It is possible to reduce the infestation by washing the scale from the bushes with a vigorous stream from the nozzle of the garden hose.

Red spider may be kept in check by dusting with sulfur or by heavy syringing with the hose.

DISEASES

Black spot is one of the most serious diseases with which the rosarian has to contend. It is first evident in the form of round or irregular black spots on the upper surface of the leaves. As these enlarge the leaves turn yellow and drop off. When the leaves are severely infected they may shed without turning yellow. The infection starts near the ground and spreads upward on the plant until it is nearly defoliated. This reduction of the leaf area checks and stunts the bushes. The leaves which fall off are a serious source of infection, since they produce myriads of spores of the fungus. It is very important that all infected leaves be burned or otherwise destroyed.

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*By Erdman West, Mycologist, Florida Agricultural Experiment Station.*
Black spot is especially prevalent during hot, humid weather, and at this time special precautions should be taken to protect the rose garden from the ravages of this disease.

Copper compounds, such as bordeaux mixture, Flordo spray or ammoniacal copper carbonate, a colorless spray, are efficacious when applied frequently. Calcium caseinate, soaps or oil emulsions assure good coverage when added to sprays that contain no spreader. The disease spreads so rapidly that a coating of some fungicide should cover the plants at all times to forestall the entrance of the fungus into the tissues of the plants. Plants in vigorous growth seem to be less severely injured.

Recent research has shown that very fine sulfur is effective in controlling black spot if a coating of the material is kept on the leaves. The grade known as 300 mesh is used as a spray or dust. Dusting is usually preferable. Sulfur sprays may be bought in the form of paste. Caution! During the summer, rose foliage that is covered with sulfur may suffer considerable injury from burning.

Powdery mildew is a serious menace to roses, especially the climbing varieties. Dorothy Perkins, Crimson Rambler and many of the common bush varieties are highly susceptible. The leaves and shoots of affected plants become dwarfed and covered with a grayish-white coating. The shoots and buds of those varieties most susceptible become deformed. Sulfur fungicides, either dusts or sprays, are satisfactory for the control of mildew.

Rose canker causes the failure of more rose gardens than any other single disease. Several fungi causing similar symptoms are responsible for the trouble. The canes are the part most frequently attacked. Small purplish spots develop along the stem, and as they enlarge they become grayish or brownish in the center. As soon as a cane is girdled, the upper portion dies. The fungus usually continues down the stem, unless pruned out, and, if it reaches the crown, kills the whole plant. The disease frequently begins around pruning cuts and other injuries, from which it spreads rapidly, killing the bark as it progresses.

The leaves are not affected to the same degree as the stems. The flowers are often attacked, the outer petals turning brown, drying and then dying. The flower is bound so tightly by these dead petals that it fails to expand. This condition is frequently confused with the injury caused by thrips.
Either a copper fungicide or one containing finely ground sulfur may be applied consistently and thoroughly after the removal of all affected canes. All parts of the plant must be kept covered with the protective coating. During periods of rapid growth and damp weather it may be necessary to apply a fungicide once a week or oftener. It is necessary to add calcium caseinate, soap or oil emulsion to some sprays to obtain maximum protection.

Pruning wounds should be covered with liquid or melted grafting wax, lead paint or bordeaux paste immediately after they are made. Further protection may be obtained by dipping the shears in alcohol or formalin solution after each cut. Many fungi can invade the pruning cuts on dormant plants and cause severe damage, while established or growing bushes are unaffected by them. Consequently it is very important to treat these on new plants if you would avoid the loss of plants during the first year. It is probably the most serious trouble during this period.

When setting a new rose bed be careful to use only healthy plants. It is easier to keep rose canker out of the garden than to cure it after it is present.

SUMMARIZED SUGGESTIONS

Locate the rose garden so that it receives at least five hours of sun each day, and avoid trees and large shrubs.

Buy rose bushes of Number 1 grade that are budded or grafted on a suitable stock.

Enrich the soil before planting.

Plant bush varieties in beds 18 to 24 inches apart each way, and space climbers at least six feet apart.

To have ample buds of a given color for flower arrangements, set several plants of a desired variety.

Plant as early during the dormant season as possible, setting at the same level as the bushes stood in the nursery row.

Use a heavy mulch of some organic material.

Give plenty of water and plant food. Fertilize several times during the growing season. Remember that roses must grow to bloom.

Prune twice each season. Remove dead, infected and weak wood. Give heaviest pruning when plants are dormant.

Dust or spray with a good fungicide and insecticide to control diseases and insects.

Replace weak, unthrifty plants each dormant season.