Cornell University Agricultural Experiment Station.
ITHACA, N. Y.
HORTICULTURAL DIVISION.

THE 1895

CHRYSANTHEMUMS

By L. H. Bailey, Wilhelm Miller, and C. E. Hunn.

1895.
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Cornell University, Ithaca, N. Y., February 8, 1896.

Honorable Commissioner of Agriculture, Albany.

Sir: This account of our cultivation of chrysanthemums in 1895, is submitted for publication under Chapter 230, of the laws of 1895.

In our former report (Bulletin 91) of chrysanthemums, made nearly a year ago, we took the opportunity of a fly-leaf to explain our position upon the vexed question of the testing of novelties. We made the following statement: “We refuse to test varieties simply because they are new. Our basis of study is the monograph,—the investigation of a particular subject, rather than the indiscriminate growing of things which chance to be put upon the market in a given year, and which have no relationship to each other aside from a coincidence in date. When we take up a certain group of plants for study, we endeavor to secure every variety of it, old or new. These varieties are studied not only in the field, but botanical specimens are invariably made of every one, so that the experimenter has specimens before him for leisurely study when the hurry of field work and the excitement of bug-catching are done. We are always glad to receive the seed novelties of any year, but we do not agree to report upon them or even to grow them. If we were to attempt to grow them all, we should simply be making a museum of curiosities, and we should have no time left for investigation and experiment.”

This seems to be plain enough to allow of no mistake as to our position, yet we have been half accused of an unwillingness to aid dealers and buyers in the determining of synonyms and the discarding of duplicate and unworthy varieties. This is exactly the opposite of the truth. We are so desirous of aiding in this direction that we have refused to make any effort except when we believed that we could really accomplish the purpose. We are free to say that we have no sympathy with the ordinary “variety test,” which simply grows a lot of things and then sets down a few unrelated measurements of them. One must make a comprehensive and detailed and prolonged study of his subject, with all the factors before him, before he is able to judge of such an apparently simple thing as the merits of varieties. All estimates of varieties must be comparative. One cannot grow an onion, and then say that it is or is not the same as others, nor can he likely give any accurate measure of its comparative merits, for he has no other varieties with which to compare; and he cannot carry even such emphatic subjects as onions in his mind from year to year. One cannot file away specimens of all garden varieties, as they grow in all soils and all seasons, as he can dried plants and bugs. If the station officer is to be able to identify and to judge all varieties sent to him, he must attempt to grow every variety of every plant every year. And even if he should grow them all, he would likely gain little, save experience, from his effort, for the subject is too large for instant study. In 1896 we expect to make a study of Brussels sprouts, dahlias, sweet corn, chrysanthemums, canna and tuberous begonias, and any person who has varieties of these things which he wants tested may send them to us. Of these things, especially the ornamentals, we should receive the novelties in advance of their general introduction, if possible.

In this chrysanthemum study, I have been fortunate in my associates. Mr. Miller is a special student in horticulture, a graduate of the University of Michigan, and has given most enthusiastic attention to our chrysanthemum test. Mr. Hunn is a gardener of much experience, well known for his long and earnest connection with experiment station work.

L. H. Bailey.
86.—Chrysanthemums grown for specimen blooms.
THE 1895 CHRYSANTHEMUMS.

I. SUNDAY REMARKS UPON THE SUBJECT.

It is charged that the rapid popularization of the chrysanthemum is mere fashion. It may be so; but if fashion were henceforth always to produce so many beauties as it has in the chrysanthemum, it might be forgiven its endless record of follies. The transcendent merit of the chrysanthemum lies in its almost limitless variety of form, texture and color of flowers. There is no plant known to American gardens which approaches it in these respects, not even the rose. Such variety of form is possible only in compositous flowers, in which each floret is a distinct element and capable of independent development. One cannot feel the truth of these remarks until he has an opportunity to study a large collection of varieties growing together. He will then see that almost every form of compositous flower which the mind can picture has here arisen.

Yet, various as the chrysanthemums are, there are limitations to the development of the species in certain directions. For example, it is idle to look for a blue chrysanthemum. This is not because of any assumed or theoretical incompatibility of the blue and yellow series of colors, but simply because no true blue varieties have ever yet appeared, to our knowledge. The only guide in the breeding for particular characters is experience, or the observed behavior of the species. The chrysanthemum has been cultivated for some thousands of years, but amongst all its departures it has given no blue flowers. It is reasonable to expect that if no hint of such variation has occurred in all this eventful evolution, we can have little hope for its appearing in the future. The same remark will apply to the much-coveted but ever-evasive blue rose. It is a fundamental tenet of plant-breeding that the operator must put himself in line with the natural tendencies of the plant and work harmoniously along with nature, rather than to set himself against her. Man's power lies more in improving or augmenting tendencies which already exist than in creating new
tendencies. There is a tradition, to be sure, that a blue chrysanthemum was once produced, under political pressure, in the orient, but there is no exact knowledge of the matter; and if the King of Japan really did receive such a tribute, I am willing to believe that someone connected with the transaction forestalled the modern flower "artist" and dyed the flower. It is possible, of course, that a blue chrysanthemum may appear, but the probabilities are all against it; and if it does come, it will probably originate as a sport or bud-variety rather than as a definite attempt thereat on the part of the operator.

One must remember, too, in this connection, that the heavy colors of chrysanthemums are nearly always associated with heaviness and gracelessness of habit. We have no pure deep red with the cut of Mrs. Rand, for example. But even the same form, particularly if it inclines strongly to regularity, has a heavier appearance in dark colors than in light ones. There is no more fertile field for the development of new types than in the combining of light and graceful forms with dark colors.

A word about the culture of chrysanthemums.—Our own tests of chrysanthemums have been made for the purpose of obtaining specimen or exhibition blooms. The plants are therefore trained to a single stem and a single flower. Fig. 86 shows our house as it looked last November. When so many varieties are grown, the house is not at its best at any one time, but there is a progressing exhibition. The house therefore lacks the full appearance of an ordinary commercial house. These plants were made from cuttings taken the previous spring, the plants having been grown in pots until late July, when they were taken from the pots and set in the bed.

This growing of the plants to a single bloom does not produce the most decorative or satisfactory results. It simply gives large specimen blooms. I much prefer to grow from three to six blooms on a plant, and shall do so this year. The plants may be flowered in pots, or in a solid soil bench. Very good small plants
may be brought to perfection in 6-inch pots, but the best results, in pot plants, are to be obtained in 8-inch or 10-inch pots. If the plants are to be used for decoration, they should, of course, be grown in pots, but the best results for cut flowers are usually obtained by growing in the earth. In any case, the cuttings are made from the tips of basal or strong lateral shoots, late in February to May. One form of cutting is shown in Fig. 87. It is inserted in the soil to the point C. If the plants are to be flowered in pots—in which case they usually mature earlier—the cuttings may be started as late as April, or even June; but if they are grown in the soil and large plants are desired, the cuttings should be taken in February or March. The plants which are flowered in the soil are generally grown in pots until July. The grower must decide how many blooms he desires on a plant, and then train the plant accordingly, bringing up the different branches so that they will all bloom at the same time. A well grown chrysanthemum, in an 8-inch pot and bearing five or six perfect blooms, is one of the most decorative plants which the florist can produce.

Reflections upon nomenclature, classification, and variation (Mr. Miller).—There is need for reform in three important matters relating to chrysanthemums,—nomenclature, synonymy, and classification. New varieties of chrysanthemums often bear absurd, bombastic, and vulgar names. Many are named after society leaders, and prominent persons. There are always practical reasons why novelties are named after popular men and women, and these reasons are often unworthy ones. The poor quality of cigars named after election candidates is notorious. Those who buy new flowers because of the attractive names usually feel defrauded of their sympathies. The criticism is often made that our monthly magazines are dealers in attractive titles, that the matter is rarely as spicy as the caption. The disseminators of new horticultural varieties take advantage of waves of popular enthusiasm. They name flowers after actors, base-ball players, barons, saints, and society leaders. Almost is realized one of Dean Swift's dissonant combinations, "lords, fiddlers, judges, and dancing masters." The only consistent course is to abolish the whole system of naming varieties after living persons. So long as this
8b.—Forms of chrysanthemum florets (See pages 220, 221)

Floret incurved, 13.
Floret reflexed, 2
Margin incurved, 7, 10
Margin revolute 2-15,
Ligulate, 1, 6,
Tubular, 12, 15
Various degrees of tubularity, 7-13
Doubly curved (if, twice curved, not "recurved"), 3

Incurved and cupping, 4.
Incurved and hooded (cucullate), 5
Lacunate, or cut, 13, 14.
Twisted 15, 16,
Hairy, 4, 5
Quilled, 11,
system continues, the element of disappointment and bad taste will persist. It is a constant reproach to horticulture that the art lacks dignity. Need it also be pointed out that we seem to be deficient in imagination?

The reform would be sweeping if made all at once, but there is a preliminary step in this direction that can easily be taken. All such titles as Mr., Mrs., Miss, General, Judge, Count, Baron, etc., should be dropped. These titles cause endless confusion. What makes the case peculiarly hopeless is that the National Chrysanthemum Society of England in its Official Catalogue has set the example of indexing varieties according to these titles, in defiance to the established rules adopted by librarians, indexers, and cataloguers. It frequently happens that the *pater familias* is not the only popular member of the family. In verifying varieties by English catalogues (whose methods have been tamely copied in America) it is often necessary to remember which is Miss Blank, and what are the first names of the other daughters. Label-writers are usually careless, and their "M" may stand for Mr., Mrs., Miss, Monsieur, or a Christian name. According to the trade journals, it is not uncommon to order a "Miss" and get a "Mr." The use of titles ought to be discontinued.

There are other problems of nomenclature which are coming up constantly. Many of them have been considered by societies devoted to other flowers, or to fruits. The only real attempts to solve any of these problems have been made by the American Pomological Society, and, for vegetables, by a committee of Experiment Station horticulturists. The Pomological Society has drawn up a set of rules, but unfortunately the other societies do not follow them. What is really wanted for progress is a national horticultural society in which professional growers of plants, amateurs and botanists may work together. The societies devoted to the culture of a single flower could cooperate with the national society. Of course, a society, as such, might not deal with problems of synonymy and classification, but its members could do so either as committees or as individual students. Records of hybridization are worth keeping, as well as many other data for a study of the botany of cultivated plants. It is a pity that we have no horticultural society of the dignity of the
Royal Horticultural Society. The American genius for organizing ought to be able to create a better society than this for our own needs. Commercial men could supply materials for history and science, and botanists could instruct plant-breeders at almost every point of their work.

There is this distinction between botanical classification and horticultural classification: the world can wait for the first; the second has a daily practical bearing. Prizes often do harm in this—that they encourage production of flowers that conform to arbitrary and fallacious standards, and discourage informality and freedom. This is strongly illustrated in the case of the Mrs. Alpheus Hardy chrysanthemum. The hairiness of that variety was no novelty in the western world. It had repeatedly appeared in England and had been patiently if not sorrowfully repressed. The florists did not want a hairy flower, nor was it absolutely new, and the successes of the florist who sold it for $1,500 and the dealer who is supposed to have made $10,000 out of it in one year, must be explained in some other way. The lesson of this is that conventional standards and horticultural classifications are often tyrannical. It is certain that in 1886 no hairy chrysanthemum could have won a prize before the National Chrysanthemum Society of England. If florists want a good example of the tyranny of classifications they can examine the centenary catalogue of that society and see the ten artificial sections that the English have made and Americans too often follow. The English have more rigid classifications, a more severe system of scoring by points, bigger prizes, and less individuality in their flowers.

The danger of suppression of individualism can be averted for the present, so far as the American Chrysanthemum Society is concerned, by a more liberal interpretation of what "incurved" and "Japanese" may mean. The Japanese section should be made broad enough to include most types which do not fit elsewhere. The English "incurved" chrysanthemums are compact, round, formal, and regular. The florets are carefully arranged in mathematical order by means of forceps. The "dressing" of petals is unpopular in this country. The guard petals of exhibition carnations in England used to be pasted down on cardboards.
There are perfectly estimable people who still take pleasure in the stiffest incurved chrysanthemums. Indeed, it is the wonder and the glory of the chrysanthemum that it can be varied to suit all tastes. This variability is a thing inherent and essential. It is the peculiar genius of the composites. Asters have it, dahlias have it, and chrysanthemums most of all. It is capable of reflecting the fleeting frivolities and fashions of the age as well as certain deeper and dearer things. Chrysanthemums can be formal as well as fanciful, but we have plenty of other formal flowers. Incurved chrysanthemums were popular in a hoop-skirt age, but
the Japanese are truly fin de siècle. They are informal, fanciful, quaint, odd, individual, and therefore a more complete expression of the times than single, incurved, anemone, or pompon-flowered sections.

Descriptions of the florets (Mr. Miller).—The greatest confusion exists in commercial catalogues as to descriptive terms for chrysanthemums; for example the word "recurved" is used by some dealers to mean twice curved or doubly curved, i.e., the second curve being in a direction opposite to that of the first. (See No. 3 in the plate illustrating different types of florets, Fig. 88.) Botanists, however, use "recurved" to mean a single curve of greater extent than that expressed by "reflexed." Descriptive catalogues are hard to write, and harder still to order from. Illustrations are preferable in this day of cheap mechanical processes of engraving. A "half-tone" gives one an idea of the bloom which no words can convey. Sometimes, however, the individuality of the floret needs special notice, and it is often impossible to tell from the loose description of florists whether they are describing the blossom or the floret. Illustrations are needed to give general effect, and botanical terms to describe particular effects. No descriptions can convey the idea of the form, compactness or looseness, regularity or irregularity of the blossom so well as a picture does. The floret, however, can sometimes be described by words that are helpful to the imagination. "Ostrich plume" is a fanciful and attractive name, but it has no place in botany. "Hairy" is the proper term. A head of florets like No. 13 (Fig. 88) gives the general effect of hairiness, and it takes a second look to determine that the individual florets are irregularly cut, but do not have hairs or trichomes, as do florets 4 and 5.

Cataloguers should distinguish between a floret and its margin; for example, a reflexed floret may also have its margins reflexed (No. 2); an incurved floret may be ligulate (No. 6), tubular (No. 13), or have its margins incurved (No. 7). Unfortunately, it is impossible to indicate such various degrees of tubularity as are successfully presented by the florets No. 13 to 7. Nos. 12 and 13 are properly called tubular, and No. 11 quilled. The ligulate form of petal is conceived to have been originated by the splitting
of a tubular form. This theory is well illustrated by florets 13 to 6. In No. 9, half of the floret shows the tubular origin, and half is ligulate. Whether the opposite tendency for ligulate to produce tubular forms exists, is a question. Possibly Nos. 7, 15 and 16 might be regarded as transitional forms from the ligulate to the tubular. It is often important to distinguish whether a floret is ligulate or whether the margins are incurved. For example, single, intense, vivid colors are probably best displayed by a ligulate floret. Crimsona (No. 6) is a case in point. The color of Miss Helyett is a similar shade, but the general effect is ruined (for some at least) by a distracting element: the margins of the florets are turned in so much that florists would say, 'it shows the under side.'

Various types of chrysanthemum florets are shown, natural size, in Fig. 88. No. 1 is a ligulate floret which was incurved in the bloom; No. 2 stood reflexed in the flower, margins revolute; No. 3, floret doubly curved, is cupped at base and top and high in the middle; No. 4, incurved as it stood in the flower, hairy-tipped, cupped, but the character not showing well in the cut (Mrs. Higinbotham); No. 5, incurved in the flower, hooded and hairy-tipped; No. 6, ligulate floret (Crimsona); No. 7, tubular below, broadly ligulate above, the margin incurved; No. 8, greater part of the floret tubular; No. 9, to be compared with No. 7; No. 10, a partially tubular floret, with very slender base, and strongly involute blade; No. 11, quilled floret; No. 12, tubular, straight (Iora); No. 13, tubular and curved or hooked, the apex cut or laciniate (Mrs. R. W. E. Murray); No. 14, deeply cut or laciniate (Mrs. W. H. Rand); No. 15, broad at base, twisted above (Ezeta); No. 16, floret twisted throughout (Shavings).

Color problems (Mr. Miller).—In consulting catalogues of chrysanthemums for the purpose of verifying new varieties, some very perplexing color problems were encountered. Much of this confusion can never be straightened out, because color is a subjective phenomenon. It exists in the minds of men, rather than in nature. But there are certain practical suggestions which can be made to flower dealers, and it is to be hoped that some general principles can be educed. Cataloguers of new varieties should not
attempt to make very fine and subtle distinctions, nor should they use such seductive phrases as "soft dove colored," "fawn colored," etc. Men who write of colors should be examined for color blindness, so that they may know their own limitations. The great
practical reason against using words expressing fine shades of color is that these words mean very different things to different persons. It is hard enough to get people to agree on such staple colors as red, blue, green and yellow. What the florists of the country need is a cheap chart of colors, containing simply the common names and the common colors. This matter has been agitated for several years. Mr. F. Schuyler Mathews, a well known artist and colorist, prepared a chart for the use of florists, which was published as a supplement to the American Florist of Aug. 17, 1895. It is an excellent and worthy attempt, and is a distinct gain to the profession; but it has the fault of containing too many uncommon and unimportant colors and names of colors. "Dull ultramine (blue, grayish)" is too long for ordinary use. Even if the florist were capable of distinguishing between Mr. Mathews’s "salmon," "salmon pink" and "reddish salmon," these names would never be attractive names for the description of flowers. It is very doubtful whether people would care to distinguish lilac and light lilac. Horticulturists ought to agree upon twenty or thirty common names of colors and then secure the preparation of a chart to correspond with these common names. We need colors for the names in common use.

People must not expect too much of color charts. They should realize (as Mr. Mathews does) that pigments cannot compete with the colors of nature. Pigments are dead, petals are alive. Moreover, neither pigments nor petals correspond with the colors of the solar spectrum. It is doubtful if Mr. Mathews is warranted in calling his colors "absolutely true." They may be correct from the pigmental or chemical standpoint, or from the standpoint of technical or trade nomenclature, but it is a question if these are to be the standards of absolutely true colors. The fact is that there is no absolute standard of color. Lapis lazuli and bichromate of potash may furnish very stable and constant pigments, but these materials and all others have decided limitations. These limitations must be understood, or there will always be disappointment, no standard in common use, and the consequent mutual charges of dishonesty and color blindness.

There are one or two suggestions which I offer in the hope that they may be of some practical help to those selecting varie-
ties. The first suggestion is intended for those who grow chrysanthemums on a small scale, who wish the best of the new varieties, and cannot afford to experiment with many. This suggestion is that such growers select of new varieties only those which have a single color. It is early enough to get those varieties containing combinations of two or more colors after they have stood the test of a year's experience with the market. People like strong, vivid, and highly individualized single colors in chrysanthemums. There are only two sides to the question when a single pure color is considered. People either like it, or dislike it. But when two colors are combined there are infinite possibilities for difference in taste. For example, here is a list of eight recent chrysanthemums, all of which have combinations of only two colors,—Fred Walz, Mme. O. Mirabeau, Mrs. Potter Palmer, Genevieve, Sunset Pink, Mrs. C. Harman Payne, Edith Smith and Burt Eddy. Now, who is to decide which one of these is an inharmonious mixture, and which a happy combination? But the problem is even more complicated than this. Let us suppose that the variety Burt Eddy contains seventy per cent. of red (to avoid confusion I shall not attempt to describe the shade) and thirty per cent. of white, on each floret. Do you suppose that this proportion can be maintained year after year? Florists know that combinations of colors are very unstable. I do not mean to condemn these varieties out of hand. Some of them may prove stable as to their proportions, and artistic in effect, but the ordinary florist can afford to wait a year. The point is, that these are typical of a class which it is safer for him not to buy while they are new.

Other mixtures of doubtful value are Gilt Edge, Evening Star, Miss Sylvia Shea, and Mrs. Moses Wentworth.

To illustrate how variable the amount of color is, the case of the new variety, Miss M. M. Johnson, may be cited. This is advertised as a pure yellow, but some of the many blossoms grown this year showed varying amounts of red. Radiance is another yellow that should be made "red proof" before being sent out as a pure yellow. Secondary colors appear with age in many new varieties that have only one color at their best. The pink that comes with age to Crystallina (white) is attractive, but that which spreads over Miss Georgiana Pitcher (yellow) makes a melancholy spec-
tacle. Often there is a chance for difference of opinion. In any case, would it not be well for disseminators in their introductory notices to state the fact of secondary color appearing with age? An analogous case is that of varieties which show the center. Mrs. J. M. Parker, Jr., and Mme. Carnot are two of many new ex-

amples of this latter class. The centre is objectionable in one, not objectionable in the other. It is a matter of dollars and cents to cut the flowers of the former and sell them before the center shows. But such judgments are essentially personal. What buyers want is the fact. If the center shows, the disseminator should state the fact.
A blue chrysanthemum is not impossible. It was formerly taught that red, yellow, and blue flowers could never be gotten in the same species. Scientists no longer believe in the incompatibility of the cyanic and xanthic series of colors. A blue chrysanthemum may arise either from seeds or "sports." As far as seedlings are concerned, one would naturally be tempted to save the seeds of varieties approaching purple. Blue is perhaps most easily reached through purple, but when the blue is once obtained the difficulty is to keep out the purple. Probably we shall never have an azure-blue chrysanthemum. Even the fringed gentian, which is the standard for azure-blue among wild flowers, is not always free from purple. The tendency among chrysanthemums is to sport towards white, instead of away from it. Of course, sports, like men of genius, have a way of disregarding prophecies, but the tendency is worth pointing out. The story is often repeated that in the year 386 A. D. the King of Corea had to pay to the Japanese Emperor a tribute consisting of red, white, yellow, blue, and black chrysanthemums. Even granting that the tribute was actually paid, what proof have we that the Japanese word for blue has meant the same thing for fifteen centuries? Moreover, how does the average person know that the Japanese word is properly translated? If those who are striving to produce a blue chrysanthemum, are also cherishing hopes of selling it for $1500, they should be reminded that the public may not care for it when it is obtained. A green chrysanthemum was very rare, but when the two plants of the pink variety Viviand-Morel sported to a green simultaneously in different parts of England, the coincidence was barely mentioned in a British horticultural journal.

_Fragrance (Mr. Miller)._—Can chrysanthemums be made fragrant? Yes and no. Nymphæa is fragrant, but it is a small-flowered variety. There are at least half a dozen others. How much these can be developed is a question. At any rate, the large-flowered varieties will certainly never all be fragrant. They are valued for other things. If odor is associated with hereditary constitution, the chances are small for making the genus chrysanthemum a fragrant one. People are not looking to the chrysanthemums for odor, but simply for form, color, and texture. Fra-
grance would have to be very emphatic to make any impression beside a flower six or eight inches in diameter. And besides, whatever odor the flower might have would be overpowered by the heavy scent of the foliage. Yet there is nothing really incompatible with the development of odor in the large chrysanthemums. *Nymphaea* has been forced to grow flowers four inches across.

II. TEST OF NOVELTIES.

In judging new varieties, we have this year divided all the chrysanthemums into very good, good, poor, and intermediate. The word intermediate does not appear in the list, however, because it was thought best not to try to describe the shades of merit between "good" and "poor." When, therefore, there is no comment upon the merit of the variety, it is to be understood that, in our test, the variety seemed to be only intermediate or indifferent in quality. There are so many good and very good chrysanthemums on the market that it is necessary to measure new varieties by a high standard. If the present judgments seem to imply a rigorous standard, it is certainly not so severe as the test of time. It is safe to prophecy that most of the new varieties of 1895 will not be for sale five years from now.

The most complete adaptation to current wants is found among white and yellow chrysanthemums. There is great room for improvement in pinks and dark shades. There are plenty of quilled and hairy pinks, but the Japanese incurved section possesses no pink of the size and beauty of *Mrs. Henry Robinson* (white) or a dozen yellows that could be named. The trouble with delicate shades of pink is that the color is rarely evenly diffused and it often fades out. The lack of single, pure colors other than white, yellow, and pink, is very noticeable. Dark reds are very popular, and yet there is no section in which so little improvement has been made as that represented by *Cullingfordii*, *Geo. W. Childs*, *John Shrimpton*, and *Mrs. J. H. White*.

In the description of varieties below, the name in the parenthesis following the name of the variety signifies the dealer who sent us the cuttings; the name at the end of each description is that of the introducer, so far as we are able to determine from the current
literature. The varieties are arranged alphabetically according to the customary rules of library catalogueing, except that whenever a name consists of two words, the first of which is an adjective, the variety is indexed according to the first letter of the adjective, e.g., Latest Fad is put under "L," and "Autumn Leaves" under "A." Varieties named for persons are catalogued under the surname. All those varieties which were first introduced to the trade last year are marked "1895." Those few without dates are such as we have been unable to trace to the introducer; but they are all very recent.

There are several matters of great practical importance which
an experiment station cannot determine for the forcing-house industry. Florists must decide amongst themselves the shipping qualities of different chrysanthemums and the length of time cut flowers will last. These matters are of great practical and momentary value, but of little scientific or permanent importance. The depot for such information should be the trade journals. It is surprising that greenhouse men do not supply these lists to their trade papers with greater frequency instead of going on year after year making avoidable mistakes, and purchasing experience dearly.

The following varieties described in Bulletin 91 have been grown again this year with results similar to those recorded last year.—Elizabeth Bisland, Georgienne Bramhall, Charlotte, Maud Dean, Golden Wedding, Mrs. Chas. Lanier (better than we said), L'Enfant des deux Mondes, Mrs. Geo. J. Magee, Mayflower, Mutual Friend, Nizeus, Mrs. Howard Rinck (worse than we said) and Miss Florence Pullman.

Some of the older varieties, not mentioned in Bulletin 91, have been grown again. Of these, the following have done well:—

Callendrea, Dr.—Similar to Miss Georgiana Pitcher.
Comley, Jas.—A very good late variety, dark red, changing to carmine and white.
Iora.—See Fig. 93, and page 234.
Lippincott, Mrs. Craig.
Queen, The.—Midseason white.
Shrimpton, John.—Type of Cullingfordii, and the best red 'mum.
Sunderbruch, F. L.— Early yellow.
Vivian-Morel.—The standard pink of its class, and still to be excelled.

The following were intermediate in merit: John Bunyan, Geo. S. Conover, Miss Helyett, Eva Knowles, Sautel's White.

The following were poor or bad: Mrs. Jas. Eadie, John M. Kupfer, Mrs. C. H. Payne, Sylvia Shea, Yellow Queen.

The following descriptions and estimates of varieties are made up from notes taken by Mr. Hunn, Mr. Miller and myself.

The dates in the descriptions indicate when the flowers were at their best.
1. **Abbott, Marion (Smith)**—Flower 6 inches wide, pink, "color of La France rose," incurved, and slightly hairy. Stem 46 inches, long jointed. Nov. 20. (Spaulding). 1895.

2. **Astor, W. W. (Smith)**—Good. (See Fig. 89.) Flower medium sized. The single row of ray florets white, edged with pink; disk flowers yellow, forming a high compact centre. Stem 36 inches, leaves small, deeply cut. Claimed to be an improvement in size. This belongs to an unpopular class. Considered by gardeners as of no value for commercial purposes. Keeps well. (Rob't Owen, Maidenhead, Eng. Introduced in America by Hill and Smith, 1895.)

3. **Atkins, F. L. (Smith)**—Flower 6 inches. Florets reflexed. Stem 40 inches, close jointed, leaves long and pointed. Considered by our gardener a good midseason white for commercial purposes. Nov. 16. (Pitcher and Manda.) 1895.

4. **Autumn Leaves (Smith)**—Flower 6 inches wide; a combination of white, red, and yellow, the yellow being confined to the tips of the florets. Habit half dwarf, stem close jointed, foliage thick and leathery. The combination of color is considered a pleasing one by our gardener. At best Dec. 12. (Spaulding) 1895.

5. **Bigelow, E. M. (Dorner†)**—Good. Flowers 5 to 7 inches, with general appearance of a red dahlia. Florets stiff, a few outer ones reflexed. Stem 50 inches, close jointed; leaves large, heavy, deeply cut. Considered by our gardener a fine, showy variety of a color that is scarce among chrysanthemums. Late. (Dorner.) 1895.

6. **Biron, M. Georges (Beckett‡)**—Good. (See Fig. 90.) Flower 6 inches in diameter, bizarre, showing chiefly the reverse side of florets which are strongly whorled. Inner side of florets maroon, reverse amber-colored. Stem 42 inches, habit slender, leaves long and deeply cut. This eccentric appearance may be incident to development or confined to rare cases, as the flower is advertised to belong to the Vivian-Morel type. This is recommended chiefly for its oddity and the attention it attracts. Nov. 16. (Calvat.) 1895.

7. **Black, Miss Louise D. (Beckert)†**—Good. Flower 4 to 5 inches in diameter, regular and globular, orange-red. Florets small, semi-tubular and tending to incurve. Stem 36 inches, habit slender. A good variety for its type and color. 1895.

8. **Bloodgood, Helen (Hill§)**—Good. Flower 7 to 8 inches, pink. Florets mostly incurved, the outer ones irregularly reflexed. Stem 52 inches, stout and short jointed; leaves deeply cut. An improvement in pinks. The shade is pure, and the color is quite evenly spread over the florets. Nov. 10. (Spaulding.) 1895.

9. **Borel, Pres. (Smith)**—Flower 8 inches wide, loosely arranged, a striking combination of purple and silver. Stem 56 inches, long jointed, leaves

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*Nathan Smith & Son, Adrian, Mich.
†Dorner & Son, Lafayette, Indiana.
‡Beckett & Bros., Glenfield, Pa.
long and narrow. Nov. 18. A French novelty. The colors are either liked or disliked at first sight. (Calvat.) 1895.

10. Brigand (Smith)—Flower 6 inches wide, deep crimson, slightly reflexed. Florets show yellow reverse. Stem 34 inches, close jointed, foliage large and light green. At best Dec 12. (Spanlding. Raised by Hill.) 1895.

93.—Iora Four-fifths natural size.

11. Bronze Giant (Smith)—Flowers 6 inches, compactly incurved. Florets yellow, shaded and splashed with dark red. Stem 30 inches, long jointed, foliage scant. At best Dec 5. (Spanlding) 1895.

12. Bryant, Mrs. W. 'A. (Pitcher & Manda*)—Flower 7 inches, yellow. Habit very tall and slender; stem 5 to 6 feet, long jointed, and strong

*Pitcher & Manda, Short Hills, N J
though very thin; leaves small and very unhealthy. The color and form of the flower is similar to that of *H. L. Sunderbruck*. Nov. 27. (Pitcher & Manda.) 1895.

13. *Carnot, Madam* (Smith). Very good. (See Fig. 91). Flower very large (8 inches wide), loose and free, the florets being very limp and graceful and ligulate, pure white. Outer florets reflexed or hanging, the inner ones variously placed. Very tall (4 ft. or over), the stem long-jointed, and foliage rather scant. A long keeper, and a most graceful and excellent white. Nov. 10. (Calvat, 1894. Introduced in America by Smith.)

14. *Carnot, Mademoiselle* (Beckert). Good. Much like the last, fully as large or larger, but shows the center, although this defect is not greatly objectionable in a flower of this class White. Stem 40 inches, long-jointed, the foliage rather scant. Nov. 27. Variation of No. 13?

*Burt, Eddy*. (See *Eddy, Burt*).

15. *Chipeta* (Smith)—Flowers 7 inches wide, closely incurved, showing only the reverse side of the florets, the color of which is compared to that of ripened oak leaves. Stem 46 inches, close jointed, leaves large. At best Nov. 16. (Smith.) 1895.

16. *Compton, Miss Georgie* (Spaulding*)—Flower in color and shade suggesting a double yellow tulip. Stem 40 inches, close jointed, leaves deeply cut, held well from stem. Nov. 10. (Spaulding.) 1895.

17. *Crimson* (Beckert)—Very good. (See Fig. 92.) Flowers 6 inches wide, dark crimson, the intense color well displayed by the ligulate florets. Stem 40 inches, close jointed, leaves large and deeply cut. Remarkable for the vividness of its deep color, and the velvety finish of the florets. Reverse light colored. At best Nov. 27. (W. Jarvis Smith, Pittsburgh.) 1895.

18. *Crosby, Emma N.* (Smith)—Flower 5 inches wide, golden. Florets slightly hairy, the outer ones reflexed back to the stem. Habit dwarf. Nov. 20. (Spaulding.) 1895.

19. *Crystallina* (Smith)—Very good. Flower 5 inches in diameter, globular and distinct in form, pure white. Florets are crisp, firm, and stand out radially. Stem 36 inches. At best Nov. 10. This is recommended for its earliness, purity of color, distinctness of form and keeping qualities. A secondary color appears with age, the pink being evenly diffused, and not displeasing. (Vaughan.) 1895.

20. *Darville, Camille* (Smith)—Flower 5 inches in diameter, same form as *Ezeta*, pure white. Stem 42 inches, short jointed, foliage light green. At best Nov. 10. (Spaulding.) 1895.

*De Galbert* (see *Galbert*).


*T. H. Spaulding, Orange, N. J.*

23. Eddy, Burt (Smith)—Flower 6 inches wide. Florets ligulate, purple and white. Stem 28 to 30 inches, very close jointed, foliage small. At best Nov. 16. (Vaughan.) 1895.

94.—Northern Lights. Three-fifths natural size.

24. Egyptian, The (Hill)—Same as Nellie Elverson with us. (Hill.)

25. Elverson, Miss Nellie (Hill)—Good. Flowers 6 inches, incurving, showing the reverse. Inner side of florets dark red, reverse bronze. Stem 44 inches, close jointed, leaves large. Nov. 25. A good exhibition flower. (Hill.) 1895.
26. *Evening Star* (Beckert)—Flower large, 6 inches across. Outer florets reflexed, the inner ones spreading and whorled, showing the center, semi-double; color old gold and salmon. Stocky, 30 inches high. Nov. 16. Odd.


28. *Exeta* (Smith.) Good. “An improved Ro haillon.” Flowers 5 inches in diameter, pure yellow, and distinct in form. Stem 50 inches, close jointed, leaves large and thick. At best Nov. 16. The form of the flower head is globular, the general effect is one of regularity. (See fig. 88 floret No. 15.) Recommended for earliness, purity of color, distinctness of form, and lasting qualities. (Smith). 1895.


33. *Genevieve* (Vaughan)—Flower medium in size, 5 inches across. Florets straight or slightly reflexed, the inner ones white and the outer ones splashed with pink. Stem 30 inches, weak, the foliage small. Nov. 10. (Vaughan.) 1895.

34. *Gift Edge* (Smith)—Poor. Flowers medium in size, 5 inches across, the florets very narrow. Color yellow tipped bronze. Stem 30 inches, close jointed. Nov. 19. (W. Jarvis Smith, Pittsburgh, Pa.) 1895.


36. *Haggard, Rider* (Smith)—Good. Large-flowered anemone. Flower 9 to 10½ inches. Ray florets light pink, disk florets a darker pink, the inner ones tipped with yellow. Habit very tall. Stem 60 inches, leaves small. Nov. 10. Recommended for its striking oddity. *Mrs. F. Gordon Dexter*. (picture on title page of Bulletin 97) gives an idea of the form. This is not a new variety, but the size has been greatly increased. Attracted universal attention among visitors and much dislike. (H. J. Jones.) 1895.

37. *Halloween* (Smith)—Very good. Flower head 7 inches wide and flat. Florets incurved and quilled, the tubular portion a lighter pink than the ligulate portion. This variety has as much individuality as *Northern Lights*, which has similar colors, but a somewhat different development. Nov. 25. (Hill.) 1895.
38. **Heacock, Esther (Smith)**—Flower incurved, yellow. A sport from *Ada Spaulding*. Stem 30 inches, close jointed, foliage good. Nov. 10. (Spaulding.) 1895.

39. **Hersylea (Sunset Seed and Plant Co.)**—Flower large, 6 inches across. Outer florets slightly reflexed, the inner ones upright and cupped. Color good golden yellow. Growth rather slender; foliage oak-leaved. Stem 40 inches. Nov. 16. (Sunset Seed & Plant Co.) 1895.

40. **Higginbotham, Mrs. (Smith)**—Good. Flower 9 inches wide, incurring, showing the center; hairy, pink. Florets incurring, cupping, and even more hairy than those of *Loris Boehmer*. Stem 40 inches, close jointed, leaves large and very dark green. A gain in size over *L. Boehmer*. Nov. 16. (Spaulding: Raised by Hill.) 1895.

41. **Hole, Dean (Smith)**—Flower 8 inches, white and pink. Stem 36 to 40 inches, foliage large, drooping to stem. Nov. 26. (May.) 1895.

42. **Hurlcy, Mrs. Wm. H. (Beckert)**—Poor. Flower large, 6 inches across; florets slightly reflexed. Color buff. Growth slender, the stem 20 inches high. Nov. 10. (Graham.) 1895.

43. **Iora (Smith)**—Very good. (See Fig. 93). Not a new variety. Flower 6 inches in diameter. Florets tubular, pink. The color is a delicate shade evenly diffused throughout. Recommended for exhibition and pot culture. Nov. 16. (Smith.) 1894.

44. **Jayne (Smith)**—Flower 4 inches wide, dark rose color, the shade of Mrs. Murdock. Stem 30 inches, long jointed, leaves nearly entire. Nov. 27. (Vaughan.) 1895.


46. **Lager, J. E. (Smith)**—Good. (See title page.) Flower 6 inches wide, bright yellow, irregular in general form, and irregular as to florets, which show varying degrees of tubularity and are irregularly reflexed. Stem 40 to 45 inches and stout, leaves good. Recommended for earliness, and keeping qualities. This is not as good as *Mrs. W. H. Rand* (see Fig. 95), an early yellow of the same class. Nov. 23. (Pitcher & Manda.) 1895.

47. **Latest Fad (Beckert)**—Flower 8 inches wide, yellow. Florets tubular, the outer reflexed. Stem 30 to 36 inches, close jointed, leaves small. Dec. 5. Considered by our gardener a good variety for growing single blooms in pots. (Spaulding.) 1895.

48. **Leech, Katherine (Beckert)**—Good. Flower very large, 7 inches across. Florets loosely reflexed, the central ones erect or spreading. Color clear buff. Strong, short-jointed grower, 25 to 30 inches high. Nov. 16. (Graham.) 1895.


51. **Millbrook** (Dorner)—Very good. Flower 7 inches, tubular. The ligulate portion of florets a bright red, tubular portion a salmon bronze, Stem 40 to 55 inches, close jointed, leaves large and held well to flower. The combination of colors is unique and attractive. Nov. 20. (Dorner.) 1895.

52. **Mirabeau, Mme. Octave** (Beckert)—Good. Flower rather large. Florets long and loose, color a delicate shade of silvery pink. Stem 30 inches high, long jointed. Nov. 28. Very attractive and odd.

53. **Molin, Mme. C.** (Beckert)—Flower 8 inches, loosely arranged, pure white. Outer florets reflexed. Stem 40 inches, close jointed, leaves light green, long. Nov. 25. (Calvat.) 1895.

54. **Mortillet, M. de** (Beckert)—Flower 5 inches wide, incurved. Outer florets red, inner bronze and yellow, reverse buff. Stem 44 inches, foliage unhealthy. (Calvat.) 1895.

55. **Murdock, Mrs. S. J.** (Dorner)—Flower 6 to 7 inches, incurved/pink. Stem 36 to 40 inches, very short jointed, leaves large, deeply cut, dark green. Nov. 25. (Dorner.) 1895.

56. **Murray, Mrs. R. W. E.** (Beckert)—Very good. Flower 5 inches wide. 4 inches deep, white, loosely incurved showing centre. Florets are cut or toothed in such a manner as to give the general effect of hairiness. (See Fig. 88, No. 13.) Stem 46 inches, close jointed, leaves small. A good late exhibition variety. Recommended for purity of color, individuality of form, and lateness. Centre not objectionable. Stands test of close scrutiny as well as that of general effect. Not to be confused with Mr. R. W. E. Murray. (Syn. Mrs. Geo. W. Pullman.) (H. J. Jones, England.) 1895.


58. **Northern Lights** (Beckert)—Very good. (See Fig. 94.) Flower 8 inches in diameter, quilled, pink. Stem 46 inches, close jointed, foliage very good. Mid season. Nov. 25. Recommended for distinctness of form, and keeping qualities. The spiral condition of development shown in Fig. 94 is succeeded by stages of growth that are perhaps even more attractive. (W. Jarvis Smith, Pittsburgh.) 1895.

59. **Nyanza** (Smith)—Good. Flower 6 inches in diameter, high built. Florets incurved, cherry red, reverse golden, very broad and strong. Stem 45 inches, close jointed; leaves finely cut. Suitable for cutting Nov. 20. In fine condition Nov. 27. Striking form and color. Keeps well. (Smith.) 1895.

60. **Oakland** (Dorner)—Good. Flower 6 inches in diameter, dark red or terra cotta, very double and spherical. Outer florets reflexed, inner ones slightly incurved, the margins revolute in every case. Stem 50 to 60 inches. At best Nov. 5. Good Nov. 25. Recommended for distinctness of form and color, earliness and keeping qualities. (Dorner.) 1895.

*J. C. Vaughan, Chicago.
83. *Troy, J.'H.* (Smith)—Flower 5 inches in diameter, incurved Japanese, pure white. Stem 40 inches, close jointed, foliage scant. (Advertised to be ready for cutting Oct. 5 to 9.) This would rank very high among the early, pure white, incurved varieties if it were not so much exceeded in size and form by *Mrs. Henry Robinson.* Nov. 10. (Pitcher & Manda.) 1895.

84. *Valleau, Marie* (Smith)—Flower 6 inches in diameter, globular, light pink, slightly hairy. Florets broad, heavy texture, the outer reflexed. Stem 40 to 45 inches, short jointed, leaves large, deeply cut, and held well from the stem. Nov. 20. (Spaulding.) 1895.
85. Wakeley, Dr. A. W. (Smith)—Flower 6 inches in diameter. Florets wide, incurved, loosely arranged, light red, with light pink reverse. Stem 24 inches; leaves small. At best Nov. 20. (Spaulding.) 1895.

86. Waltz, Fred (Bock)—Flower 5 inches wide, pink and white. Reverse and tips of inner florets silvery. Stem 30 inches. Nov. 16. (Bock.) 1895.

87. White, Mrs. J. H. (Hill)—Flower 6 to 7 inches, reflexed, crimson, Stem 30 to 40 inches, short jointed, foliage very thick. It seems doubtful whether this is any improvement in the much desired dark shades of which Cullingfordii is the historic example. There was considerable variation among the specimens as to time and manner of blooming, color and stature. Neither was "extra dwarf." 1895.

88. Wynne, Rose (Smith)—Flower very large, 7 inches across, loose, silvery pink. Stem 3 feet, very stout and close jointed, and of distinct appearance. Nov. 16. (Rob't Owen, Maidenhead, Eng., 1894. Introduced in America by Hill, 1895.)

89. Zipangii (Smith)—Flower 6 inches wide, very high built. Outer florets reflexed showing dark red, inner ones incurved showing buff reverse. Stem 48 inches; leaves large. Nov. 16. (Smith.) 1895.

90. Zulinda (Smith)—Flower similar to that of Halloween, but smaller. Stem 34 inches, very close jointed; leaves large, very dark green. Dec. 5. (Smith.) 1895.

Mr. Miller's synopsis of varieties.—The names of the varieties in the following selection are not arranged in a fashion that is designed to be complete or systematic, but simply helpful. The arrangement aims to save persons of limited time the labor of reading through a long list of new varieties alphabetically arranged. Florists, gardeners and others who visited our forcing-houses were constantly asking such questions as these: "Where is your biggest blossom?" "Have you any good pink varieties?" "What new colors are there in hairy varieties?" "Will you give me the names of some good quilled sorts?" The following list attempts to answer just such questions:

Varieties of great size.—Mrs. Henry Robinson, Rider Haggard, Mrs. Higinbotham, Helen Bloodgood, Mrs. W. H. Rand, Northern Lights.

Varieties of single, strong colors.—

White.—Mrs. Henry Robinson, Crystallina, Mrs. R. W. E. Murray.

Yellow.—Mrs. W. H. Rand, Miss Georgiana Pitcher, Ezeta, Miss M. M. Johnson.
Pink.—Helen Bloodgood, Mrs. Higinbotham.
Crimson.—Crimsona.
Dark red.—Miss Elma O'Farrell, Oakland.

Good combinations of color.—W. W. Astor, Millbrook.

Early varieties.—
White.—Mrs. Henry Robinson, Crystallina.
Yellow.—Mrs. W. H. Rand, Miss Georgiana Pitcher, Miss

M. M. Johnson.
Light yellow.—Philadelphia.
Pink.—Mrs. Higinbotham, Marie Masse.
Dark red.—Oakland.

Midseason varieties.—
White.—F. L. Atkins.
Yellow.—Ezeta.
Crimson.—Crimsona.

Late varieties.—
White.—Mrs. R. W. E. Murray.
Red.—E. M. Bigelow, Miss Elma O'Farrell.
Tall.—Rider Haggard, Oakland.
Dwarf.—Miss M. M. Johnson, Marie Masse, Paul Noisette.
Hairy.—Mrs. Higinbotham.
Quilled.—Hallowe'en, Northern Lights, Millbrook.
Tubular.—Iora, Mrs. R. W. E. Murray.

Keeping qualities.—Crystallina, Ezeta, Oakland, Mrs. W. H. Rand, Mrs. J. H. Starin.

Good for exhibition blooms.—W. W. Astor, M. Georges Biron, 
Crimsona, Crystallina, Mrs. Higinbotham, Millbrook, 
Mrs. R. W. E. Murray, Miss Georgiana Pitcher, Mrs. 
Henry Robinson, Mrs. W. H. Rand, Northern Lights, Shavings.

Strong individuality of form.—Crystallina, Ezeta, Shavings, Mrs. 
W. H. Rand, W. W. Astor, Hallowe'en, Northern 
Lights, Millbrook.

Large Anemone.—Rider Haggard.

Varieties showing the reverse colors.—Miss Nellie Elverson, M. 
Georges Biron.

Velvety finish of florets.—Crimsona.

Odd, striking, fanciful, eccentric, etc.—W. W. Astor, M. Georges 
Biron, Rider Haggard, Mme. Octavie Mirabeau, Mrs. 
W. H. Rand, Shavings.

Mr. Hunn's choice of varieties.—It is a difficult matter among 
so many varieties of exceptional merit to name those possessing 
the greatest number of valuable points, as different methods of 
growing and varied soils will often so change the character of a 
variety that one is compelled to constantly revise his opinion.

The following list is not an arbitrary selection, but it simply 
gives the results obtained here in 1895:

**WHITE.**

*Early.*
Mrs. Henry Robinson, 
Madame Carnot, 
Crystallina, 
Miss Gladys Spaulding, 

*Late.*
The Queen, 
Mlle. Carnot, 
F. L. Atkins, 
Mrs. J. H. Starin, 
Mrs. R. W. E. Murray,
Iora,
Helen Bloodgood,
Mrs. Potter Palmer,
Mrs. J. M. Parker, Jr.

Northern Lights,
Mrs. S. T. Murdock,
Marion Abbott,
Marie Valneau.

Mrs. W. A. Rand,
J. F. Lager,
Miss Georgiana Pitcher,
Louise A. Black,
Mrs. M. M. Johnson.

W. B. Dinsmore,
Jennie Falconer,
Ézeta,
W. H. Rieman.

M. Georges Biron,
Mrs. J. H. White.

E. M. Bigelow,
Nyanza,
Crimsona,
Miss Nellie Elverson,
Millbrook,
Diavola,
Hallowe’en.

Mr. Bailey’s choice of six.—

1. Mrs. Henry Robinson (Fig. 96).
2. Mrs. W. H. Rand (Fig. 95).
3. Crimsona (Fig. 92).
4. Iora (Fig. 93).
5. Madame Carnot (Fig. 91).
6. Miss Georgiana Pitcher.

In this test of 90 novelties, we thought that the following twelve showed superiatory (‘‘very good’’) merits (excluding the varieties which are simply odd or curious): Madame Carnot, Crimsona, Crystallina, Hallowe’en, Iora, Miss M. M. Johnson, Millbrook, Mrs. R. W. E. Murray, Northern Lights, Miss Georgiana Pitcher, Mrs. W. H. Rand, Mrs. Henry Robinson.

L. H. BAILEY,
WILHELM MILLER,
C. E. HUNN.