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Growing and Preparing Agricultural Crops for Exhibition.

BY THE DIRECTOR AND THE BOTANIST.

Bulletins will be sent free upon request. Address: Director Experiment Station, Laramie, Wyo.
Wyoming Agricultural Experiment Station.

UNIVERSITY OF WYOMING.

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Growing and Preparing Agricultural Products for Exhibition

BY B. C. BUFFUM.

1.—Wyoming has a greater opportunity this year to become known to the rest of the world and to her own citizens than has ever been offered the State before. The Louisiana Purchase Exposition at St. Louis next year promises to be the greatest show of the kind ever known. Our Legislature has provided that this State shall be well represented at St. Louis. We are also fortunate in having arrangements already under way for several local exhibitions in the State this coming fall. Plans are being considered for the Frontier Day celebration in Cheyenne; for an Albany County Fair at Laramie; a Johnson County Fair at Buffalo, and perhaps others, in addition to what it is hoped will be a good representation of our resources in an exhibit at Sheridan in connection with the third annual meeting of the Wyoming Industrial Convention to be held on October 7, 8 and 9 next.

2.—In order to make the most of the opportunity offered, it is necessary that we begin early. It will be too late next year to grow crops for the St. Louis Fair. Every ranchman and farmer who is interested in the future development of the State should so plan this season's work that he will be able to contribute something to one or more of the coming exhibitions. In no section of the United States can there be produced more perfect or more interesting examples of our staple crops than can be grown in our own State. Our grasses and forage plants
are notable for their large number of varieties, as well as their economic and scientific interest. Our grains are plump and heavy, and the straw is marvelous in its perfection and color to those unacquainted with color effects produced on vegetation by the abundant sunshine of the arid region. Abundant material will be available if enough people in the different sections of the State interest themselves in the matter, in order to bring worthy specimens to light this year. There is no reason why the more imperishable crops shown in Wyoming this fall, and those which are preserved so they will keep, should not be displayed again next year.

Grains.

3.—It is not possible to make a creditable exhibit, even of grain, unless it is properly raised and prepared. Many exhibitions lack merit because they are merely picked up. There may be something practical in a bundle of grain pulled out of a stack and shown in the rough, but it is seldom attractive. If a sample of white wheat contains kernels of red wheat, oats, barley or weed seeds scattered through it, the effect is anything but pleasing. In addition to this, everyone who attends expects that that which is exhibited shall be worthy of its place. The sight-seeing public, or the student who gives time and thought to an agricultural display, naturally infer that what has been prepared for their inspection represents the best that can be produced, and if anything less than the best, or at least that which is first class, is shown, the State receives an injury rather than a benefit. A poorly prepared exhibit is seldom worth the price of admission, and those who see it have a right to be disappointed. Therefore, great care should be given to growing, selecting and preparing such material.
4.—It is well to plant annual crops, especially such noteworthy varieties of grains as may be available, with extra care on small plats of land prepared for the purpose. Where this is done the best seed may be selected and planted in a much better manner than prevails in our field practice. If grain has already been planted, a small area can be selected in the field, and given some extra attention.

5.—Where the season is short, as it is at some of our high altitudes, it is advisable to plant grain rather thickly, in order to make it ripen evenly before danger of injury by early frosts in the fall. Some of the late varieties of wheat or oats should be planted at the rate of one hundred pounds or more of seed per acre. However, the larger number of our varieties of small grains are sufficiently early to ripen ahead of frosts, even at altitudes above 7,000 feet. Average seasons we have ripened between 400 varieties and 500 varieties of wheat, more than 100 varieties of oats, and 30 or 40 kinds of barley on the Laramie Plains. Our experiments indicate that as a rule seventy pounds of seed wheat or oats per acre give best results, though in raising seed for selection we use less than one-half this amount. This year with our selected varieties we will use approximately forty pounds of seed per acre.

6.—The “culture method” of raising grain, which is used to considerable extent in Europe, even with their field crops, should be practiced in order to produce the finest samples. In the “culture method,” the drills are simply placed twice as far apart as usual, leaving room to cultivate and hoe between the rows until the plants have reached full growth. Wide rows also enable the irrigator to run water between them without flooding the crowns of the plants, and this produces better plants, even of grain and grasses, than can be grown where they are flooded. When planting, stop up every alternate drill hole, leaving the rows fourteen inches or sixteen inches apart. If planting has already been done, hoe out one row of grain on the plat selected
for the purpose. When the grain is up, run a wheel hoe through the rows occasionally or use a hand hoe, keeping down all weeds and leaving the surface soil in good condition. If the soil is poor, the grain may be stimulated with a little nitrate of soda, or potash fertilizer or bone meal, but care must be taken not to fertilize too heavily, or the straw will grow too late instead of ripening plump grain in season. We have never resorted to special fertilization, and it will not be necessary on land which has borne crops in rotation, especially if the previous crop has been alfalfa. Large, perfect heads may be produced by culling out some of the plants in the row to throw more strength into the “mother heads,” as the ones on the main or first stem from the seed are called.

7.—No foreign grain should be allowed to grow with the variety being produced. We seldom obtain seed which is so pure that there will not be found heads of different varieties growing in the drill rows. Cutting out these heads is sometimes called “rogueing;” and it should be done as soon as the heads are large enough to show the character of the grain. It is better to “rogue” the grain early than it is to wait until the crop is ripe, because these foreign plants act as weeds to take strength from the others. When done early, it is necessary to go through several times. Unless the entire plant is pulled out the first time, new heads will be thrown up on side tillers, and these should be removed before they ripen.

8.—Harvesting many of our varieties must be done before they are too ripe, because they are apt to be shelled out by the wind or by handling. Shelling seems more liable to occur if the ripe heads are wet by showers of rain. Alternate wetting and drying, especially in our dry atmosphere, makes the straw and glumes very brittle, so they break with the wind or any sudden jar, releasing the kernels of grain. This may be prevented by harvesting early while the grain is still in the thick dough. We find that the grain is usually more plump and heavy if it has
been cut before fully ripe. The only difficulty is that samples shown in the straw may not have the desired color. The straw of many of our varieties, when grown at high altitudes, shows considerable tendency to remain green until the heads are well advanced in the ripening stage.

9.—Whether or not the grain has been grown especially for exhibition, samples should be carefully selected for this purpose. If it is desired to show the whole length of straw, a few plants may be pulled and the roots carefully washed out. To make neat bundles, only a few plants with the roots on can be used, filling in the center with stems, which are cut off as near the ground as possible. Unless single specimens are retained to show the number of tillers and heads produced from a single seed, these smaller side stems and heads may be removed. Soft twine, such as is used for sewing sacks, or, still better, the raphia used by horticulturists for tying grafts, seems to be the best material for tying bundles, as it holds them without mutilating the straw.

10.—Each bundle should be carefully labeled with the name of variety, when planted, date harvested, locality, name of grower or exhibitor, yield, if determined, and other particulars, if notes are available which would be of interest. In finally preparing samples in the straw, they may be stripped by carefully removing all the leaves, or at least all broken or imperfect ones. Removing the leaves makes the bundles of clean straw very attractive, and pays where time can be taken to do it. Of course, the bundles may be varied in any way to suit the fancy of the grower. Sometimes fine heads are produced on straw which is not worth saving, when they may be cut off above the first joint below the head.

11.—Where samples are to be kept over winter, or for any period of time, as in exhibitions which last several weeks or
months, the heads may be preserved from shattering by dipping them in the following glazing solution:

- Gum Arabic, 1½ pounds.
- White glue, 1½ pounds.
- Water, 5 gallons.
- Acetic acid, 1 teaspoonful.

Dissolve the gum and glue over a slow fire in enough water to take it up, which will be about one gallon. Care must be taken not to let it burn. Add the acetic acid to the rest of the water and mix with the dissolved gum and glue. Dip the heads of grain into the solution while hot and spread out on the floor or shelves to dry. In dipping bearded grains, care must be taken to shake the beards out thoroughly, so they will not become matted or stick together, which spoils their appearance. Grains treated in this solution may be handled without so much danger of shattering and spoiling them.

12.—All grains should be stored in a dry place, where they will not mold or become discolored, and if samples of any crops are kept in which a green color is desirable, as broom corn, or alfalfa, they should be kept away from the light as much as possible. To protect from dust and abrasion when packed or stored, the tops of bundles should be wrapped tightly in muslin, which may be fastened by a few stitches with sack needle and twine.

13.—Little need be said about threshed grains. It is interesting to display small samples of threshed grain in connection with the sample of the same variety shown in the straw. Larger samples of a half bushel or more are always desirable, and if these contain foreign grain, seeds or gravel which are not removed by the fanning mill, it may be necessary to hand pick them. This is expensive and should be unnecessary if the grain is properly raised and selected before it is threshed. At ordinary wages it may cost as much as $12.00 per bushel to hand pick dirty wheat, oats or barley.
Grasses.

BY AVEN NELSON.

14.—The preparation of fine specimens for exhibition purposes requires some labor, the exercise of good judgment in their selection, and attention to details at the proper time. This is especially true if it be specimens of vegetable products, which need some particular treatment, in order that they may resist decay. And it is no less true of grasses, in spite of the fact that they are readily "cured," since it is not "hay," but "specimens," that we wish to secure.

15.—“Specimens” of grasses, whether native or cultivated, must have the following characters if they are to attract attention: (1) They must be ample, otherwise they either escape notice or they are criticised as insignificant. (2) They must be neat in form, and must make a harmonious unit in the general scheme of the exhibit. (3) The form of the specimen must be such as to bring out the very characters which constitute its value. (4) They must retain their natural characters, such as color, form and flexibility, in so far as that is possible.

16.—The following suggestions, based upon some experience and observation, are offered, and it is hoped that they may at least prove suggestive to those who may wish to prepare display specimens:

17.—In making choice of specimens, avoid the discolored and over-ripe plants. If taken as they are approaching maturity, but before they are ripe, the plant is less brittle and the heads less likely to shatter. Having selected the choice speci-
mens of the grass in question, uproot it with a spade or other implement, being careful not to break the stems nor destroy the leaves. Loosen up the soil around the roots with the hands, or by laying the specimen flat on the ground and then beating the sod lightly with a bit of board. When the soil has been loosened, shake gently till the roots are clean, being careful to preserve as many of them as possible. Secure in this way a number of specimens of each kind of grass that you wish to use. Arrange the specimens neatly and uniformly, the root ends even. Bind in small bundles or sheaves rather loosely at first. Wrap bundle in one or more thicknesses of paper (large newspapers will do), and again tie lightly. Dry the bundles in the shade (sheds, barns, etc.). If the weather be damp, or the bundles large, examine every day for a few days. If the bundles are heating or threatening to mold, spread out for a few hours in a good current of air, but not in the sun. Plants dried in the sun, especially if unwrapped, bleach out and become brittle and soon fragmentary. If dried in the shade as directed, they should retain their color and flexibility.

18.—Having thus cured several bundles of each kind, they may be stored till wanted. From the several bundles, reject the poor or injured specimens and arrange the others to the best possible advantage in such sized bundles as may best accord with the form of the exhibit you have in mind. Tie firmly, and then the bundle is ready for the shelves, cases, or display board.

19.—It should be said that each bundle must bear a tag, either with the data in full on it, or merely a number. If the latter, the data should be kept in a book under that number and the numbers arranged serially. The sheaf, when ready for exhibition, must be properly and neatly tagged, the tag bearing at least the following data: (1) The name of the plant (common and scientific, if possible). (2) Native or introduced. (3) Cultivated or spontaneous. (4) Irrigated or unirrigated. (5) State, county and locality. (6) By whom grown. (7) By
Crops for Exhibition. whom collected and exhibited. (8) Date. Other facts, such as yield, value, etc., may be of interest.

20.—In the foregoing it is assumed that the exhibit will take the least expensive form, i. e., that it will be an open one. If the specimens were to be shown singly under glass or mounted on sheets of cardboard, it would then be necessary to reduce the size and quantity, possibly to fold them and dry them under pressure between heavy carpet-felt driers. These specimens would be more valuable from a scientific standpoint, but would be less impressive from the economic point of view. Besides specimens framed and under glass take up much space and are usually too expensive for general exhibition purposes.

21.—Naming the Specimens. It often happens that choice specimens may be secured, the common and scientific names of which are not known to the collector. In such cases the botanist of the Experiment Station will gladly render such assistance as he can give. The large collection of plants in the Rocky Mountain Herbarium is available for purposes of comparison. Forage plants or plants of any other kind, in which any of our citizens may be interested, may be sent in for determination. The specimens may be sent in the fresh state, or, better, if there is any probability of delay in transmission, after they have been cured. This may be done by drying thoroughly and quickly under heavy pressure between thick layers of paper (newspaper, blotter or carpet-felt). Where the size of the plant will permit, the whole of it should be secured, folding it, if necessary, so that it will lie on a sheet 12x16 inches. If the plant is a large one, a sample will answer, but should show typical leaves, and both flowers and fruit, if that is possible. When cured, such specimens may be sent in a flat package, protected by cardboard. The mailing rate is eight cents per pound.
Vegetables.

22.—Vegetables, or other things of a succulent or fleshy character, must ordinarily be shown in the fresh state. Where cold storage is not available, it is sometimes difficult to keep them for any length of time. Such things as beets, carrots, celery, etc., may be kept in prime condition, even over winter, buried in moist soil or sand in cool cellars. Cabbages may be stood on their heads and buried in the garden. Pease, peanuts, peppers and the like may be dried in the shade to preserve their colors. Melons, pumpkins and others may be stored in cool cellars, and will probably keep better if buried in bran, oats, or oat or buckwheat hulls. Asparagus, beans, and tomatoes must be preserved in some kind of pickle, such as the solutions recommended for fruits in 25.

Fruits.

23.—At this time only brief suggestions will be made in regard to growing and preserving fruits, in order to have some which will be worthy a place, either in the fresh or preserved state. Orchardists should spray their trees at the proper time, and it is not the purpose of this article to give instructions for such work. The codling moth is not a serious pest in this State, but where it is known to occur, spraying, to produce perfect fruit, should not be neglected. There are many methods known to the practical fruit grower of producing very fine specimens, such as girdling a twig to produce an unusually large apple or bunch of grapes, or of pruning the tree in order to let sunshine in to paint beautiful colors on the fruit, or of
properly thinning the young fruit in order to produce large, uniform specimens in quantity. As there are no cold storage facilities in this State, it will probably be necessary to show fruits in specimen jars preserved with some of the fluids used for that purpose (See 25). Some of the better keeping kinds can be saved for some time by properly packing them and putting in cool cellars, where but little air is allowed to circulate. Too much ventilation tends to dry out and shrivel the specimens.

24.—One of the things which has been most puzzling to horticulturists and museum curators is how to preserve the natural form and color of fleshy specimens. No method has been found which will permanently preserve fruits, but they may be saved in a fairly satisfactory manner for a year or so.

25.—To preserve fruits in their natural color, form and condition, some solution must be used which will prevent the growth of bacteria of decomposition, and yet will not attack the fruit. The solution must be of such a strength that it will not allow the fruit to absorb or to give up water, which would cause the fruit to swell up and crack open, or shrivel and become wrinkled. This latter requirement is attained when, to use technical language, the osmotic pressure of the solution is the same as that of the fruit juices. This differs for different fruits, and is different for fruits grown in the arid region from that required when the fruits are grown with an abundance of moisture. It must be determined by experiment in each case.

(a) Fruits have been preserved at this Station for six years in a mixture of glycerine and water of the proper strength with the addition of two per cent. of formalin (the commercial forty per cent. solution of formaldehyde).

(b) Cranefield, of the Wisconsin Station (sixteenth annual report), recommends two per cent. formalin, 20 per cent. alcohol and 78 per cent. water, as the best solution for preserving plums.
(c) The California Station (Bulletin 86) recommends a solution of one ounce of salicylic acid dissolved in five gallons of water, to which as much glycerine has been added as corresponds to the density of the juice.

(d) Saunders (Trans. Roy. Soc., Canada, 1894) says kerosene is to be preferred for preserving strawberries; a one or two per cent. solution of boric acid for dark fruits, and a two per cent. solution of zinc chloride for light-colored fruits.

The following methods are recommended by C. F. Millsbaugh, of the Field Columbian Museum, Chicago:

(e) First Method—the best—is to cast the fruits in plaster of paris and paint the resulting models.

(f) Second Method.—Select fruits that are perfect to the core, no codling moth grubs, nor decay in the least. Make a syrup of white sugar, to which add, for each quart, one ounce of salicylic acid and thirty minims of thymol solution. From your stock of syrup draw sufficient to cover each jar content. Add the proper amount of the salicylic acid and thymol to the syrup, and dilute with water until the fruit barely floats. Keep the jars stored in the dark under as even a temperature as possible until ready to exhibit. Fill all jars as full as possible to prevent injury to content when shipping.