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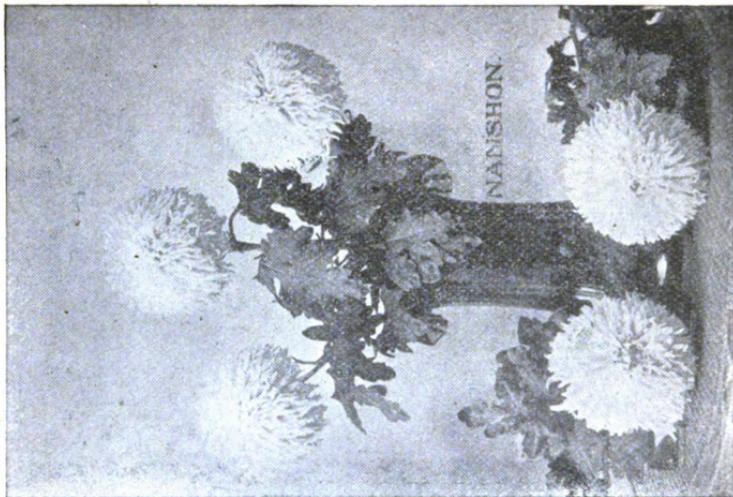
How to Grow  
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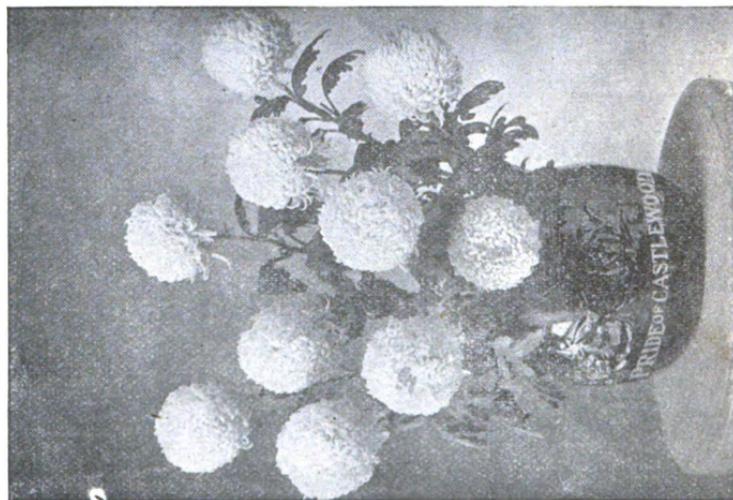




HOW TO GROW  
CHRYSANTHEMUMS.



REFLEXED JAPANESE



INCURVED OR CHINESE

HOW TO GROW  
**CHRYSANTHEMUMS.**

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A PRACTICAL GUIDE  
BY THE MOST EXPERT GROWERS.

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COMPILED FROM THE VOLUMES OF  
**AMERICAN GARDENING**

BY THE STAFF.

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**PRICE, TWENTY-FIVE CENTS**

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# CHRYSANTHEMUM GROWERS' CALENDAR.

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The following epitome of a year's work is compiled largely from the serial cultural directions of C. Totty and Peter Duff, as given in the columns of *American Gardening*.

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## JANUARY AND FEBRUARY.

**THE BEGINNING.**—In January or February begin to take cuttings for another season. These early struck cuttings can be topped again in May, and these young leads will make the best plants, especially for planting on benches. The old stools should not be overwatered, neither should they become dust dry. One mistake which is often made, and which should be avoided, is that of placing the old stools under a warm greenhouse bench, and thus forcing an early growth, which, under these conditions, becomes very much drawn.

**SPECIMEN PLANTS.**—Cuttings which are to be grown into fine specimen plants must be taken during these two months and receive special care and attention, as detailed in another chapter of this book.

## MARCH (EARLY PART).

**PROPAGATION.**—This is probably the best time to propagate the bulk of the plants for pot work. Old stools are beginning to move, and should be kept a little warmer, say 50 degrees, at night. It makes the cuttings root more quickly. When you run across a plant that is yellow, avoid it, though you may be short in that particular variety. Yellow foliage, like the poor, will be always with you, and will always crop up when the plant gets too much water.

**CUTTINGS THAT WERE STRUCK** in January for specimen plants should be kept moving on gently. In potting them a

little burnt vegetable refuse thoroughly mixed with the soil will put the gloss of health on the leaves as nothing else will.

OUR IDEAL POT PLANTS for exhibition flowers are struck now, and finally, in May or June, potted in a 9-inch pot, and three shoots taken up. Flowers from these are superior in every way to those from a June-struck plant in a 6-inch pot.

TRY the English method with some of the slower-growing kinds by rooting now and growing right along without pinching. Mrs. H. Robinson and Major Bonnaffon are two that will give superb flowers that way, and will amply repay a longer season of growth.

NOVELTIES.—Go easy on propagating. There have been others that did not live up to their records after the first year.

#### MARCH (LATTER PART).

BENCH CULTURE.—It is always better to grow a separate batch of plants to propagate from for this work. Cuttings can, of course, be obtained in due season by pinching plants intended for specimens, but it is better to plant out now a batch of young plants a foot apart in a bed, keeping them airy and cool. These will, after being stopped a few times, furnish an abundance of healthy cuttings by the end of May. The bench system is a simple and economical one, but, perhaps, the best finished blooms come from pot-grown plants. With the roots confined the plants can be fed more heavily, and a deeper, heavier flower will result.

CHRYSANTHEMUMS FROM SEED is a very interesting experiment, and there is always the bare (almost threadbare though) possibility of raising a bonanza. "Things are not what they seem" is always true of your new seedling. Sow the seed now in a flat in nice light soil, and keep warm till it germinates, when the young plants can be pricked out and gradually hardened off.

GENERAL ATTENTION.—Never let your young plants get pot-bound, and, above all, keep things unpleasant for the black fly.

## APRIL (EARLY PART).

TREATMENT OF CUTTINGS.—One of the commonest faults is to leave the cuttings in the sand-bed till they begin to grow, making a spindly top and long wiry roots. Nothing is worse; it impairs, to a large extent, the constitution of the future plant. Just as soon as the cutting stands up stiff, and looks you in the eye, so to speak, it will be found that the roots are about half an inch long, and then is just the time to pot or box it up. It will go right into the new soil, and you will have in place of the attenuated, long-drawn-out object, a clean, thrifty, close-jointed, little plant, that is sure to render a good account of itself.

INDIVIDUALITY IN VARIETIES begins to show itself even in the initial stages, and it will be found that some will root at least a week earlier than others. Golden Wedding will take six days longer than the average under exactly the same conditions. The cultivator must study the peculiarities of each variety if he would grow it with the greatest measure of success.

SOIL FOR FIRST POTTING should be principally good loam, with lots of fibre in it, and made light by the addition of a little sand, burnt refuse, and leaf soil. Just a sweet, healthy rooting medium only is needed.

## APRIL (LATTER PART).

PLANTS FOR SPECIMENS should be potted on as they require it, soil to consist of good rotted fibrous loam, with just a suggestion of bone meal, thoroughly mixed with it. It is a great mistake to mix humus with the soil. It has a tendency to sour the loam before the roots of the plants can make much headway, and the good properties are exhausted before they can be used. The 'mum is a gross feeder but the time to feed is when the pot is full of roots. Plants should be kept closely pinched, as the more breaks that can be got from now on, the better.

KEEP ALL FIRE HEAT AWAY from plants now, in whatever stage they may be. Give all the air possible on bright days, and plenty of syringing, particularly in the afternoon. This will keep away insects and keep the plants booming.

THE COLD FRAME at this season is just the thing for young plants; care, of course, being exercised to guard against frost. Coolness, from now on, is the watchword.

#### MAY (EARLY PART).

CUTTINGS intended for bench work may be rooted any time from now for the next six weeks, though if the cuttings are in fit condition to be taken, the sooner the better. Fine flowers can be, and are, obtained from June cuttings, but many of the dwarfer varieties, as Mrs. Jerome Jones, Sunderbruch, Zulinda, etc., seem to be benefited by a longer season of growth. Cuttings will root almost anywhere at this season. The cold frame is an excellent place if the glass be well shaded. Remove lights at night if the weather be not cold. Spray lightly, and the cuttings will pick up splendidly during the night.

KERNELS OF ADVICE.—Don't let your plants get dry. Don't let them get pale and sickly from too much water. Wage war to the death on every insect that comes along. Dust frequently with tobacco dust. Prevention is better than cure. Give abundance of air day and night. Aim to keep plants sturdy and strong. Syringe often without getting soil too wet. Attend right away to business when plants need attention. Never let anybody's plants look more healthy than your own.

#### MAY (LATTER PART).

SUMMER QUARTERS FOR POT PLANTS.—There can be no question but that plants are better inside all the season. There they are not exposed to the furious thunder storms and winds, nor will they suffer as they did outside last year, when plants were waterlogged for weeks at a time. If, however, there is no help for it, and they have to go outside, why the sooner the better now, standing them on a bed of ashes in

as sheltered a position as possible. If a house be at disposal clean out the soil from the benches and stand in the plants, giving each plenty of room; then bank up well all round the pot with coal ashes, which will keep the roots cool—probably one of the most important things in the blazing summer sun. If the glass can be easily removed from the sides it will be a great help, and the bottom ventilators should be thrown open and left so to keep the current of cool air blowing through underneath.

CUTTINGS.—Where these are being taken for bench work it will pay to go to a little extra trouble in making them, and if the bottom eyes are removed it will mean a good deal less bother with suckers later on.

WATERING.—Plants of strong rooting sorts, like Mrs. Twombly, need just about twice as much water as weaker growers, like Helen Bloodgood (a beautiful pink, by the way). Water each variety in proportion to its needs.

#### JUNE (EARLY PART).

CUTTINGS.—Those for 6-inch pots may now be rooted, using such varieties as experience teaches will be most useful for the purpose you intend them; the weaker growers are better off in a bench. Olympus, as a type, with its long, thin stem, is comparatively useless for pot work. What are needed for pot plants are kinds that will stand up alone, strong and robust—Minerva, for example. If growing for exhibiting in a special class, of course, use exhibition varieties, and the list of such given in this paper last fall could not be much improved on. Just as soon as they are rooted pot up into 2½-inch pots, and from that to the 6-inch, with as little check as possible. The least neglect means loss of foliage.

INSECTS are waking up to a sense of their importance, and that little yellowish-white moth is thus early getting in its fine work by depositing its larvae on the under side of the leaves. Be watchful and clean them out before they clean you out, for their appetite is tremendous.

**MILDEW.**—There is little excuse for mildew on plants. The only variety I ever saw troubled with it was Golden Wedding, which was growing in the shade, and a little sulphur soon relieved the trouble.

**DON'T LET PLANTS RUN UP** long and spindly. How often, in going around, does one run across a batch of plants jammed in close together, and calling to mind the poet's words, "Linked sweetness long-drawn out." Not so sweet, perhaps, but drawn out long enough in all conscience!

**GIVE ROOM.**—Give your plants lots of room and a decent show. They will pay for it in the fall.

**ETERNAL VIGILANCE** is the price of a good Chrysanthemum. Good flowers were never yet obtained from plants that had been neglected half the summer.

#### JUNE (LATTER PART).

**PLANTING THE BENCHES.**—This should now be proceeded with as soon as practicable. Thoroughly clean out the house before getting in the new soil; for soil use, if possible, good rotted sod, and the less manure the better. The private grower is at a disadvantage with bench plants, since he cannot, like the florist, devote a whole bench to one variety; but while in most cases all varieties must go into the same house, it can be done with discretion.

**HOW TO PLANT.**—In planting it should be so arranged that varieties that come in together should be planted together—early, medium, or late, as the case may be. If early and late kinds be mixed in together trouble will ensue in feeding with manure water. One kind will be just in the stage when feeding is absolutely necessary, and another developed so that feeding will be sure to cause the petals to damp.

**DISTANCE APART.**—Plant a foot apart each way, then a good bloom and a stout stem is assured. It is better to have twenty high-grade blooms than 100 smaller ones. A big flower always commands attention, while everybody is surfeited with smaller ones.

**PLANTING IN BLOCKS.**—All of one variety together is a good plan, but it has its disadvantages, because then varieties

that are liable to scald do not get the benefit of a little shade from the stronger ones. We think it better to plant in rows with the tallest kinds in the centre of the bench and graded down to the side. Then every plant has its place, and does not get smothered.

SPECIMENS should have their last potting now, and attention must be paid to their training. Train up a plant in the way it should go, and when it is old it will do you credit.

SEEDLINGS.—If you have any, a good plan is to put them in boxes easy to handle, and let them go ahead. They may not turn out marvels, but are sure to be interesting, nevertheless.

#### JULY (EARLY PART)

WATERING DURING SUNSHINE may injure some plants, but the man who waits till sunset to water his Chrysanthemums will most assuredly not be on hand when the prizes are being distributed next fall. Give water when the plants need it, which will be often, as the pots get full of roots. Plants should be sprayed over at least once every two hours on bright days. In no other way can fine foliage be got and maintained during the hot months; and what does a plant look like when all the bottom leaves are gone?

LATE VARIETIES may still be rooted and will come in for late work. They will throw terminal buds, and if kept very cool will prolong the season quite a little. H. W. Rieman is a fine variety for this work.

INSECTS are numerous, but not too numerous to mention. Once a week, anyhow, plants should be dusted with tobacco dust or syringed with tobacco water to keep down the fly. Where the leaves are getting gnawed round the edges there is a caterpillar at work; watch and wait, and he is bound to come your way. The first consignment of grasshoppers struck here last week, and, of course, made straight for the Chrysanthemums. They are small as yet, but they, too, will bear watching. Insects come and insects go, but the work of extermination must go on; if not forever, at least till the blooms are fairly under way.

**POTTING UP.**—Don't let those cuttings you intend to pot up into 6-inch pots hang around too long. They dry out in half an hour, and the foliage is bound to suffer.

**BUDS.**—If any of the earlier rooted plants are showing buds, pinch them out and let the plant break. The second shoot below the bud, if perfect, is generally the best one to keep, removing all the others.

**SHADING.**—Many people think that when a house is newly planted it should be shaded until the young plants get established; but such treatment is apt to be more harmful than otherwise. It might do good where the plants cannot get much attention in the way of syringing, but it will induce a long, sappy, soft growth, and the only way to get a big flower is to build up the plant from the ground with a close-jointed, richly-clothed stem, finishing in the fall with foliage like leather and a stem hard as nails.

**VENTILATION.**—When the house is planted throw open the ventilators, doors, sides, and everywhere you can, and keep them so both night and day. The atmosphere should be kept charged with moisture by spraying over the plants, roof and floors, five or six times during hot days, and scald will not amount to much, except where there are bad spots in the glass.

**WATERING BENCHES.**—The soil should be kept just moist enough to allow the roots to work, but not by any means saturated, or it will sour and the plants begin to lose that dark, healthy gloss, the sure sign of health and good digestion.

**PLANTING,** if not yet finished, should be done as soon as plants are in fit condition. Do not let them get pot-bound in such a small state, for that only means a check which they can do very well without.

**VIVIAND-MOREL.**—This very fine variety is addicted to the habit of throwing a bud every three weeks or so, and we believe the best way to handle it is to strike it about the first week in July and grow straight along. Late-rooted plants only produce terminal buds, and this is one of the few

varieties that produce better colored flowers from the terminal than the crown buds, the crown-bud flower being, as a rule, pale and of a dirty white color.

#### JULY (LATTER PART).

**WATERING.**—The hot weather necessitates a good deal of attention with the hose, and plants must be closely looked after, particularly the pot plants, for if they get dry a few times the shoots get tough and wiry, and the plant will, in gardening phraseology, get “stuck,” and a serious check will result. If pot plants are inside the conditions of moisture can be more easily attended to, but plants that are outside, if they are fully exposed to the sun, would be greatly benefited if a piece of canvas shading could be fixed to spread over them at mid-day.

**MULCHING.**—Where the bench plants have made a good start they should now be mulched with tobacco stems. This will keep the roots cool and keep black and green fly at a respectful distance. It also has value as a fertilizing agent, in addition. Examine the bed on a hot day where it is mulched and where the soil is bare, and the difference in the temperature will speak for itself.

**THE ARMY WORM** is putting in an appearance. Later on, if not caught now, this becomes probably the most destructive of all his fellows. He will bore right through a bud and sever every petal. His aspirations should, therefore, be “nipped in the bud,” and before, if you can find him, and he generally leaves abundant evidence around, eating, as he does, from the ground up.

**STAKING** the bench plants should be proceeded with as the plants begin to reach heavenwards. If they can be readily strung to wires running through the house, that will be found to be the best method, if the wires be made taut. Three wires for each row will be enough for the season, and then three ties will be sufficient. If wiring be not practicable, wire stakes certainly come next in the order of neatness, and they offer no obstruction to the sun's rays as do a forest of

bamboos. Whatever is used must be made firm, for the plants must have vigorous syringing to keep them clean, and this cannot be done if the whole thing is loose and liable to fall over.

ZULINDA.—It seems an outrage to put a stake to this and varieties like it. From a June cutting, this variety, if well grown and the crown bud be taken, will measure more across the flower than the height of the plant from the ground. It is one of the most handsome foliage varieties grown, and struck the end of April, moved along into an 8-inch pot, pinched once, and three shoots taken up, makes in the fall, with its pleasing pink flowers, one of the prettiest plants imaginable.

THE SINGLE STEMS in 6-inch pots should be plunged in ashes up to the rim. They are liable to suffer from neglect, because they dry out so quickly. Stake them and lay a plentiful mulch of tobacco stems in the pots.

LOOKOUT for caterpillars.

MISS BRAMHALL is throwing lots of buds. "Rub out the July bud, and take the next," still applies.

MRS. ROBINSON is making splendid growth. Why do we so often hear that it has a weak neck?

FEEDING.—So long as the plants are making a strong, healthy growth, they do not need any stimulant; but some of the earlier-potted plants will now be rootbound, and will be improved by a liquid of either cow or sheep manure. We believe that when plants will carry along in good condition till the bud is set, without feeding, they are better for it, but just so soon as you get the bud, feed it "for all it's worth," and then the flower gets all the benefit. No hard and fast rule can ever be laid down as to when feeding should begin, but the man who watches his plants closely can tell at once when they are not happy. When the foliage begins to get pale (if the paleness does not proceed from over-watering) it is a sure sign that the plants are in need of a pick-me-up.

THE POTATO BUG has begun in this section to pay attention to the Chrysanthemum. During the past year or two we have made the acquaintance of many different insects around and on the plants, but the potato bug is a new one. We presume the young would hatch out all right, and set in to feed if the eggs were left alone. If this kind of thing keeps on, all the gardener of the future will have to do will be to plant a row of Chrysanthemums along one end of the garden, when the myriads of bugs and insects will settle right with them, and all will cease from troubling, and the gardener be at rest. A fortune awaits the introducer of a new insect-proof, self-disbudding variety. It will fill a long-felt want.

SPECIMEN PLANTS should not be stopped again, as it is getting late in the season for such work. If the pots are now full of roots, give a good top dressing of cow manure. It is a great help, because plants so treated do not dry out nearly so soon as others left to themselves.

#### AUGUST (EARLY PART).

SPECIMEN PLANTS.—There is still time to plant for cut blooms, and the production is often remarkable, considering the short season of growth they have. The work of pinching specimen plants and standards has now been stopped, so that they may have plenty of time to make good strong shoots that will bear good blooms. At the final potting of those plants we left lots of room for a top dressing later on. This has just been given, as the roots were creeping all over the surface of the soil; the dressing consisted of equal parts of loam and cow manure, with a good sprinkling of bone dust added. Attend to the training of the plants, and never allow the branches to get all bunched up together. Give the plants plenty of room, and turn them once or twice a week, so as to give them a good shape. Syringe twice a day in bright weather, and keep the house moist. Tobacco stems placed around the pots will keep down aphids. The plants in 6-inch pots for single blooms are now well rooted. These were rooted about the beginning of June, potted into 3-inch pots, and later into sixes.

**SCALD.**—Dull, cool weather, followed by a hot day, is usually the time when scalding takes place, the plants then being soft and easily wilted. The house should be kept very moist to keep the foliage stiff, and if this be done, scald can usually be prevented.

**GOLDEN WEDDING.**—Of all varieties, this is perhaps one of the most susceptible to scald, and certainly one of the hardest to grow well. It does not need nearly so much water as the average; with the least overwatering the “yellows” appear, and the foliage dies away at the bottom of the stem. But if one does happen to strike the proper conditions, Golden Wedding is a magnificent variety, though it is within the bounds of possibility that Modesto will crowd it out in time.

**SIDE SHOOTS** should be removed as soon as they can be caught hold of. They all detract from the vigor of the main stem, and it is wonderful what a quantity of laterals a single plant will produce in a season. It makes a big difference to the flower if all the energy that would be spent in throwing out useless side shoots and suckers be concentrated in the proper channel. Plants should be picked over every morning. The work then does not take so long, and many a stray caterpillar and grasshopper will be found at the same time.

**BENCHES** should have the surface scratched over once a week. This will keep the soil sweet, and weeds will not become unsightly.

**POTS.**—If the soil comes away from the edge of the pot, it should be rammed around very firmly, for otherwise in watering the water will run down between the pot and the ball, which latter will get dry in the centre, and the whole plant suffer in consequence.

#### AUGUST (LATTER PART).

**SPECIMEN PLANTS.**—These are now growing freely since pinching was stopped, the foliage being larger and of a much more healthy color. Put a few stakes near the centre of the plant, and tie the main shoots to them; this will prevent any chances of splitting, to which the plants are liable after be-

ing syringed. The plants require feeding from now on; the larger and healthier they are the stronger they will take it. No *careful* cultivator gives the same feeding to both strong and weak plants any more than he would equally water a lot of plants. Yet this is often done, just to save the necessity of going over them again soon after. Change the manure every week or so, as the plants will then do much better than if the same be given them all the time. We use cow, sheep and stable manure, and sulphate of ammonia, time about, with an occasional dose of lime water.

PLANTS FOR CUT BLOOMS.—Those which were early planted in benches or boxes should now have a mulching, one the same as recommended for the specimens will do. It might also be added that a little well-decomposed night soil can be used to advantage. Keep all shoots tied up.

CROWN BUDS are now forming, and the grower must determine which bud he is to "take," being influenced by the use to which he intends to put the flowers. For large exhibition flowers the crown bud is the best, but the flower then gets up above the foliage, notably in kinds like Indiana, and therefore for general decorative work the terminal bud will throw the best flower, for, though smaller, it is better furnished with foliage. For the benefit of the uninitiated, it might be well to state that the crown bud is always known by the three or four growth-shoots which appear directly under it, and these must be at once removed, or they soon render the bud useless by taking away all the strength. It is safe to take the crown bud any time now if a little heat can be given when the flowers are opening. The reason the crown bud comes deformed is very frequently that it is kept too cool. Some growers swear by the crown bud and some swear at it, results being largely a matter of individual practice.

DISBUDDING should be done in the morning, because then the shoots are brittle, and easily rubbed off. Hold the stem in one hand and use the thumb-nail of the other to remove the superfluous buds. Care must be used in the operation,

for it is mighty easy to injure the bud and destroy the labor of months.

IT IS NOT TO BE SUPPOSED that because the crown bud shows earlier, the flower will open earlier also. It makes but little difference, in fact, sometimes the terminal bud opens first, as the crown hangs for a long time.

TERMINAL BUD.—If the crown bud is not needed, rub it out and select the best of the shoots which appear, which will, in a few weeks, produce a terminal bud. This is always safe, and must be grown along very cool to allow the wood formed since the last break to ripen. Viviani-Morel, on account of the poor color of the crown bud, is always better on the terminal; and in the Chinese such has been my experience with Miss Gladys Spaulding, not for the color, but for the perfect shape of the bloom, the crown bud throwing a peculiar-looking bloom that might pass for an Anemone-flowered variety.

MULCHING AT THIS SEASON.—A good mulch of cow manure on pots and benches will be found very beneficial. It is surprising how soon the manure brings the roots up to the surface, where they get more benefit from the feeding with manure water.

NITRATE OF SODA.—If some of the plants are looking pale and sickly a dose or two of this—just a little—say, about an ounce in a four-gallon can of water will soon bring back the color.

BUDS.—Take these now as they appear; the plants should be looked over every day to catch the bud in its earliest stage. We believe in the crown bud, as we think much of the trouble from weak neck is the result of taking the terminal. The plants have an extra growth to ripen, and when they are not kept cool enough to allow it to do so, the stem is weak, the flower flops over, and the grower finds, in the language of the politician, that “it is a condition and not a theory that confronts him.”

EXHIBITION SCHEDULES that bar out flowers having artificial support are on the right track. It seems ridiculous to

see a bloom held up by a wire or piece of cane. A flower should hold its head up, no matter in what company it may be, then the admirer realizes to the full why the Chrysanthemum is called the queen of the fall. In real life a queen that cannot hold her head erect does not amount to much.

PLANTS IN THE OPEN GROUND, which it is proposed to house, should be cut around with a spade a few days before lifting. The transfer will not then give quite such a check to them. They cannot be taken up too carefully, as the object should be to retain the foliage.

SPRAYS.—For this work plants should not be disbudded, but just left to develop all the flowers they will. They will be small blooms, certainly, but are a pleasing change from the big ones. Single varieties and all the smaller flowered types are good for this work.

#### SEPTEMBER (EARLY PART).

FEEDING.—September is the month when feeding occupies a large share of the time, and feeding, like everything else, needs a little care. Many a man has gone around rubbing his hands with glee as he saw his plants running up and making great stems and looking as though they were going to produce a flower big enough to “knock the spots off the sun,” and (incidentally) his rivals, and later wondered why somebody else, with a comparatively insignificant-looking lot of plants, produced flowers just as good as his. Plants can get a surfeit of good living just as easily as a man can. Natural manures, as horse, cow or sheep manure, seem to be of more use to the Chrysanthemum than artificial ones at this period, changing off from week to week from one to the other, and not forgetting every little while to stop and give some clear water to wash down the manures and sweeten things out a little.

WELL-RIPENED WOOD is the only secret of high-grade flowers; the less manure used in soil the better. The plants should make in summer good healthy wood without being rank; then, when fall comes, such wood ripens well, with

little pith in the centre, stands with impunity lots of feeding, and does credit all round. The crown bud is swelling rapidly, and the stem is hardening and thickening down in a manner that gladdens the heart of the grower. Such wood is easily ripened, but where the bud has not yet appeared run easy on the feeding till it shows itself.

SYRINGING should be eased up as the days get shorter, and the house should be pretty well dry before nightfall; a spray over in the morning and after dinner on sunny days is ample. When the weather is dull, run dry, and mildew will not make its appearance on your premises.

THE ARMY WORM must be closely watched for now. In the day he bores in the soil at the foot of the plant; at night he varies it by boring the buds; and the poor grower he bores all the time.

SPECIMEN PLANTS.—These should all be housed now, as nothing will be gained by keeping them outside. We prefer to grow specimens inside, because out-of-doors it is hardly possible to keep the foliage in good condition, owing to heavy rains and insect pests. As the nights are cool now, growth will be rapid, therefore have sufficient stakes in the pots to keep the plants in proper form, and to secure them from breaking. Different methods are used for the final tying out of the plants; we prefer wire frames to wooden stakes. Taking the buds is now in order; on specimens we retain all the crown buds we can get to form in September, as they seem to make the finest blooms. In feeding, change the manures every week.

CUT BLOOMS.—Plants which are being grown for these should be kept neatly staked, and all side growths removed as fast as they appear. Don't allow the early planted ones to get starved; if they had a mulch lately, begin feeding them with weak liquid once a week. Put into the house all the plants that it can possibly hold without crowding them. Use the syringe freely yet, on all bright days. Keep a good lookout for grasshoppers, as they seem to pick out the choicest

buds for a meal. Keep 6-inch stuff growing by giving a weak solution of liquid manure.

**WHICH BUD?**—Buds of all kinds will be forming now, and experience should teach us what bud to retain, whether crown or terminal. For Viviand-Morel, Inter-Ocean, Minerva, and many others, take crown buds; still there are growers who often prefer terminals for the same varieties. Mark several plants as to what buds were taken, also noting the date, keeping note of same, and then compare the results; the information thus gathered is both useful and interesting.

#### SEPTEMBER (LATTER PART).

**VENTILATION.**—Cool nights are with us, and a little attention to ventilation is now in order. Our ventilators are never closed through June, July, and August, save during a gale, for plants fairly revel in the cool night air after a hot, exhausting day; it hardens the wood and builds up the plant, but when September is ushered in, and the temperature outside drops to 48 degrees and thereabouts, the side ventilation should be reduced, or the quick transition from a hot day to a cool night may cause a check to the buds. Plants should not be "coddled" by any means, but the change in temperature is very great, and should be guarded against a little.

**PLANTS OUTSIDE** will very soon need housing, for any time after the middle of the month we look for a touch of frost in Jersey.

**RETARDING.**—If it is desired to retard some plants for late work the terminal bud should be taken, and the plants put in a house by themselves. The ventilators should be closed only in case of actual frost. Late varieties only should be used for this work, as early kinds would only open in mid-season, and the flowers would not be nearly so good as they would if allowed to flower when nature intended they should.

**FEEDING WITH MANURE WATER** is probably the biggest job now, and it must be persevered with. Changing the barrels from week to week, from one kind of manure to another, is better than mixing it together, change of diet being very

beneficial. It is pretty hard work, and not the most agreeable in the world, but on it depends a large measure of success, and the only way to do is to put on your boots and sail right in, never looking "where the chips fall." It is just about now that we realize that the 'mum is a gross feeder.

**SPECIMEN PLANTS.**—The buds will now be showing on these, and crown buds, when obtainable, should always be retained, as, on specimen plants, they will make better blooms than terminals will. Keep off side growths, and cut off all weak shoots, and attend to feeding, for now is the time it will tell.

**DISBUDDING** is now the order of the day among plants to yield cut blooms, and it is often puzzling to know which bud to retain. When we can get good, plump crowns at this season we generally retain them, at least with few exceptions. While we can have no hard and fast rules laid down in this matter, still we give our selections herewith:

#### TERMINALS.

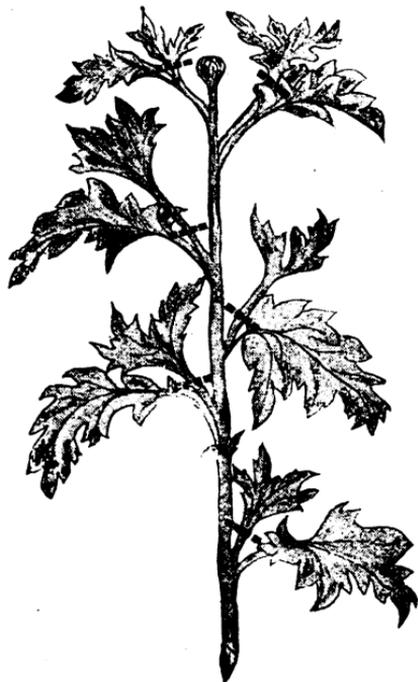
Adelaide Loomis.  
Dorothy Toler.  
Enfant des deux Mondes.  
Eugene Dailedouze.  
G. W. Childs.  
Headlight.  
Ivory.  
Inter-Ocean.  
Joan d'Arc.

Mrs. Henry Robinson.  
Miss Agnes Dalskov.  
Miss M. M. Johnson.  
Mrs. Robert Crawford.  
Mrs. W. P. Raynor.  
Trilby.  
W. H. Hurley.  
Vivian-Morel.

#### CROWNS.

Ada Spaulding.  
Charles Davis.  
Cullingfordii.  
Dean Hole.  
Domination.  
Duke of York.  
Edwin Molyneux.

Marquis de Montmort.  
Mayflower.  
Mdme. F. Bergmann.  
Minerva.  
Minnie Wanamaker.  
Mrs. George West.  
Mrs. C. H. Wheeler.



**TERMINAL BUDS.**—They are less clustered here than in the other cut, and the central bud is larger.



**A GROWN BUD.**—Showing when to remove vegetative shoots, as advised by Elmer D. Smith.

(The above figures are by permission of the *American Florist*.)



A Crown Bud is seen below A. To save the Crowns, cut off the shoots A, B and C. To secure a Terminal bud cut off the Crown bud and the shoots B and C. The shoot A will eventually bear clusters of flower buds as shown on next page.

A Cluster of Terminal Buds. Whichever one is saved becomes the Terminal bud. Note that there are no vegetative shoots. This and the former illustration from *The Gardener's Chronicle*.



Erminilda.	Mrs. H. McK. Twombly.
George W. Childs.	Mrs. Jerome Jones.
Gloriana.	Mrs. J. G. Ills.
Gloriosum.	Mrs. Henry Robinson.
Golden Wedding.	Mrs. H. Weeks.
Harry May.	Mutual Friend.
Hicks-Arnold.	Niveus.
Inter-Ocean.	Philadelphia.
Invincible.	Queen.
Iora.	Robert McInnes.
J. Shrimpton.	Titian.
John E. Lager.	Viviand-Morel.
Latest Fad.	Wm. Simpson.
L. Canning.	Wm. Seward.
Major Bonnaffon.	

#### SEPTEMBER (LATTER PART).

PLANTS are now needing attention on every hand. Side shoots and suckers seem to spring up in a night, and as quickly as they are removed, others appear to take their places. Constant attention is necessary to keep the energies of the plant concentrated on the bud. Begin at one end, and by the time you get through you can begin over again.

ALL BUDS MUST BE TAKEN as soon as possible, nothing that is not needed should be left on the plants for even a day, if possible. September, so far, has been a bright, sunny month, which will be a great help in ripening the wood, and the good effects of this will be seen when the flowers expand.

FEEDING.—Sulphate of ammonia is a favorite chemical manure, and used very carefully, it gives splendid results. It deepens the color of the flower, and brightens up the whole plant. It can be used stronger when plants are accustomed to it, but half an ounce to three gallons of water is enough to start with.

GOLDEN WEDDING should be isolated from other varieties, if possible, so that it will not get so much syringing. It is

the worst variety for mildew that we have, and this must be kept down with sulphur if the foliage is to be kept good.

GRASSHOPPERS are troublesome in this section just now, eating out the points just below the bud. The best time to catch them is in the early morning, as they seem paralyzed till the sun warms up the temperature.

SPECIMENS.—These will now have finished their growth, the buds will be swelling rapidly, and the final tying out should soon be given. We prefer waiting until the plants have reached this stage before performing this operation, as we can then tell just where the blooms should be.

AVOID STIFFNESS in training; balloon-shaped plants have little to commend them, and never attract the attention that is given to a good specimen, with the top just nicely rounded.

KEEP MILDEW OFF by using sulphur or grape dust, and the same purpose will be furthered by keeping a drier atmosphere at nights in the houses. Give lots of ventilation. Those who have front as well as top ventilation, have much in their favor.

APHIS.—Should aphid have gained a hold the houses had better be fumigated at once. Better to do it mildly three nights in succession than by a single heavy one. Keep tobacco stems placed through the house afterwards.

FOR CUT FLOWERS.—The remarks as to condition of houses given above are also applicable here. Attend to tying up. Soot applied in a liquid state at this time will be found very beneficial. The early varieties will now be expanding their florets. Marquis de Montmort will soon be in flower.

#### OCTOBER (EARLY PART).

WATERING is the rock on which the boat of many a good man's hopes gets wrecked. Some people have an idea that a Chrysanthemum cannot have too much water once it is well established. The result of such a policy is always seen in a long thin stem and pale, sickly foliage. Season must be largely considered, and while plants take a good deal of water during hot summer we are now at a cooler period and

shorter days. Pot plants are now full of roots, and must needs be kept well supplied, but the benches should not be allowed to get into a muddy condition. When watering do the job well, and then let the bench get into a moderately dry condition before repeating. The roots work best when the soil is neither wet nor dry, and our experience has been that the old roots rot as quickly as young ones are made, when they have nothing but a wet pasty mass to work in. When this is the case it is certain that the bud cannot swell so well as when every root is sound and doing its share to help push a good thing along. Where mulching with cow manure has been carried on it sometimes bakes into a hard mass, and the water cannot pass through it, when the soil beneath may be almost dust dry. Again, when plants are in boxes, as many of ours are, the ends sometimes come apart, and what might have been meant for a good watering has most of it run outside. All these things are insignificant in themselves, but they must be guarded against, for "mony a mickle mak a muckle."

SPECIMENS should now be pretty well into shape, and no more tying should be done than can be helped. The less tying they get from now on the more natural will they look when exhibition time comes.

TIDINESS.—Keep all dead leaves cleared away; refuse from the manure barrels and rubbish of every description also. The atmosphere will be sweeter, and it is better for the plants, and all better for the eye.

BUDS ARE SWELLING APACE, and so far as cultural methods go, there will soon be little to do. Now is the time when varieties should be compared with previous years as to times of flowering, etc. A few notes are not much bother, and are very useful for comparison.

FEEDING.—Plants that have had much feeding will now take with safety liquid manure of almost any strength you like to give. Feeding should, however, be discontinued just as soon as the flower gets half way open, or the petals will damp.

**BENCHES** should be kept only moderately moist now, and the **flowers** will finish much better in consequence. Don't dry them out by any means, but they do not now need the water they did a month ago.

**THE ATMOSPHERE** should always be dry and buoyant by nightfall, and no matter how cold the night is, always leave on a little air at the top of the house. This will prevent the moisture from collecting on the petals, said moisture being always a fruitful source of damping. Give lots of air on bright days, and this will strengthen the neck of the flower, and make it stand up stiff and sturdy. A weak-necked flower is disliked by every true Chrysanthemum lover. It is an unnatural condition, and any variety, if properly grown and finished, will hold itself erect.

**THRIP** may be making himself obnoxious just now. He gets in the flower and manages to muss it up considerably in a short time. He seems to prefer whites and yellows, and if the flower looks stained and spotted he can almost always be found somewhere in the petals. Other times he will be found sitting on a bud waiting for it to show color so he can begin operations.

#### OCTOBER (LATTER PART).

**FOR SPECIMENS.**—The final tying out should now be seen to, and the following way answers the purpose very well: Get some thin iron stakes, insert five or six of these in the pots in a slanting position. Make a ring of strong galvanized wire, and tie it to the tops of the stakes, seeing that the ring is at the same height all around. Place another stake in the centre of the plant, at the desired height. Cut lengths of wire and bend them to the shape of the plant, and attach them both to the outside ring and to the top of the centre stake. The thin iron stakes are to be preferred to wooden ones, as they can be bent as desired. The blooms can be placed at will by running string from wire to wire. Varieties that seem to be late can be pushed by giving sulphate of ammonia more frequently than the others.

**FOR CUT BLOOMS.**—Syringing will have to be stopped now, at least on all the plants where the blooms are opening. Where practicable, the early varieties should be kept by themselves, so that syringing may be carried out longer on the later varieties. Some varieties are more apt to get red spider than others—Niveus, for example.

**MOISTURE OF HOUSE.**—While the house may be moist during the day, it should be dry by night. This can be accomplished by giving a good bit of air, and a little fire heat.

**MILDEW.**—Paint the pipes with sulphur to keep down mildew.

**EARLIEST VARIETIES.**—Our leaders are Marquis de Montmort, Madame Bergmann, Gloriosum, John E. Lager, and Mrs. Henry Robinson.

**RETARDING BLOOMS.**—The plants which are to provide cut blooms will require lots of attention; some varieties will be too early for those who grow for exhibition, and many ways are tried to keep them back, and get in good shape. It will be much more easy to take one of them when they are grown in boxes or pots than it will be when planted out in benches. When the blooms are just about finished the boxes or pots can be carried into a cool, dry, darkened room. Should any dampness arise from the plants being watered while in there a little fire in a stove will soon dispel it.

**KEEPING CUT BLOOMS.**—When we have to cut the blooms we use a little salt in the water. By cutting off a small portion of the stem every day or so the blooms can be kept for a considerable time.

**FIRE HEAT IS BAD.**—Very little can be gained by trying to push blooms open by fire heat. In fact it makes the blooms a poorer color, and also of less substance.

## NOVEMBER AND DECEMBER.

### TREATMENT OF PLANT AFTER FLOWERING.

Now, the flowering season is over, select one or two plants of a kind and cut the stems off at, say, about four inches from

the soil. Store away these roots in a cool house, such as a vinery at rest or other fruit house.

The old plants can be wintered in a cold frame by covering the pots with dry leaves and again covering the glass enough to prevent the soil from freezing. In this way they can be stored till spring without attention.

Commercial growers or those who have to propagate a large quantity adopt this plan: As soon as the plants have flowered they lift them from the bench and box the kinds they need, say, six to twelve plants in a flat, simply covering the roots with soil and then store in a cool house. Or, they may plant the old stools quite close together on a shallow bench. Cuttings are made from January to the end of June, according to the system of cultivation that may be practised.

CARE OF STOCK.—Nothing is more essential to successful Chrysanthemum growing than a healthy, vigorous stock, and to obtain this the old stools must be taken care of. Select a sufficient number of each variety to be retained, and place them in a cool, airy house, the vinery at this time being probably the best place. There they will be benefited by air on all possible occasions, and keeping the plants on the dry side; for constitution and sturdiness are the requisites for the production of vigorous growth. We are not speaking now to the florist, who, with an immense stock to work up, must propagate every cutting he can get, but to the private grower, who is looking for a chance to distinguish himself, and it is just now he should lay the foundation for next November. The practice of wintering the plants in frames is, a doubtful procedure, for though some varieties will break away strongly, many of the weaker kinds may not start at all. A Chrysanthemum plant needs a cool temperature, but it is as susceptible to check as any other plant. If the bench system only be followed, the grower need not yet think about propagation, but cuttings for specimen plants may be inserted this month, using only the strongest and healthiest suckers.

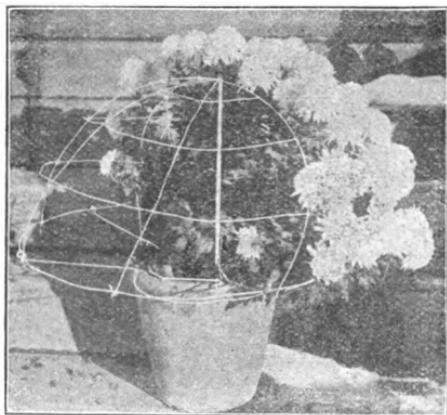
## SPECIMEN BUSH-GROWN PLANTS.

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The foundation of my success, writes Mr. W. C. Russell, one of the most successful exhibitors of these plants, I owe chiefly to the way the plants are tied, and to the fact of growing only a few varieties, the same varieties year after year, thus learning their special requirements.

### MAKING THE FRAME.

Nothing looks more out of place in a fine plant than a lot of visible stakes, one holding up each flower. My way is to



place in the centre of the plant a small iron stake, having a hole in the top, and four or five of the same kind around the sides of the pot at equal distances, and at an angle that will bring the plant down so as to hide as much of the pot as possible. The length of the stakes is governed by the habit of the plant, but a stake should be six or eight inches

shorter than the outline of plant will be when it has made its full growth. Next I run a wire through the holes of the outer stakes (or irons), thus making a hoop around the plant. Then take two more wires long enough to reach from outer wire on one side to the corresponding wire on the other, placing them through the centre stake, and so dividing the frame-work into quarters; so much for the foundation. Now, take a small wire, make it into a ring, and fasten it to the arched or quarter wires at, say, eight inches from the centre stake, and continue with other rings until you have the quarter or foundation wires crossed by hoops at about eight inches apart, thus making the complete frame-work for the plant (as is shown in the photograph). The blooms are tied to wires as required, and some may be stayed by green string from wire to wire, so as to give the plant a more graceful appearance.

The final staking is not done until buds are beginning to open; but the plant must be staked with a few small stakes while growing through the summer, both as a support and to tie it out so as to give it some shape.

I will not attempt to give any detailed information regarding the kind of soil to use or how I feed, as we all know that we have to use the best soil that can be obtained near-by. The character of soils varies so much in different localities, and all who grow *Chrysanthemums* know that they need a good, rich soil for the final potting.

#### VARIETIES.

As to feeding, I have to guess myself as to what the plants need and how often to apply it, so cannot give much information in a written communication. But I do feed, and feed heavily at times, being careful to give a change.

As to the varieties that I grow for plants, the number is comparatively small, as each specimen takes up so much room at a time of year when space is the most needed. I make a limit at four or five varieties, the fifth one being a variety for trial. The four varieties are *Vivian-Morel* (a

charming plant when done well), William H. Lincoln, Puritan, and Ivory, the last named being one of our best whites for bush plants, but very hard to grow, for it needs nursing from start to finish. Some people say to me, "Why not change and grow some other varieties, as you always have the same old ones year after year?" But it is to this that I largely attribute my success, for I consider that it takes time to find out the requirements of a plant, or one variety, and what I learn one year I put in practice the next. By so doing year after year I take it that I will know something about a few varieties and their requirements, if I do know nothing about the many.

Take Ivory, for an example. If grown under the same conditions as Lincoln, it would be apt to suffer, for when one thought he had a plant he would not have it; the foliage would be apt to turn yellow, and the flowers would not have the finish or color which are leading points in that variety. I have some trouble with it myself, but by being careful I generally have a fairly good plant for our show. There is really nothing gained by changing around and growing newer varieties each year, and losing the benefit of all you gained the previous one. To be sure, I advocate the trial of the newer varieties, but if they do not prove better than the old ones, why fall back on the old.

#### TAKING THE CUTTINGS, ETC.

I take cuttings for plants from January 15th up to March 15th, but find those taken about the middle of February make the best plants. When well rooted they are potted in small pots, placed near the glass, and shaded from direct sunlight for a few days; when a shift is needed I pot into 4-inch; then 6-inch pots.

At the next shift I pot them into whatever size I wish to flower them in.

Pinching begins as soon as the plant is from six to eight inches high, which height is generally reached while in a 4-inch pot, and this pinching continues all through spring and summer, until about July 25th, according to variety, as some may be pinched a little later.

I notice of late that the classes for bush plants are fast falling out from the schedules of nearly every show in and around New York, yet what is an exhibition without bush plants? They give variety and finish and attract the eye as much as, if not more than, the large cut blooms. So I sincerely hope, brethren, that when making out your schedules for the future you will have one class or so for bush plants. And, let me add, make the prizes an object, so as to encourage those who have room to grow a plant or two. Finally, I would reiterate, better grow one plant and grow it well than a dozen and have them poor.

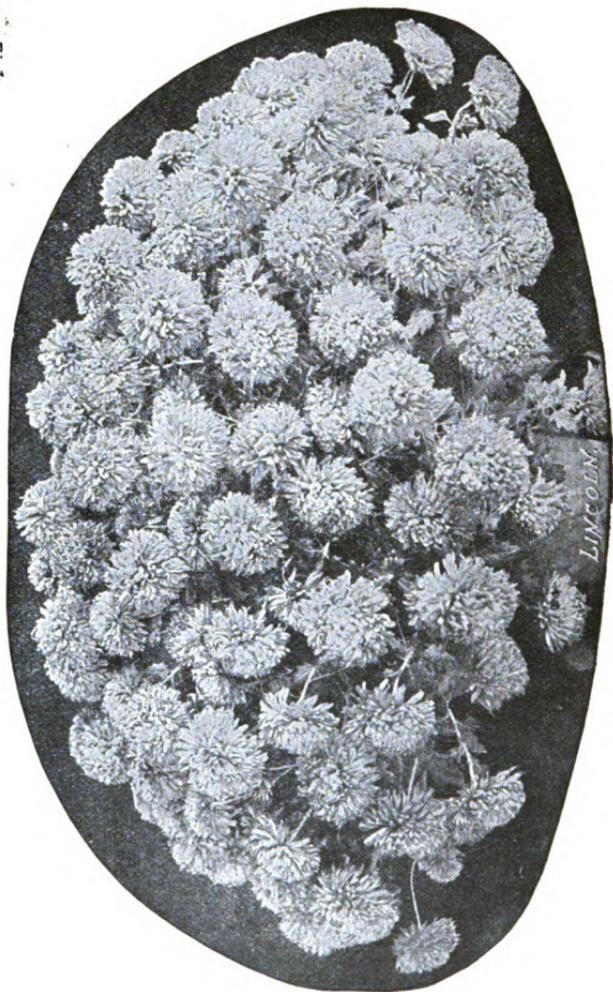
#### THE MONTH OF JULY.

In growing specimen plants very particular attention is demanded during the month of July, when they are getting well rooted in their last pots. Mr. Duff's explicit directions covering this critical time will be read with interest. The compost he uses for this last shift is composed as follows: Four parts of good fibrous loam, which was grubbed up in the spring, two parts well-rotted cow manure, about one-quarter part of finely ground bone, with a sprinkling of lime added. Thorough and good drainage, consisting of broken pots and charcoal, is given.

Now is the time to get plants into shape before they start on their last growth. Every shoot will then come straight from the plant, and no unsightly after twisting will be necessary; we put thin stakes at intervals in a slanting position into the pots, to which we draw the shoots where we want them. Pinching must be attended to every day, so as to get all the breaks possible.

Pinching should be stopped the end of this month; in fact, one or two of our plants which we consider have enough breaks now (250 to 300) have already been left to grow. The blooms obtained from early-made plants are always better than those formed on those pinched late.

If the pots are filled with roots, weak liquid manure must be given to keep them growing. Nitrate of soda given at in-



SPECIMEN BUSH PLANT, as grown by J. L. Powell.

tervals will be found beneficial. Sulphate of ammonia, also, applied in a weak solution, will keep a healthy color in the foliage.

The varieties we grow for specimens are W. H. Lincoln, Puritan, Nemesis, Vivand-Morel, Ivory, and Mrs. Hicks-Arnold. These are our standbys for big plants, but many other varieties are grown in smaller pots.

# THE CHRYSANTHEMUM: ITS CULTURE AND MANAGEMENT.

PRIZE PAPER BY T. D. HATFIELD, WELLESLEY, MASS.

The last ten years has seen a remarkable growth in the popularity of the Chrysanthemum. Up to the time of Waterer's importation of Japanese varieties, and the introduction of the Neesima set by Fewkes, we had comparatively few of this type. The Chinese incurved was the leading class. The difference between these types was one of blood almost. They were easily defined. The influx of Japanese varieties, with the addition of a multitude of seedlings raised in this country, mostly haphazard (and often from indiscriminate crosses), has so merged these types, that now, what belongs to one or the other, has to be decided by authority, rather than by their characteristics.

## SINGLE BLOOMS.

Selection has led almost wholly to blooms of immense size, and the passage from exhibition on boards to vases with long, stiff stems, excludes a large number of refined blooms.

The season commences with the exhibitions. There we note what strikes us as exceptionally good. Further, we have an opportunity for inquiries; novelties grown under special conditions, and known only by reputation, frequently fail on a first year's trial. Still we must keep up with the times, and so, every year we find ourselves loaded with novelties, and these must be given a fair trial. The selection made, we should secure stock as soon as possible, root them, and store them in boxes in a cool house, say, a violet house. Scarce varieties we would top over, and root cuttings during the winter; others, keep stopped until the 1st of March, and then let them grow for a general supply of cut-

tings to be put in in May. In the meantime, our novelties come. These, also, should be topped and rooted. The plants will be benefited thereby, and give a good supply of base cuttings later. We consider it a good plan to box the new arrivals and place them in an intermediate temperature.

May is the best month to take cuttings for exhibition varieties; June for commercial blooms. We use a propagating bed, which can be closed and shaded by day, and opened by night. Abundance of water is essential for the first week. They should not be allowed to wilt; though they recover afterward, some vitality is lost. The rooted cuttings may be potted off or boxed in light soil and placed in a cool, airy house, to keep them stocky.

It is presumed a good compost pile is ready by the time the plants are established. If it is heavy, wood ashes in the proportion of 100 pounds to a cord, may be well worked through it. If the soil is deficient in lime, bone meal will be a good form in which to add it, in about the same proportions. Wood ashes alone would not exactly meet all requirements for supplying these mineral deficiencies. Charcoal may be used locally for varieties liable to burn. In bench culture, nine inches apart is a fair distance for exhibition blooms, the planting to be done about the 20th of June. For commercial purposes, from six to seven inches will be ample, when the planting is done in July. We make them moderately firm, but do not pound the soil as we would for roses. Watering is done sparingly at first; each plant being taken separately, or at least, the watering confined to the rows, leaving as much dry space between the plants as possible, until they are well established. As the plants grow the matter of supporting them should not be an unsurmountable obstacle, but they should be secured to light supports before bending over.

Many plants—in some varieties more than others—will show a bud, a crown bud, late in June or July. This should be removed, and we can then decide whether we desire one or two shoots to start from below it, and in such other

cases where two flowers are desired the tips should be taken out in July. Early crowns we avoid—that is, such as appear before the 12th of August, and even then a terminal will, in most cases, give a better flower, and be only two or three days later.

It is so much a matter of experience that it is difficult to give a list of varieties which are best taken on an August crown. E. Molyneux is one of few exceptions, and this *must* be taken on an August crown, if we wish a characteristic bloom.

Feeding is important. The condition of the plants will decide the time to commence. A top dressing may be given in August. Feeding with liquid manure ordinarily does not commence until August. Well diluted drainings from the barnyard should be the basis of all. Artificial decoctions made from sheep and cow manure answer well. A little artificial fertilizer like Bowker's greenhouse chemicals or Clay's helps. Discretion plays an important part. Feeding may be easily overdone. Pink varieties are poor in color; crimson varieties burn; all, more or less, from this cause. Feeding should be stopped when the buds show color. As to whether or not permanent shading is beneficial, I am in doubt. Some varieties burn when shaded. We use a roller shade—down only when the sun shines.

Select list: White—Mrs. H. Robinson, Mrs. Weeks, Mrs. Jerome Jones, Mayflower, Mutual Friend, The Queen. Yellow—Major Bonnaffon, Mrs. O. P. Bassett, Golden Wedding, H. L. Sunderbruch, H. W. Rieman, Modesto. Pink—Lady Playfair, Mrs. Perrin, Maud Dean, Vivian-Morel, Mrs. S. T. Murdock, Iora. Crimson and Bronzes—J. Shrimpton, Defender, Red Warrior, President McKinley, Sundew, Colonel W. B. Smith.

#### SPECIMEN PLANTS.

Growers of specimen plants commence at exhibition time to prepare for another season. Among a number of exhibitors there will be found several new varieties. The fraternal feeling being strong, exchanges are freely made. Varieties

suitable for exhibition should have a free branching habit, and have full double flowers with decided colors. Reflexed, rather flat blooms make the best display; they make a better perspective from any point of view; conversely, incurved blooms lose in effectiveness. It is, further, a fact worth noting, that reflexed varieties are better habited. Loosely incurved Japanese are soon past and carry poorly, although for the sake of variety and sometimes for decided colors, a few must be included. Color in an exhibit is an important consideration. I have seldom been quite satisfied with any color scheme I have been able to develop. In the massing of specimen plants, I take it, in a dozen we should have, three yellows, three pinks, three whites, two dark colors, and one bronze. It will take at least three dozen to commence with, in order to select a dozen at exhibition time. The value of a variety under artificial light may be worth considering. It is hard to tell the difference between a shell pink and a white, when the light is on; while the delicate pink Iora loses half its lustre; the saffron tinted Silver Cloud becomes a dirty white; sulphur yellows like Georgienne Bramhall, have no color value, while the bronzy Colonel W. B. Smith passes for a deep yellow; purples make a poor showing, though the Amaranths, like Morning Crow, show up well.

Cuttings struck about the middle of February make the best plants. Preference should always be given to root cuttings over those produced by the stems. Cuttings will root in a very low temperature. For expediency we use an ordinary propagating bed, such as is used for carnations. When rooted they are potted into 2-inch pots, using light soil, and placed in a cool, airy house. They are shifted into 6-inch pots about the 1st of April, using a heavier soil—such as is recommended for single stems. In moving them from sixes into eights we weed out such as apparently are not suited for specimens. The discarded ones are planted out, and it is often found that quite a number of them will make good plants before August. They are shifted into tens or

twelves, during the month of June. This being the final shift, charcoal is used as part drainage. They are potted moderately firm and watered sparingly until well rooted. Before the chinch bug became a pest, it was my custom to plunge them outdoors for the season, but lately I have kept them in a cool, airy house. Though they grow somewhat taller, they hold the foliage better, as it is easier to keep aphides in check by fumigation. Stopping, commenced when the plants are small, is continued well into July. There is no set time; the work is done almost daily, no shoot being allowed to gain strength at the expense of weaker ones.

Thrips have given us considerable trouble of late years, but by the frequent use of tobacco water with a little sulphur added, we have kept them well in check. Frequent spraying during bright weather seems beneficial—tending to keep down insects and promote clean, healthy growth.

The manure water decoctions recommended for single blooms are also used for specimens. With the roots confined, much more care is required. The pots must be filled with roots, and the drainage free to begin with. A little soot water once in a while is beneficial, but it should only be used after being filtered. Weak plants will not be benefited by an extra dose, rather less, and they should be skipped occasionally.

Up to the middle of August very little has been done toward getting the plants into shape, only enough stakes are used to preserve their outline. If we intend to finish the plants with stakes we must continue tying them out, as after this time the stems begin to harden, and it will be difficult to get the stiffness out of them if left too long. Last season we used a home made wire hoop with good success. It is well enough for home use, but impracticable for exhibition purposes, adding to the difficulties of handling the plants.

The month succeeding the middle of October is a time full of interest to all growers of specimen plants. The earliest kinds have to be shifted to a shaded corner, while later ones, like W. H. Lincoln, must have all the sun possible, and yet

others must be shaded by tissue paper. Less and less water will be required as the plants mature, but never so little that they wilt. When preparing the plants for the road we fill the heads between the flowers with tissue paper, before drawing them together with bands of cotton cloth. The plants are packed in boxes to give them a firm standing in the teams.

Select list: White—G. Daniels, Le Ermindra, Adelaide, Mutual Friend, J. H. White, Crystalina. Yellow—W. H. Lincoln, Harry Hurrell, Marion Henderson, Clinton Chalfant, President Hyde, Georgiana Pitcher. Pink—Thanksgiving, Norma, Mrs. Breers, October Queen, Arethusa, Iora. Bronzes—Columbine, Colonel W. B. Smith. Crimson—J. Shrimpton, and G. W. Childs.

## FERTILIZERS AND MANURES.

### AMMONIUM SULPHATE AS A FERTILIZER.

In Volume XV., No. 2, of *American Gardening*, in an article on "Chrysanthemums at Baronald," the writer, giving Mr. Farrell's mode of culture, says he "gives them a *little* sulphate of ammonia ( $\frac{1}{4}$  ounce to 1 gallon of water), when they are coming into bloom." Mr. Duff, in *American Gardening* of August 15, 1896, says: "Use 1 ounce to 4 gallons of water." Mr. E. Molyneux, in his excellent book, "Chrysanthemums and Their Culture," says: "One tablespoonful dissolved in four gallons of water." Now, there is a wide difference in quantities. One grower recommends 1 tablespoonful to 4 gallons, another 1 ounce, which equals nearly 2 tablespoonfuls, to the same quantity of water. But what puzzles most beginners is what quantity of the liquid to give the plants, say in an 8-inch pot. Another thing they would like to know is, if the chemically pure is stronger to use than the commercial. Common mortals are not supposed to know all about these concentrated manures, and the problem was submitted to two skilled cultivators and an agricultural chemist, whose replies are given below:

"We have always found sulphate of ammonia an excellent fertilizer for Chrysanthemums. It is used in the proportion  $\frac{1}{4}$  ounce to 1 gallon of water, when the plants have filled their pots with roots—not till then. A larger proportion of the sulphate of ammonia may be used, but the quantity quoted is safe in the hands of the most inexperienced. The amateur should always bear in mind that liquid manure or any fertilizer is not a plant medicine, and should not be given to a sickly subject. It is only to strong, healthy plants in comparatively small pots that these manures are of benefit. One of the commonest mistakes with the inexperienced is, when the plant is sickly and not doing well to give it a "little liquid manure to help it along." As to how often it should be given: Twice or three times a week to strong, healthy

plants, giving a good watering to the plants just as would be done in using ordinary plain water. It should be discontinued immediately the buds show signs of coloring, as used later than that it has a tendency to make the flowers flabby. The "chemically pure" sulphate of ammonia is stronger bulk for bulk than the "crude." The intermediate grade which we use is known, I believe, as "pure."—*Wm. Fitzwilliam.*

The Chrysanthemum-grower need have no hesitation in using sulphate of ammonia, as advised in *American Gardening* of August 15th (1 ounce to 4 gallons), provided his plants are well rooted. In fact, we often use it in excess of that, when the plants are strong and healthy. Regarding the quantity of liquid to be given an 8-inch pot: When the plant is ready for the liquid, first thoroughly water with clear water, and then follow with the liquid. If the pot is well drained and has the usual amount of soil, fill it to the top with the liquid, as it will soon soak through. The same rule applies to any sized pot. When getting the sulphate of ammonia from the drugstore we always ask for and are told we get the pure article. This is just where the trouble is in using sulphate of ammonia—if it cannot be got good it had better be let alone. Two or three times a week will be often enough to apply it at one period, changing off to some other manures for three weeks, and then applying again at same rate.—*P. Duff.*

It is impossible to be explicit when giving directions for using concentrated manures because the treatment that will work excellently with a given soil, and a certain mode of culture will utterly fail with others. As to the strength of solution, the directions stating the weight to be taken are preferable to those which attempt to measure a solid substance. There are perhaps a dozen sizes of tablespoons and as many ways of having one full, varying from levelfull to heaped and piled-up-full. I have no doubt but that Mr. Molyneux mentioned the tablespoon as an easy way (to him) of estimating an ounce of the material. One pint of the  $\frac{1}{4}$  ounce to 1 gallon solution would contain enough nitrogen to ma-

terially hasten growth. The amount to be added cannot be definitely stated, for the reason that the vigor of growth of the plants and the richness of the soil in the pots varies so widely. It is best to use a small amount at first, say  $\frac{1}{2}$  pint, and increase the quantity if the plants will stand it. Really the only way to find out how much to use is to try. Chemically pure sulphate of ammonia contains but very little more nitrogen than does a good commercial grade. The former costs more than the latter, and is not appreciably better or stronger for use in the greenhouse. The commercial grade does not contain any impurities that might be of detriment aside from the sulphuric acid, and this is in the C. P. article as well, being an essential constituent of the compound.—*Jonn Fields.*

#### HOW TO USE FERTILIZERS FOR CHRYSANTHEMUMS.

Nitrate of soda and sulphate of ammonia should be used at the rate (each) of 1 ounce to 4 gallons of water. For specimen plants nitrate of soda can be used, say every three weeks, for three times a week; after which change to some other manure. After the buds set, discontinue its use, as it tends to make the blooms flabby. For cut blooms it should not be used so often.

Sulphate of ammonia should be used at the same intervals as nitrate of soda, and its application should be kept right up until the blooms are three parts developed.

Apart from chemical fertilizers, sheep, cow and horse manures can be used to advantage, especially those from the cow or horse. They are to be applied in liquid form as manure-water, which can be made as follows: Place half a bushel of sheep manure in a bag placed in a 36-gallon barrel of water and allow it to stay two days. This makes an excellent liquid fertilizer. The barrel will stand filling twice with water. Cow and horse manures can be served in the same way and in the same proportions.

Pigeon or hen manure can be used in the proportion of five pounds to 50 gallons of water. This latter though needs to be used with a great deal of caution as it is very caustic

in its properties and is only safe in the hands of an expert. It is well to alternate this every few days with the chemical fertilizers before mentioned.

Bone meal can be used in the proportion of 8 pounds to 50 gallons of water.

A common practice with some growers is to use a pint of nitrate of soda or sulphate of ammonia in the 50 gallons of either of the above liquids, but this can be left to the discretion of the user. The foregoing remarks practically cover all the stimulants and foods employed in the art of Chrysanthemum growing.

## FUNGOUS DISEASES OF THE CHRYSANTHEMUM.

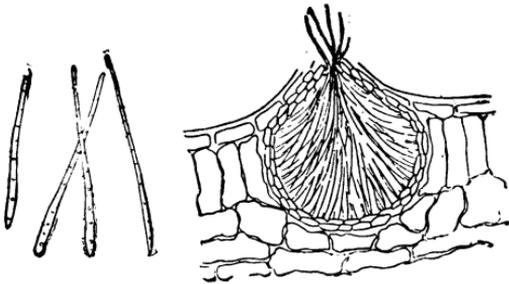
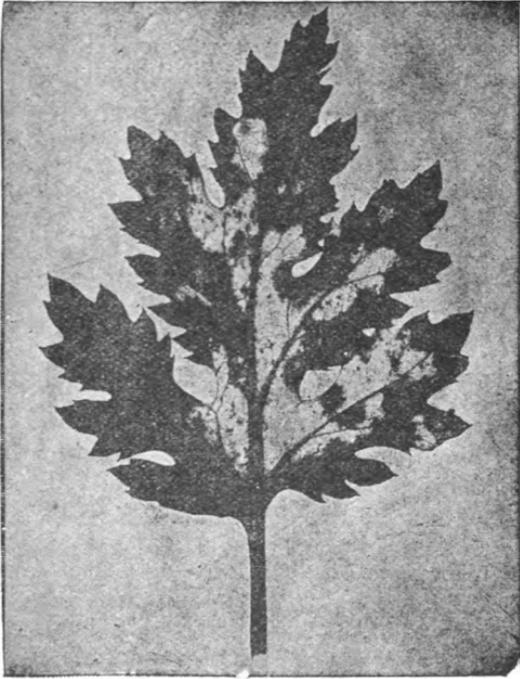
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There are several fungous diseases of Chrysanthemums, the oldest known and very common one being the mildew or Oidium. This consists of fine, cobwebby filaments that are confined to the surface of the leaf, and give it the appearance of being dusted with flour. It is less destructive than most of the other kinds of Chrysanthemum diseases.

The leaf spot is one of the leading troubles of the Chrysanthemum, and first appears in small brown spots upon the foliage, which, increasing in size, cause the death of the leaf. The illustration (page 49) is made from a leaf by sun printing, and shows the location of the fungus (*Septoria Chrysanthemi*, E. & D.) by the dark patches that are generally along the irregular margin of the leaf. The lower sketch gives a view of the microscopic structure of the fungus. A spore-bearing cavity is seen to the right imbedded in the substance of the leaf in which long, slender bodies, the spores, are produced in great numbers shown more enlarged to the left. These spores, unlike many other kinds, are made up of several cells placed end to end. Badly blighted leaves have their surface covered with these spores that have oozed from the small openings into the spore cavities, and may be carried by water at spraying time to other leaves and plants, and thus spread the disease.

The Bordeaux or other remedy falling upon these spores kills them either when they are freshly issued from the diseased spot or after they have been carried to the surface of a healthy leaf. All badly-diseased leaves should be removed and burned, so as to destroy all germs of the parasite.

A second form of blight is shown on page 51, where three plants are seen as they were photographed full length. The fungus causing this distressing condition of the Chrysanthemum



LEAF SPOT DISEASE.

num was discovered only a few years ago, and bears the long name of *Cylindrosporium Chrysanthemi*, E. & D. It is a more rapid grower than the *Septoria*, previously considered, and the affected plants are often stricken down so that they can make no blooms. The discoverer, Mr. Dearness of London, Canada, describes the general appearance of the trouble as follows: "The fungus can be easily recognized by the dark blotches usually about half to three-quarters of an inch in diameter. In these blotches are found the spore heaps or pits, and beyond them the leaf turns yellow; not long afterward the whole leaf shrivels and is drawn downward to the stem." This condition of things is well seen in figure 197, where an almost entire collapse of the foliage is shown.

Some varieties are much more susceptible than others to this *Cylindrosporium*, and growers will need to take careful notes upon this feature of the trouble and be guided accordingly.

A single leaf that is badly blighted with the blight in question is shown on page 53. The large dark spots are located with order, and the remaining portions having lost the characteristic green color, the leaves present anything but a healthy appearance.

There are other fungi that interfere with the growth of Chrysanthemums, as, for example, one that attacks the cuttings, and causes a large percentage to damp off before the roots and buds start into growth.

Last, but not least, there is a genuine rust, probably *Puccinia Tanacetii*, D. C., that has made its appearance upon the Chrysanthemum during the past season in an alarming extent, and of which the first announcement was made in *American Gardening* for October 2, 1897. This rust appears upon the foliage in numerous small chestnut spots, somewhat raised above the skin, through which the fungus has pushed itself and produced the heaps of oval brown spores. In general appearance it is not unlike the rust upon carnations, to which it is closely related; but there is no reason to suspect that they are identical.



PLANTS AFFECTED BY LEAF BLIGHT.

This rust is a fungus that establishes itself all through the plant before it begins to produce the rusty spots, and there is but little hope of relief in spraying. The better method will be to pick off all affected leaves and burn them.

The remedies perhaps have been treated sufficiently in describing some of the diseases, but here are some remarks that apply to all cases that may serve as a concluding paragraph: In the first place, the stock upon which Chrysanthemums are to be propagated should be of the very best. Here, as with other plants, a weak, diseased plant may be expected to produce its kind when cuttings are taken from it. There is, in the second place, much to be done in the study of varieties and their susceptibility to fungous diseases. If there is a predisposition, so-called, to disease, the grower should, if possible, know it, and turn aside from such sorts. For example, the Chrysanthemum Golden Wedding has been swept off by disease in many places successively for years, and growers should rank this otherwise superior sort accordingly. In the third place, the blighted parts when they first appear and are few in number should be picked off and burned.

As a last resort, as here mentioned, but not, in fact, is spraying; and if the grower is to use a fungicide it is wise to begin with it early and spray faithfully until blooming time. The Bordeaux is the standard mixture, and is made with varying proportions of the ingredients, but the following is satisfactory: Sulphate of copper, six pounds; lime, five pounds; water, sixty gallons.

Dissolve the sulphate in a few gallons of water; slake the lime and add a few gallons of water to it, dilute both to hold the total amount, and unite, stirring constantly. If a limeless mixture is preferred that the foliage may be kept nearly natural, it may be made by dissolving five ounces of carbonate of copper in three-quarters of ammonia and adding fifty gallons of water. The carbonate may be added to the ammonia, and the mixture diluted as desired for use. While not quite as effective as the Bordeaux, this fungicide has the advantage of not coating the plants with lime.



**LEAF BLIGHTED BY CYLINDROSPORIUM.**

In writing the above notes the author has drawn liberally upon his previous published observations as found in the various reports of the New Jersey Experiment Station, an address upon "Fungous Diseases of Ornamental Plants," before the Massachusetts Horticultural Society, and an article upon "Fungous Diseases" in the *American Chrysanthemum Annual* for 1895. The cuts are from the same sources, and from the *American Florist*.

BYRON D. HALSTED.

Experiment Station, New Brunswick, N. J.

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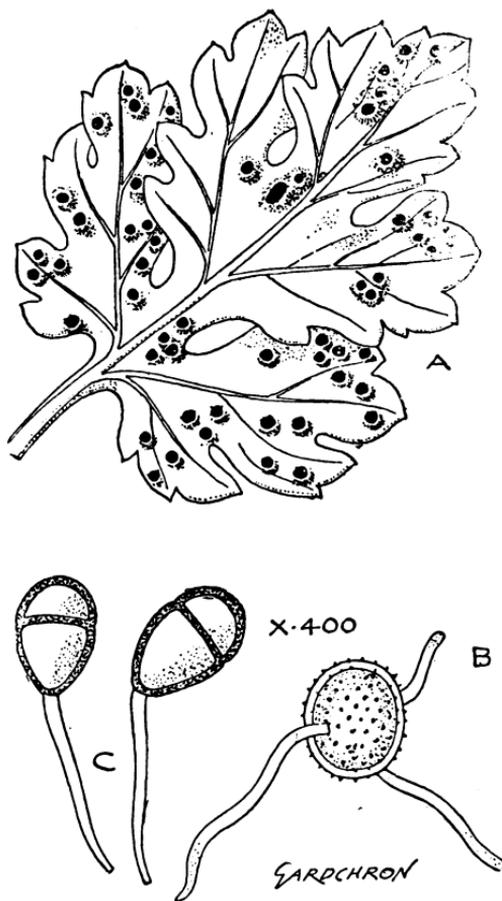
### CHRYSANTHEMUM RUST.

(*Puccinia Hieracii*, Mart.)

The following illustrated account of the rust of which the first American mention was made in *American Gardening* is of importance to our readers:

This very destructive parasite belongs to a group of fungi that have a bad record from the farmers' and horticulturists' standpoint. It includes such species as *Puccinia malvacearum*, the Hollyhock rust; *P. graminis*, the rust of wheat; and numerous others, equally injurious to cultivated plants.

All the species are true parasites, and in many instances produce three or four very different looking forms of fruit, and live on different plants during different seasons of the year. As an illustration may be mentioned the rust of wheat, which in the spring produces its first form of fruit on the young leaves of the common Barberry; the spores or reproductive bodies of this form are carried by wind, and inoculate the young leaves of wheat, giving origin to the form of fruit called rust; later in the season a third form of fruit is produced on the wheat leaves. The third form of fruit rests during the winter, and on the return of spring germinates, the minute spores produced being borne by wind on to the surface of damp leaves of the Barberry, where they germinate and enter the tissues of the leaf, and in about a fortnight's time produce the form of fruit, which in turn again inoculates the young wheat plant.



CHRYSANTHEMUM RUST: PUCCINIA HIERACII.

A—Leaf affected with "rust."

B—Uredo- or summer-spores, magn. 400 diam.

C—Puccinia-spores or winter-spores, magn. 400 diam.

In the *Chrysanthemum* rust the life history of the fungus is somewhat simpler than in the examples described above; it produces only two forms of fruit, and both are developed on the same kind of plant—the *Chrysanthemum*.

The form of fruit too much in evidence just now on *Chrysanthemum* leaves is what is termed the uredo stage, or summer form of fruit. The use of this form of fruit is to enable the fungus to extend its range of distribution as widely and quickly as possible. If a small portion of the powder contained in one of the rust-colored pustules on a leaf is examined under the microscope, it is found to consist of myriads of pale brown, minutely warted, roundish cells or spores, each of which is capable of germinating the moment it is mature. As is too well known, when the disease has once appeared, its spread is rapid. The spores are produced in rapid succession throughout the summer; as fast as they become ripe they fall away, and are carried by rain, wind, watering, syringing, the clothes of gardeners, etc., from one plant to another—an easy matter where the plants are more or less crowded together. Every spore that happens to alight on the surface of a damp *Chrysanthemum* leaf germinates quickly, pierces the tissue of the leaf, and in about a week's time produces a heap of ripe spores, ready in turn to continue the work of extending the disease. The above account is no exaggeration of what happens, and will, I trust, make clear to every one interested the manner in which the disease spreads. Later in the season, when the cultivator has lost all interest in the diseased plants, the same mycelium of the fungus which during the earlier part of the season has been producing myriads of summer spores, now gives origin to an entirely different form of fruit called "teleutospores," or winter spores. These latter differ in form from the summer spores, in being formed of two cells, and more especially in the fact that the winter spores will not germinate until after a period of rest, remaining in a quiescent state until the following spring, when they germinate and produce minute spores, some of which find their way on to the *Chrysanthemum* leaves, germinate, enter the

tissues of the leaf, and in a short time give origin to the uredo, or summer condition of the fungus.

Soon after the winter spores are developed, the Chrysanthemum leaves die and fall; when all the leaves have fallen, the plant is absolutely free from disease—that is to say, there is no permanent mycelium of the fungus left in the plant, so that if it commenced to grow the next season it would be perfectly free from disease, and would remain so unless inoculated by the bodies produced by the winter spores, as described above.

Summary: The Chrysanthemum rust disease is entirely the result of plants becoming inoculated by the resting spores produced by the fungus the previous year.

Too much care cannot be exercised in collecting and burning all diseased leaves, and this should be done early in the season before the winter spores are formed on the leaves. From the above account it will be seen how difficult it is to check the disease, if the summer form of the fungus once gains a foothold. A single dead leaf bearing teleutospores lurking in a corner is more than sufficient to secure a crop the following season.

Where the disease has previously existed, it would be wise to spray at intervals during the early part of the season with a solution of potassium sulphide—half an ounce to a gallon of water—as a preventive. This solution destroys germinating spores before they pierce the cuticle and enter the tissues of the leaf.

Finally, it must be remembered that the Chrysanthemum rust is very common on many of our wild composite plants, Hawkweeds, Burdocks, etc., and care must be taken that the disease is not introduced by this means.—G. Masee, in the *Gardeners' Chronicle*.

## SEED SAVING.

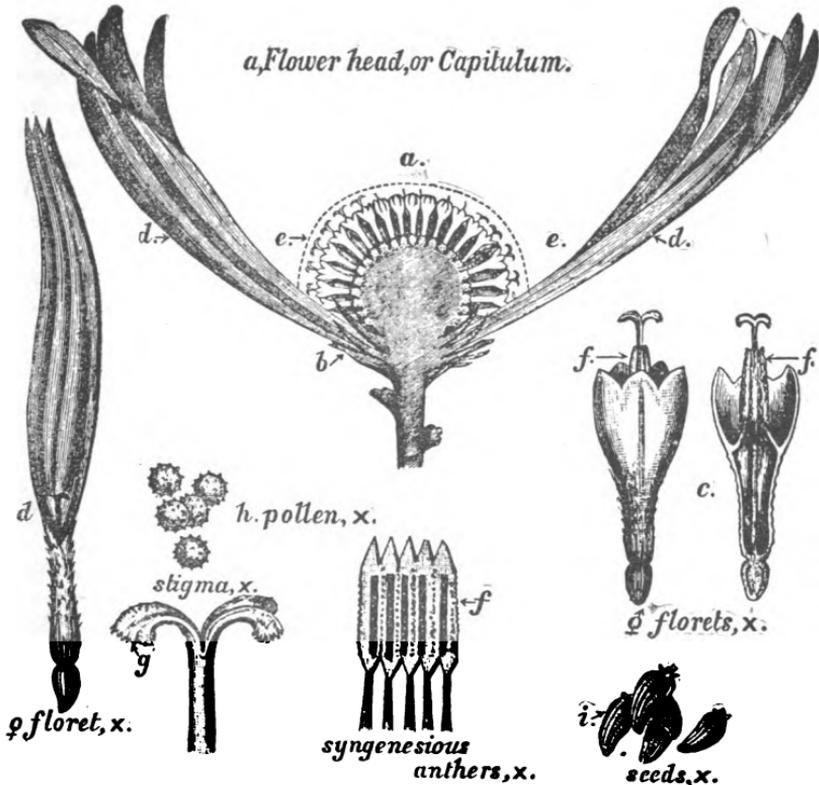
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Mr. F. W. Burbridge, M. A., curator of the Botanical Gardens at Trinity College, Dublin, gives the following interesting account, which appeared originally in the Journal of the Royal Horticultural Society:

"I have reasons for believing that the small single yellow *Chrysanthemum indicum* (commonly cultivated in India, although only wild in Corea, China, and Japan) is the original wild type from which natural variation and culture have evolved all larger growing and more highly colored forms. All the botanists, from Linnaeus and De Candolle to Messrs. Forbes and Hemsley (Jour. Linn. Soc., Vol. XXIII., pages 437 and 438), have considered *C. indicum* and *C. morifolium* (sinense) as two distinct species. I only believe in one species—the so-called *C. indicum* (of which *C. morifolium* (*C. sinense*) is, as I take it, a mere geographical variety), since I find that nearly every batch of seedlings exhibits a tendency to revert to this, as the primitive yellow-flowered type, although all sorts and sizes and conditions and colors, are obtainable from seeds gathered from the same capitule, be the seed-bearer pompon (*C. indicum*), or large flowered (*C. morifolium*-sinense). When the weird forms, now known to have been of Japanese garden origin, were introduced by Mr. Fortune in 1862, we were very nearly led to believe in a third species (*C. japonicum*), so distinct and different were these flowers from those previously known in Britain. Even supposing that there were originally two wild species of *Chrysanthemum* in China and Corea (a view from which I dissent), the result, as above stated, would tend to show that they must have intercrossed freely with each other; but all my observations go to prove that the weedy little single yellow pompoms, which so often come from the seeds saved from the finest and most modern of the large flowered kinds,

really imply reversion to first principles (atavism), and not the unmixing of two distinct wild plants naturally or artificially cross-fertilized.

Botanically, the Chrysanthemum is a glorified ox-eye daisy, trying hard to raise itself from a herbaceous perennial into



an evergreen shrub. It belongs to the great natural family of the daisy flowers (compositae), and what we as gardeners call a "flower" or a "bloom" is really a flower-head or capitulum (*a*) made up of a hundred or more separate individual flowers, all neatly arranged into a bouquet-like

group, and held in their places by a cup-shaped common calyx or involucre, as shown in this diagram (b). In fact, composite flowers are made up on what I may call the paint-brush principle, the florets representing the hair or bristles, and the involucre replaces the supports by which the hairs or component portions are held together, as here shown (b). The florets (c and d) are generally of two kinds, the outer, or ray, flowers being more or less ligulate (d), while the central or disc florets are tubular as here shown (c). The outer or ray florets are female flowers, having styles only, and no stamens, but the central or disc florets are hermaphrodite, being furnished with pollen-yielding anthers as well as with pollen-receiving bifid styles (e). The anthers (f) of the Chrysanthemum, as of all the members of the composite order, are coherent by their margins, or syngenesious, and they are, moreover, proterandrous—that is to say, the pollen is ripe and ready some days before the stigmas of the same flowers are fit for fertilization. In a word, the Chrysanthemum had ages ago become naturally adapted for cross-fertilization, and to that fact no doubt is due its variability in nature and in our gardens.

“When we come to consider the harvesting of Chrysanthemum seed in the garden, we, of course, find that the question of nutrition is at the bottom of the whole thing.

“Being, as we have said, naturally a sub-shrubby plant, the more woody it is the better it seeds. Our plan of cutting down the plants every winter, and growing on young plants from the succulent young growths in rich soil by the aid of stimulants, is quite opposed to the possibility of seeds being saved. All other things, such as heat and light, being equal, rich soils and much moisture or manurial stimulants conduce to the production of vegetative growth, and the development of the female floral organs, such as ray florets and styles. On the contrary, poor soils and drought are highly conducive to the growth of the androesial whorl, or the anthers and their golden harvest of pollen, and also to the production of seed. Heat and drought—sexual flowers; cold and moisture—neuter flowers. Do we not see this result every year of our lives

in the garden? After a dry, hot summer and autumn (which, as the gardeners say, ripens the wood), we get good fruit and seed crops the succeeding year, but after a dull, wet, cold season we know the reverse is generally the rule.

“But there must be no manurial stimulants, none of the syringing, and but little of the watering so necessary in the culture of large and showy flower-heads for decoration or exhibition. The Chrysanthemum seeds best as plants out in the open air in a high and dry position, and when the flowers show color they should be protected by a glass coping, with a roller-blind of stout canvas to let down in front of the plants to protect them from rain and frost. The thin, late, and shabby blooms seed best, and the greatest drawback to the seed ripening is wet, or even a damp atmosphere. As a rule, the large and early flowers of the Chrysanthemum are erect; but the later axillary flowers are dropping, and not so liable to suffer from rain or dew and fogs as are the large full flowers. The whole secret in the harvesting of Chrysanthemum seed is to place the plants in a very dry, warm (55 degrees, Fahrenheit), and airy atmosphere when in bloom. Even in the dry and sunny winter climate of Guernsey, the first seed was obtained by a baker (Mr. Webb), who trained his seed-producing plants on a warm wall at the back of his oven, thus securing the two great essentials of warmth and dryness, so necessary to seed and pollen production. Again, a good deal of patience is required, for the seeds swell and ripen slowly long after the florets have withered away. The decayed florets should be carefully cut away, or there is great danger of damp ruining the crop. Mr. John Thorpe cuts off the female florets before he fertilizes or pollinises the stigmas. Very good, keen eyesight and some practical knowledge of what Chrysanthemum seed is really like when ripe are also necessary, for there are numerous instances of good seed having been overlooked or thrown away by the unconscious grower.

“Most old raisers seem to have trusted to insect aid, or to chance, in the matter. It is, however, quite easy to take the pollen from one flower on a dry and sunny day, when it is

ripe, and to apply it to the out-curling stigmas of another capitulum. A camel's-hair brush moistened in the honey of a Fuchsia flower is best for removing and applying the pollen. As a rule, the incurved varieties are deficient in pollen, most of the florets being female, and to this fact is mainly due the extra difficulty in rearing these kinds. Late flowers from old and hard-grown plants sometimes contain a few disc florets, from which pollen is procurable. All the single and anemone centred kinds seed freely; and so do the Japanese when grown naturally, as above indicated.

## CHRYSANTHEMUMS IN THE GARDEN.

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Within the last few years there has been a notable progress into public favor of the Pompon and hardy Chrysanthemums. This is a rejuvenescence of an old group, not a new growth. The present season has witnessed a most remarkable increase of the cultivators of these interesting plants, and the exhibitions have borne witness to their popularity.

It is now several years since *American Gardening* urged upon the public the advisability of cultivating the more hardy Chrysanthemums and of growing varieties that would be suitable to all sorts of gardens. To-day there are numerous varieties offered in the trade, and any one who desires to make his garden beautiful in the dying months of the year, with a minimum of energy, has at hand an abundance of material. There are a great number of varieties which can be used for this purpose, but it is not our present design to descant upon their relative merits and demerits. Rather do we briefly but graphically present four portraits which will serve to illustrate the class as an entity.

Of the Pompons pure, *Trevenna* may be taken as a good type, and it is known in white, yellow, and pink forms—the latter being exceptionally delightful.

The variety *La Soeur Melanie* is one of the most charming of the hardy Chrysanthemums. Its delicately-formed flower and its purity of color, the profusion with which it blooms, all entitle it to notice.

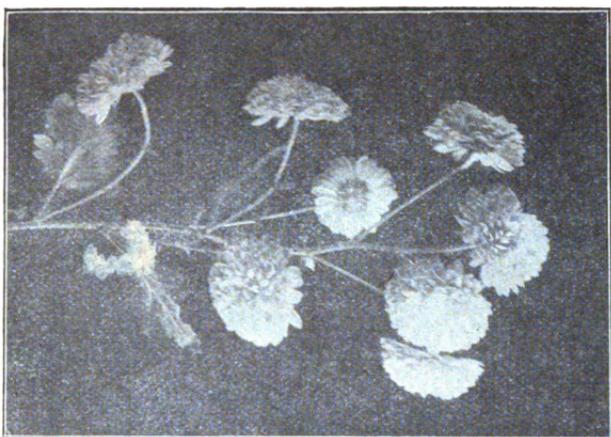
In *Jules Lagravere*, properly belonging to the group which our European brethren specialize as reflexed, we have an intense dark red. The plant is a strong grower, very floriferous, and, as is seen by our picture, carries its blooms in dense masses, very distinct in character from the two to which we have just alluded above. For its richness of color it is unsurpassed.

Our last is to a type which is as yet but very rarely seen—the Pompon Anemone. The title of this group is sufficiently descriptive of the characters that should be looked for, and Emilie Roebottom well illustrates a good white form of this section.

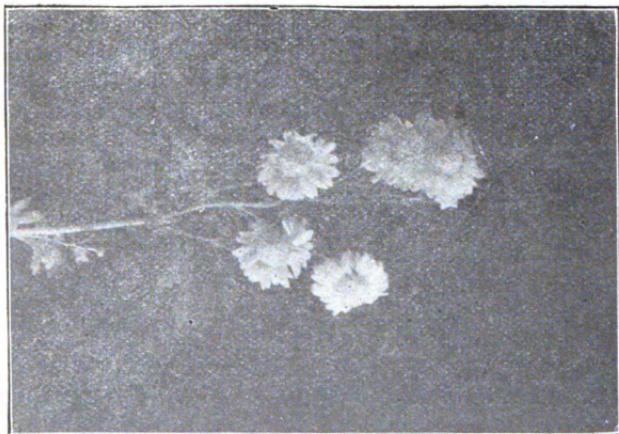
The great charm of these hardy Chrysanthemums, and it is indeed a wonderful charm to many, rests largely in the fact that they are good-natured, as without any special care they will from year to year, in due season, repay carelessness with an abundant crop of flowers; but, let it be remembered, the results that the careful cultivator and skillful gardener will obtain by judicious care, will amply repay whatever extra attention is bestowed. The best method of growing these hardy Chrysanthemums in starting a new plant is to take a newly rooted cutting and plant it out in the border, where it is desired to flower. In good soil the growth will be rapid, and the only attention that will be needed will be the occasional pinching out of the growing tips up to about the middle of August. Nothing can be more beautiful than the boldness of these tender-looking plants, braving the early frosts and serenely carrying through all their masses of whites, pinks, yellows, bronzes, and richest reds. To all our readers who cannot devote the space and attention that the larger-flowered Chrysanthemums demand, we again urge, grow the Pompons.

It may be well here to remark that though several sections of the Chrysanthemum, as we know them to-day, are very distinct from each other, and the lines of demarcation are pretty closely drawn, yet it should not be forgotten that they all represent one species—*Chrysanthemum indicum* of botanists—and that all our present forms have been produced by the skill of the cultivator in selection. There is no evidence of the existence in nature of such forms as we know to-day.

The question is often asked, Which are the earliest to bloom, and are they perfectly hardy? Yes, there are scores of varieties, and all perfectly hardy. We will give you a dozen



ПОКРОН ХРИСАНТЕМУМ (HARDY)  
РОЗЕ ТРЕВЕННА.



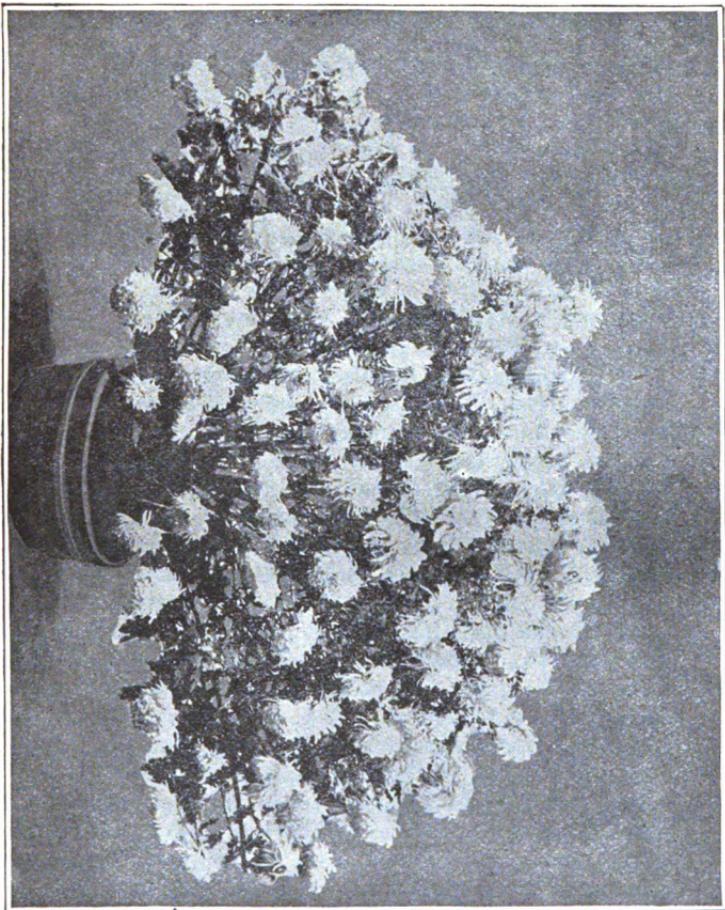
ПОКРОН АНЕМОНЕ ХРИСАНТЕМУМ  
ЕМИЛИЕ КОБОЛТОВ (HARDY).

names, the balance you can get from a trade list—Roi des Precoces, very early; Soeur Malanie, M<sup>me</sup>. Marthe, Souvenir d'Elise Dordan, Model of Perfection, Rose Trevenna, Snowdrop, Viscomte De Vere, General Canrobert, Souv. de Jersey, Princess Melita, and the different colors of the Cedo Nulli. Of the large flowering kinds there are plenty hardy enough, but the trouble is to get them into flower sufficiently early, and for this reason there are but few worth bothering with, unless you are prepared to give protection. Ivory (pink or white), Mrs. Whilldin, Marion Henderson, Marquis de Montmort, M<sup>me</sup>. Gastelier and Lady Fitzwygram are among the few that are early enough to give entire satisfaction.

#### FINE CHRYSANTHEMUMS WITHOUT GLASS.

It is not by any means unusual to hear visitors at the various flower shows expressing regret it is not possible to grow good Chrysanthemums out of doors. To all such the object lesson of the illustration herewith (page 67) should be a full and sufficient answer. It is the reproduction from a photograph of a plant, which was exhibited at a Newport, R. I., show, and of which Mr. Alex. MacLellan writes: "The plant received the premium as the best specimen plant at the Newport Horticultural Society's Chrysanthemum exhibition, it being about 7 feet in diameter, and had 263 blooms. It was grown by an amateur, Geo. Douglas, a mason by trade, who has no glass whatever, but who protected his plants for three weeks before the exhibition with plant bed cloth. I think that this proves what can be done by any amateur if there be only the necessary enthusiasm."

SPECIMEN PLANT GROWN WITHOUT GLASS.



## TRIED IN THE BALANCE.

### THE EXHIBITION RATING OF LEADING VARIETIES.

One of the perplexing problems to a beginner, and even to one who has been at it for many years, is the selection of varieties. Introductions are numerous and varieties deteriorate rapidly, so that the problem is ever new to the grower. For this reason we reproduce an analysis of 155 varieties with their record established in exhibitions of 1897 and 1898. We think that from this table the contemplative grower can see at a glance what are the best, and govern himself accordingly. It is true that this list will get out of date, say, in the course of two years, but as a matter of history, even then, the table will be of immense value.

The comparison of the lists of the years of 1897 and 1898 as here given, is based upon the published reports in the press, and have been compiled only from such reports as have had careful critical reviews of the varieties exhibited. No notice is taken of other than first-prize collections, and plants are included. The number of plants which appeared at exhibitions does not very materially influence the figures now presented. The varieties most prominent have been: Puritan as an early, W. H. Lincoln, the best all-round; Ivory, which again figured very prominently; and Pink Ivory in several instances was shown in good shape. As a basis for the tables the reports of eighteen shows were taken in 1897, as against fifteen in the year 1898. Thus, in order to make a perfectly satisfactory comparison, the figure as given for the previous year has been reduced in proportion.

This year Viviani-Morel heads the list, deposing Major Bonnaffon, which divides with Mrs. Henry Robinson the second place, this latter variety retaining the same relative position as it had last year. The varieties which follow in order of merit show a smaller gap than before, but the changes of rank are very remarkable. Golden Wedding remains very much as before.

Among those which have advanced by great strides from the bottom to the top of the list are, Frank Hardy, which stands third this year; Mrs. H. Weeks, Charles Davis, H. W. Rieman, and Nyanza. Fortune has been less favorable to Niveus, Queen, Mayflower, Mrs. Jerome Jones, Ivory, W. H. Lincoln, Mrs. G. W. Childs, Maud Dean, and Philadelphia. Among those which have not shifted their relative position one way or the other are Modesto, Minerva, Golden Wedding, Mutual Friend, and H. L. Sunderbruch.

The following varieties have been awarded first prizes or been in winning lots:

Relative times in winning lots 1897		Times in winning lots 1898
20	.....Viviand-Morel .....	26
19.2	.....Mrs. Henry Robinson.....	20
23.4	.....Major Bonnaffon .....	20
2.5	.....Frank Hardy .....	19
11.6	.....Golden Wedding .....	16
14.2	.....Modesto .....	17
3.4	.....Mrs. H. Weeks.....	14
11.6	.....Mutual Friend.....	10
9.2	.....Minerva .....	10
5.9	.....H. L. Sunderbruch.....	10
5	.....Mrs. G. Peabody .....	9
15	.....Mrs. Perrin .....	8
10	.....Miss Georgiana Pitcher.....	8
3.4	.....Charles Davis .....	8
9.2	.....Philadelphia .....	7
10	.....G. W. Childs .....	7
11.6	.....Mrs. Jerome Jones.....	6
2.5	.....J. Shrimpton .....	6
4.2	.....Eugene Dailedouze.....	5
4.2	.....Inter-Ocean .....	5
6.7*	.....Jeannie Falconer .....	5
1.7	.....H. W. Rieman.....	5
1.7	.....Nyanza .....	5
—	.....W. H. Chadwick.....	5

—.....	Autumn Glory .....	5
—.....	Newitt .....	5
5 .....	Pink Ivory .....	5
—.....	Eureka .....	5
10 .....	Maud Dean .....	5
—.....	Silver Cloud .....	5
6.7*.....	Peter Kay .....	4
14.2 .....	The Queen .....	4
15 .....	Mayflower .....	4
12.5 .....	W. H. Lincoln .....	4
2.5 .....	Mrs. S. T. Murdock .....	4
2.5 .....	Mrs. W. C. Egan .....	4
5.8 .....	Ivory .....	4
2.5 .....	Lady Playfair .....	4
1.7 .....	Hicks-Arnold .....	4
5 .....	Mrs. J. J. Glessner .....	4
3.4 .....	Mrs. George West .....	4
2.5 .....	Mrs. M. A. Ryerson .....	3
15 .....	Niveus .....	3
—.....	J. H. Troy .....	3
—.....	Lawn Tennis .....	3
1.7 .....	Indiana .....	3
4.2 .....	Iora .....	3
4.2 .....	Western King .....	3
—.....	Casco .....	3
3.4 .....	Mrs. G. M. Pullman .....	3
2.5 .....	Miss Florence Pullman.....	3
2.5 .....	Mrs. E. H. Bigelow .....	3
—.....	J. G. Warren.....	3
1.7 .....	Australian Gola .....	3

\*In 1897 Jennie Falconer and Peter Kay were regarded as synonymous and grouped together.

The following varieties were in winning lots twice in 1898: M. Wanamaker, W. Simpson, Zulinda, Marguerite Jeffords, Mrs. O. P. Bassett, New York, Harry May, Mme. Bergmann, Harry Hurrell, Falstaff, Lenawee, Defender, Solar Queen,

Pennsylvania, Golden Gate, C. H. Peirce, Lorna Doone, Mrs. T. L. Park, The Bard, Miss Helen Wright, Mme. Carnot, Shenandoah, Mme. P. Rivoire, Pluto, Charles Molin, Louis Boehmer, Longfellow, Mrs. A. J. Drexel, Baron de Rothschild, Belle of Castlewood, Amoor, Oakland, and Evangeline.

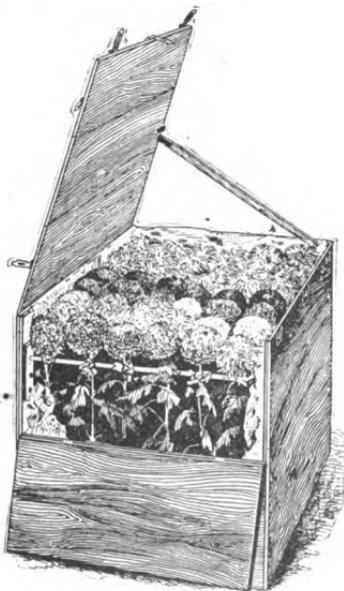
The following were seen in winning lots once: Pitcher and Manda, Mrs. M. Magee, Mrs. Alpheus Hardy, Good Gracious, Mrs. H. McK. Twombly, Miss M. Wright, Mrs. W. P. Raynor, Mrs. F. A. Constable, Mrs. H. Rinek, Rustique, Joan d'Arc, C. H. Curtis, Gertrude Brydon, Louis D. Blank, Gladys Spaulding, Petro Diaz, Arline, Mongolian Prince, Dorothy Toler, Mrs. S. Coleman, Prince Alfred, Mrs. R. Craig, Theo, Columbine, Mavourneen, Mrs. J. W. Withers, Mersa, Harry Toler, Eda Prass, Erminilda, Cullingfordii, Snow Queen, Shilowa, Moonstone, Phenomenal, Mrs. R. Carey, Dorothy Spaulding, Phoebus, Sunrise, Infatuation, Helen Bloodgood, Mrs. McArthur, L. Canning, F. H. Levy, Merula, Onyx, Bruant, Henry Nanz, Leonidas, G. Bramhall, Garza, Emerson, Golden Queen, Bonnie Dundee, Sunstone, Mrs. A. P. Meredith, Swanley Giant, The Harriott, Col. W. B. Smith, Pres. W. R. Smith, Belle of Castlewood, Gold Standard, Mrs. J. G. Buer, Marion Henderson, Austin Cannell, Chito, and Diana.

## A TRAVELING BOX FOR SHOW BLOOMS.

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Chrysanthemum growers sending their flowers long distances know well the importance of having suitable boxes or packages in which to ship them.

In the past the rule has been to lay the flowers flat in boxes, the stems resting over cross pieces of wood, which are fastened sufficiently high to keep the weight of the blooms from resting



on the bottom of the box, the stems being made fast to prevent shifting. Other tiers are added in the same way. A piece of damp moss having been previously tied to the end of each stem, flowers packed in this way travelled fairly well, if cut not less than forty-eight hours before being packed and placed in water in a cool place, free from draught.

In the box designed by Robert Laurie, of Newport, R. I., and here shown, the flowers stand bolt upright, and each one secure in its place, so that there is no shifting about.

The size preferred for ordinary purposes is a box to carry four dozen blooms, the dimensions of which are as follows: Length, 4 feet; width, 3 feet; depth, 2 feet 6 inches. When long stems are wanted a deeper box is used. In a box of this size there are eight rows, with six blooms in a row.

In packing work is commenced at one end. Two cross-

stakes, one a few inches up from the bottom and the other just immediately under the bloom, as shown, being put into position for each row as the work progresses, and to these the stems are tied. On the sides light strips, having holes made at regular distances apart, are placed, and into these the ends of the cross pieces are put; these being light are simply sprung into position.

A tin pan  $3\frac{1}{2}$  inches deep is fitted into the bottom of the box and filled with damp sphagnum moss, over which is placed a sheet of wire netting, through the meshes of which the ends of the stems are placed.

In making the boxes one-half-inch white wood is used. The corners are bound with iron clasps. The cover hinged and fastened in front with a hasp. And for convenience in putting in and taking out the flowers one end is hinged in the middle, and may be let down out of the way.

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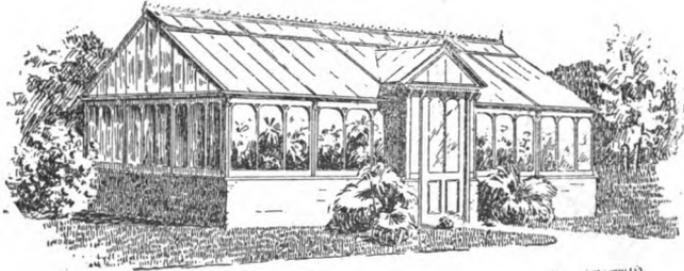
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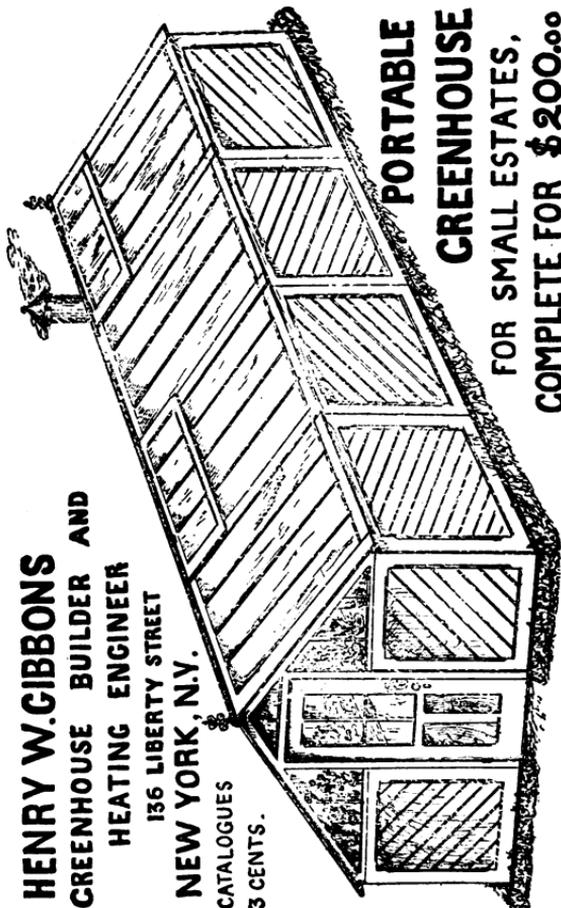
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