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HOME COURSE
IN SCIENTIFIC
AGRICULTURE

FIFTEENTH ARTICLE.
THE PROPAGATION
OF PLANTS.

By L. C. CORBETT, Horticulturist, Bureau of Plant Industry, United States Department of Agriculture.

IN addition to using the natural means of reproduction of plants by seeds, bulbs, etc., man has developed several artificial ways, of which the principal are cuttings, layering, grafting and budding. A cutting is a detached portion of a plant inserted in soil or in water for the purpose of producing a new plant. This method of propagation is considered most important. The most common form of hardwood cuttings consists of a straight portion of a shoot or cane nearly uniform in size throughout and containing two or more buds. At the lower end it is usually cut off just below a bud, because roots develop most readily from the joints. At the top it is usually cut off some distance above the highest bud. A heel cutting consists of the lower portion of a branch, containing two or more buds, cut off in such a manner as to carry with it a small portion of that branch forming the so-called "heel." A mallet cutting is produced by severing the parent branch above and below a shoot, so as to leave a section of it on the base of the cutting. The principal advantage



Photo by Long Island agricultural experiment station.
DWARF BARTLETT PEAR GROWN ON QUINCE STOCK.

in the use of heel and mallet cuttings lies in the greater certainty of developing roots. The principal drawback is that only one cutting can be made from each lateral branch. When it is desired to make the largest number of cuttings from a limited supply of stock, cuttings are made containing but one bud each. Such cuttings are commonly started under glass with bottom heat either in greenhouse or hotbed. Cuttings are usually made with two or more buds. The cuttings are made while the wood is dormant during the fall or early winter. As fast as made they are tied in bundles of twenty-five or fifty (butts all one way) and buried bottom end up in a trench and covered to a depth of two or three inches with sand or mellow soil. Cuttings may also be kept over winter in a cool cellar buried in sand, sawdust or moss.

The following spring cuttings are set about three inches apart in a trench with only the topmost bud or buds above the surface. The soil is then replaced in the trench and thoroughly packed. In planting, the cuttings should be exposed to light and air as little as possible. After being planted the cutting should develop roots and put forth leaves, and by the next fall or spring it should be ready to put out. Herbaceous or soft wood cuttings are exemplified in the "slips" used to increase the numbers of house plants. This method of propagation can be employed in the winter time under glass. Herbaceous cuttings may be made from the leaf or stem.

Leaf cuttings are commonly employed in multiplying plants having thick, fleshy leaves containing a large quantity of plant food either in the body of the leaf or its larger ribs. As a general rule, in preparing slips the leaf area should be reduced to a minimum in order to lessen evaporation. Usually an inch of broken stone or coarse gravel overlaid with one and one-half to three inches of sand will be found ample for all soft wood cuttings.

Short cuttings of the roots may be used in the propagation of many plants, especially those which show a natural tendency to sucker. A layer is a branch so placed in contact with the earth as to induce it to throw out roots and shoots. Layering frequently proves a satisfactory method with woody plants which do not readily take root from cuttings. All the common pomaceous fruits, the stone fruits and the citrus fruits

are now multiplied by grafting or budding. A scion is a portion cut from a plant to be inserted upon another of the same plant, with the intention that it shall grow. Except for herbaceous grafting the wood for scions should be taken while in a dormant or resting condition. The time usually considered best is after the leaves have fallen, but before severe freezing begins. The scions are tied in bunches and buried in moist sand, where they will not freeze and yet will be kept cold enough to prevent growth. Good results often follow cutting scions in the spring just before or at the time the grafting is to be done. If cleft grafting is the style to be employed this practice frequently gives good results but spring cutting of scions for whip grafting is not desirable. The stock is the plant or part of a plant upon which or into which the bud or scion is inserted. For best results in grafting it is essential that the stock be in an active condition. Cleft grafting is particularly adapted to large trees when for any reason it becomes necessary to change the variety. Branches too large to be worked by other methods can be cleft grafted. A branch one or one and one-half inches in diameter is severed with a saw. Care should be taken that the bark be not loosened from any portion of the stub. Split the exposed end with a broad thin chisel or grafting tool. Then with a wedge of the wedge shaped prong at the end of the grafting tool spread the cleft so that the scions may be inserted. The scion should consist of a portion of the previous season's growth and should be long enough to have two or three buds. The lower end of the scion which is to be inserted into the cleft should be cut into the shape of a wedge, having the outer edge thicker than the other. In general it is a good plan to cut the scion so that the lowest bud will come just at the top of this wedge, so that it will be near the top of the stock. To make this contact of the growing portions doubly certain the scion is often set at a slight angle with the stock into which it is inserted. After the scions have been set the operation of cleft grafting is completed by covering all cut surfaces with a layer of grafting wax.

Whip grafting is almost universally used in root grafting. It has the advantage of being well adapted to small plants only one or two years of age, and it can be done indoors during the comparative leisure of winter. The graft is made by cutting the stock off diagonally—one long smooth cut with a sharp knife, leaving about three-fourths of an inch of cut surface. Place the knife about one-third of the distance from the end of the cut surface at right angles to the cut and split the stock in the direction of its long axis. Cut the lower end of the scion in like manner, and when the two parts are forced together the cut surfaces will fit neatly together, and one will nearly cover the other if scion and stock are of the same size. A difference may be disregarded unless it be too great. After the scion and stock have been locked together they should be wrapped with five or six turns of waxed cotton to hold the parts firmly together. It is in root grafting that the whip graft finds its distinctive field. The roots are dug and the scions are cut in the fall and stored. The work of grafting may be done during the winter months. When the operation has been performed the grafts are packed away in moss, sawdust or sand in a cool cellar to remain until spring. In ordinary propagation by means of whip grafts the scion is cut with about three buds, and the stock is nearly as long as the scion. The graft is so planted as to bring the union of stock and scion not very far below the surface of the ground. But where the trees are required to be especially hardy in order to stand severe winters and the roots used are not known to be so hardy as the plants from which the scions have been cut a different plan is adopted. The scions are cut much longer, and the roots may be cut shorter, and the graft is planted so deep as to cause roots to issue from the lower end of the scion. When taken up to be set in the orchard the original root may be removed entirely.

Budding is one of the most economical forms of artificial reproduction, and each year witnesses its more general use. The operation of budding is simple and can be done with great speed by expert budders. The work has usually to be done in July, August or early September. The bud should be taken from wood of the present season's growth. Since the work of budding is done during the season of active growth the bud sticks are prepared so that the petiole or stem of each leaf is left attached to serve as a handle to aid in pushing the bud home when inserting it beneath the bark of the stock. This is what is usually called a shield bud and is cut so that a small portion of the woody tissue of the branch is removed with the bud. The stock for budding should be at least as thick as the ordinary lead pencil. The height at which buds are inserted varies; the nearer the ground the better. When the bud is made a ligature is then tightly drawn about, above and below the bud to hold it in place until a union shall be formed. Bands of raffia about eight or ten inches long make a most convenient tying material. As soon as the buds have united with the stock the ligature should be cut in order to prevent girdling the stock. This done, the operation is complete until the following spring, when all the trees in which the buds have "taken" should have the top cut off just above the bud. The one objection to budding is that it causes an unsightly crook in the body of the tree unless the tree is planted deep in the orchard.

CORRESPONDENCE

Interesting Items from the many flourishing towns in the county by our own correspondents

Ferndale Correspondence on Page 5, Custer, Laurel and Wiser Lake, Delta and Sunshine, and other Localities on Page 6.

CLEARBROOK

R. W. Simonds is holding a series of meetings at the Van Buren church. Miss Esther Swanson was absent from school this week on account of injuries received from a fall while skating. Mrs. A. Campbell took her little daughter to Sumas Sunday to consult a physician. Dr. O. E. Beebe, of Bellingham, was called to see Grandma Elder Saturday evening. Mrs. Elder was taken worse the last of the week, and a trained nurse from Bellingham is caring for her. Fay Nevins, of the Bellingham Normal, visited home folks Saturday and Sunday. Mr. and Mrs. Roy Tudor and little daughter, of Sumas, and Mr. and Mrs. S. A. Weide were guests at the Higginson home Sunday. The Loren children, who have been ill with typhoid fever, are reported as convalescing. Albert Johnson, who has been visiting his parents the past month, returned to his home in Yakima on Thursday. The basket ball team played with Deming at the latter place Saturday evening. The score was 9-11 in favor of Deming. Miss Rhoda Greenough, who has been spending the winter with her parents, left for Victoria Sunday. Messrs. O. C. Van Houten, C. E. Flint, and Miss Weisenberger entertained a large audience at the school hall Friday evening. Dairy and fruit subjects were thoroughly discussed.

EVERSON

Mr. and Mrs. Will Melvanie and son, Wallace, of Bellingham, were Sunday guests at the Geo. Adlom home. The W. C. T. U. held its "Frances Willard" memorial tea on Friday afternoon. About twenty ladies were present. A good program was rendered and refreshments were served. Mrs. J. Bridges entertained a number of girls Saturday evening in honor of the birth anniversary of her daughter, Kathleen. Miss Helen Zeek, of Seattle, arrived Thursday to make her home with her mother, Mrs. Montgomery, and will continue her high school course at the Nooksack school. Mr. and Mrs. Westwood left Friday for Sydney, Australia. Mr. Westwood has been employed at the Nooksack Creamery. J. E. Sligh was a Bellingham passenger Tuesday. Miss Ellen Pengelly, of Vancouver, visited the Cyr home the last of the week. Mrs. Lou Markson and daughter, of Strandell, visited Miss Euphemia Thompson Tuesday. Mr. and Mrs. Markhart have as their guests Mr. and Mrs. Jack Oden and baby, of New Westminster. Mr. and Mrs. J. H. Shoup and baby son visited Mrs. Shoup's parents over Sunday. Miss Edith Hunt, of Nooksack, spent Saturday night at the Bushby home. Norman Thompson is suffering from a fever. Mrs. Mary Collins and daughter, of Lynden, were the guests of Mrs. W. H. Massey, on Route 2, Saturday. Claude Ernberger left Wednesday for Oklahoma where he expects to spend the coming two years.

BOOTH'S CORNERS

Several from this neighborhood attended the Co-operative dinner given at Lynden Wednesday. Mrs. Folsom and Mrs. and Miss Wilkins, of Bellingham, visited at George Rathbone's Saturday and Sunday. Mrs. Ruth Palmer visited Mrs. Maude Palmer Monday. Miss Elsie Bovendam went to Clearbrook Friday for an indefinite stay. William Follis called on friends here Sunday. Archie Palmer was at home over Sunday. Mrs. Elizabeth Rathbone was pleasantly surprised Saturday afternoon at her home by the ladies of the neighborhood. Lunch was served to the following: Mmes. Merritt, Campbell, Love, Livingston, Litton, Ruth Palmer, Swope and children, Maude Palmer and children, Wilson, Watkinson, Curry, Folsom and Wilkins of Bellingham, Ivy Palmer and children, Cox, and Miss Wilkins, of Bellingham; also Mr. Watkinson and Mr. Rathbone and sons. Mr. and Mrs. C. B. Love and family and Mrs. Sarah Campbell visited at John Bovendam's Tuesday evening. Mr. and Mrs. J. H. Swope and family dined at Archie Palmer's on Sunday. Mr. Horsfall, of Bellingham, visited at L. Sather's from Tuesday until Saturday. Mr. and Mrs. S. L. Palmer visited at A. C. Palmer's and also at J. H. Swope's Sunday. Miss Mabel Willey called on Mrs. Ivy Palmer and Mrs. Elizabeth Rathbone Monday afternoon. Mrs. Mary Swope visited Mrs. Maude Palmer Tuesday. Ruth Johnson spent Sunday and Monday with Belle Doan, at Lewis Sather's. Mrs. J. D. Scrimger, Miss Evelyn Scrimger and Elnor Weeks and Mrs. Susie Cox called at the A. C. Palmer home Wednesday.

GLENDALE

Bert Farrington and daughter, Dorothy, made a business trip to

Lynden Saturday. Leo Jes spent a few days last week in Bellingham. Oscar Pearson has been ill. Vera Anglin and Carl and Will Burger spent Sunday afternoon at the Jes home. Mrs. Brundage was in Bellingham on business Friday. A. T. Hanscom is visiting his parents, Mr. and Mrs. F. E. Hanscom. Mrs. Eitzel was visiting at the D. O. McClanshan home last week. Martha Lewis spent Sunday at the Dan McLeod home. Iva Goodrich spent Sunday at the Lowrey home. Mrs. D. O. McClanshan and son Ike, spent a few days recently in Blaine. Mildred Farrington and Miss Brunson were in Lynden one day last week. Mrs. Abbott and daughters were in Lynden Saturday on business.

SUNRISE

Mr. and Mrs. Hathaway and son, Lawrence, were visitors at the Frank Lopus home Sunday. Mr. and Mrs. J. B. McPhail spent Sunday with their daughter, Mrs. J. Kulp. Miss Anna Winroth spent Sunday with Misses Irene and Alice Nelson. Miss Minnie Dykes spent Sunday afternoon with Drade and Edith Kulp. Mr. and Mrs. J. W. Austin were in Lynden Wednesday. Mr. and Mrs. J. B. McPhail visited Mr. and Mrs. W. C. Dykes on Wednesday. Mrs. A. Dunker, of Lynden, visited at the home of her parents, Mr. and Mrs. A. Simons, a few days this week. Mr. and Mrs. J. B. McPhail visited Mr. and Mrs. J. W. Austin on Thursday. Mrs. W. C. Dykes and Mrs. J. H. Phillips were out calling Thursday. Lee Austin was in Lynden on business one day this week. Mrs. E. Prather and children visited relatives the last of the week. Charles Kelso sold some beef cattle to one of the Lynden butchers Friday. W. M. Wells has a fine modern barn almost completed at his place. L. D. Hilton installed a phone in his residence recently. Several from this neighborhood were digging claims at the bay on Saturday. The Misses S. Depew, Martha Lewis and Jessie McLeod were callers at the Kelso home one evening this week.

The Wiser Lake Literary Society will present the 3-act play entitled "Daddy," at Wiser Lake Grand hall on Friday evening, February 27.

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